



REGIONAL GROUNDWATER FLOW COMMISSION

ANNUAL PROGRESS REPORT

(January – December 2018)

1. Sessions at Conferences

The IWFC-2018 was the 6th of the ambitious bi-annual scientific international conferences focused on a joint understanding of water sources, groundwater functioning, water resources, as well as in water engineering approaches, management, and technology. This time the IWFC-2018 was held in Hammamet, Tunisia, 19-21 March 2018. The conference aimed to share updated information and methodologies to stimulate scientific discussion and an environmentally orientated communication among participants. This conference encourages the participation of students, experts, scholars as well as decision-makers in agreeable fields related to water, not only from the MENA region but, at an international level to partake in this endeavour. Research abstracts that were programmed to participate presented studies from Algeria, Benin, Canada, Congo, Côte d'Ivoire, Egypt, France, Germany, Hungary, Italy, Mexico, Morocco, Palestine, Tunisia, Turkey, and United States.

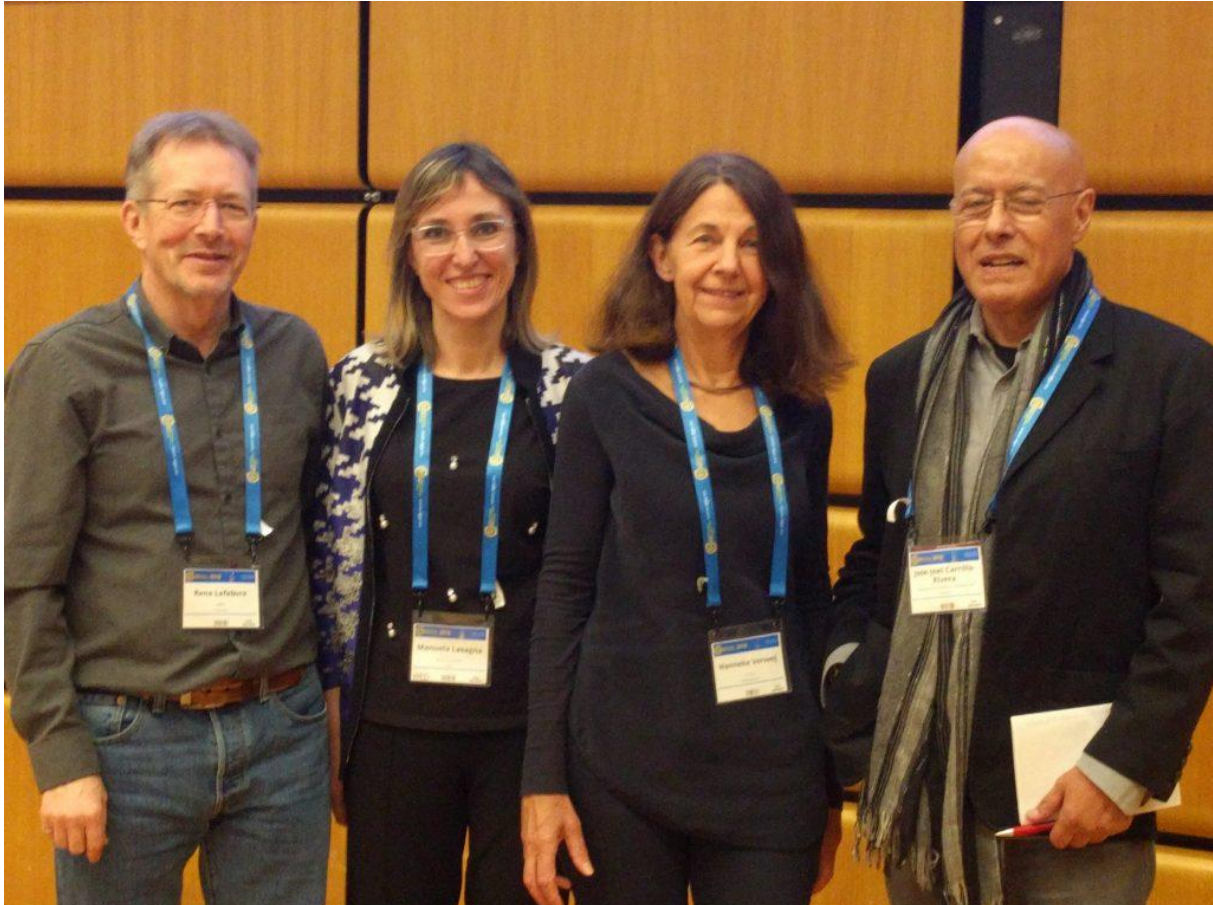
The total number of attendees was 278. The RGFC-IAH Special Session included 10 oral presentations on groundwater flow systems. The meeting had the participation of distinguished groundwater lectures Chair Judit Mádl-Szőnyi, Co-Chair Joel Carrillo-Rivera and Secretary Ádám Tóth, Udo Weyer (Canada), and local participants as Belgacem Agoubi and Faten Telahigue (Higher Institute of Water Sciences and Techniques, Gabes University) and Fayrouz Slama (Higher Engineering School, University of Tunis Al Manar). One of the Conference Chairs and keynote speakers was Joel Carrillo-Rivera.

This event was a very nice occasion for promoting the theory of groundwater flow.



Our Commission sponsored a session entitled “Groundwater flow understanding in water management: Environmental problems and potential interactions with subsurface water ecosystems” at the European Geosciences Union (EGU) General Assembly, 8–13 April 2018, Vienna, Austria. The 3 oral blocks and poster sessions attracted altogether 18 oral presentations and 25 posters. The session was a great success, it included a broad range of topics and techniques such as groundwater management and its protection from qualitative and quantitative degradation, geochemical characterization of groundwater flow systems and knowledge of groundwater flow system from local to regional scale. The presentations attracted great

attention. The presenters came from countries in Europe, Asia, the Americas and Africa to examine and discuss water management and groundwater flow system characterization related issues. The Convenor was Jim LaMoreaux with the help of Co-Convenors: Daniela Ducci, Manuela Lasagna, Xiao-Wei Jiang, René Lefebvre, Luc Aquilina, Judit Mádl-Szőnyi, Christine Rivard, Chrystel Dezayes and Alexis Defresne.



Session Conveners René Lefebvre (RGFC Co-Chair), Manuela Lasagna, presenters and RGFC Co-Chairs Hanneke Verweij and José Joel Carrillo-Rivera

The Commission organized one of the 45th IAH Congress' (Daejeon, Republic of Korea) sessions in Topic 7 entitled Innovation in regional groundwater flow understanding. In addition to 16 oral presentations in the session, around 20 other delegates, including students from more than 10 countries contributed with their oral and poster presentations on the topic of regional groundwater flow elsewhere in the Congress. We were delighted that many of these provided recent results regarding the theoretical progress, research methods and future development of regional groundwater flow.

Furthermore, RGFC held its annual meeting in Daejeon. Chair Judit Mádl-Szőnyi and Co-chairs Joel Carrillo and Xiao-Wei Jiang summarized the achievements of the past year and discussed tasks for the coming year.

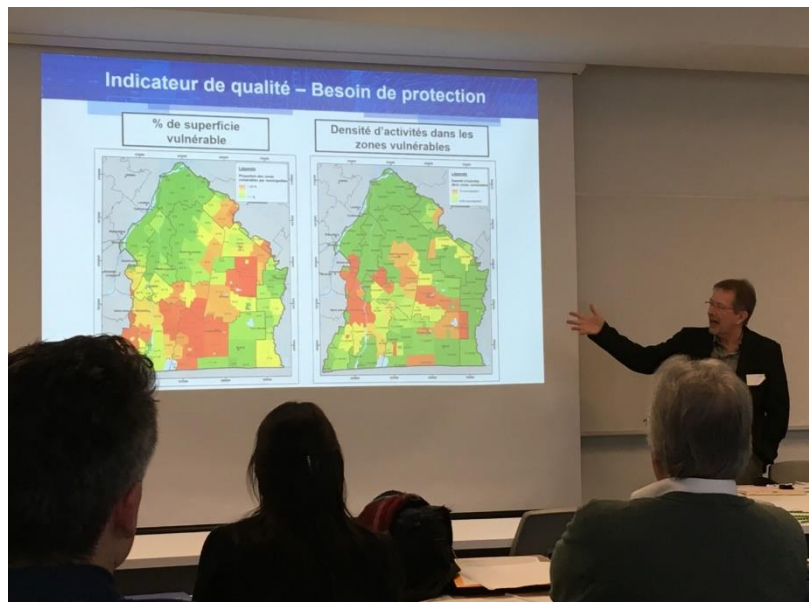


RGFC Annual Meeting. Alfonso Rivera, José Joel Carrillo-Rivera, Ádám Tóth, Judit Mádl-Szőnyi and Xiao-wei Jiang

2. Training workshops, short courses

Joel Carrillo's short course in Daejeon, Republic of Korea, highlighted the importance of regional groundwater flow. The identification and usage of direct and indirect indicators of the flow systems were discussed in the course using a wide system view. Practical applications of the flow systems include efficient groundwater extraction and integrated water management practice.

North American IAH-RGFC co-Chairs René Lefebvre and John Molson presented hydrogeology seminars to employees of the provincial government, regional municipalities and watershed management groups as part of a groundwater knowledge transfer workshop in Drummondville, Quebec, Canada, February 2018. The workshop was organized by members of the Quebec Groundwater Network (RQES: <https://rqes.ca/>). The objective was to inform stakeholders on how to use information collected from the Quebec regional groundwater aquifer characterization program for planning and groundwater protection. Groundwater flow systems and resource protection were important themes of the workshop.



IAH-RGFC co-Chair René Lefebvre presents a seminar during a groundwater knowledge transfer workshop at the University of Quebec (Drummondville), February 2018

3. Dissemination of Knowledge

RGFC launched its LinkedIn page, which is a forum for scientific discussion, in autumn of 2014 and since then the number of members reached 308 (~20 new members during this report period).

Now, the news and activities of RGFC can be followed on another social media platform. We will share conference pictures and updates @rgfc_iah Instagram profile, as well. You can use hashtag #rgfc_iah if you would like to share a photo of regional groundwater related topics or even a memory of your daily hydrogeology practice.

The Commission launched a ResearchGate project entitled *Selection of papers related to Regional Groundwater Flow*. This project was created and is managed by the Regional Groundwater Flow Commission of the International Association of Hydrogeologists (RGFC-IAH) in cooperation with the József & Erzsébet Tóth Endowed Hydrogeology Chair. This project is a selection of international papers related to the research and practical application of regional groundwater flow theory. The project has 41 followers and 368 reads at the end of this reporting period.

4. Future plans

- AGIC2019 is the 2nd International Congress of Atlas Georesources, to be held in Hammamet, Tunisia, 28–30 March 2019. It will bring together researchers, research scholars, experts and policy makers to share their research, experiences and discuss recent advances in applied Geosciences for Groundwater. The conference will cover many aspects related to groundwater.

The special session entitled “Regional Groundwater Flow Systems” anticipates analysing issues connected to groundwater management and related environmental protection defining physical and chemical degradation in the context of groundwater flow system functioning. Contributions related to alternative methods of defining groundwater flow components and their application in establishing, regulating and mitigating negative environmental impacts to and from groundwater are also encouraged to be submitted.

Additional information at <https://lgr-certe.com.tn/>

- We are pleased to invite you to attend the EGU2019 (7–12 April 2019, Vienna, Austria) and our two sessions supported by the Regional Groundwater Flow Commission, entitled *Groundwater flow understanding in water management and environmental problems*, and *Geofluids as natural resources or sources of contamination: Research and Innovation*.

Additional information about the EGU2019: <https://www.egu2019.eu/>

- GAC-MAC-IAH Québec 2019, 12–15 May 2019

Where geosciences converge. Three geological provinces converge toward Québec City: the Grenville Province of the (Precambrian) Canadian Shield, the (Paleozoic) St. Lawrence platform and the Appalachians. Three geoscientific associations (the Geological Association of Canada, the Mineralogical Association of Canada and the Canadian National Chapter of the IAH) have converged their efforts to organise the GAC-MAC-IAH Québec 2019 conference. In May 2019, Canadian and international geoscientists will also converge toward Québec city to be part of this exciting conference.

Additional information at <https://gacmac-quebec2019.ca/>

- IAH–NCGRT Australasian Groundwater Conference, 24–27 November 2019, Brisbane, Australia

Additional information at: <https://www.groundwaterconference.com.au>

5. Publications

Papers and books

Alconada-Magliano MA, Damiano F, Carrillo-Rivera JJ, Fagundo-Castillo JR 2018: Arsenic and fluoride in water in northwestern Buenos Aires: their association with natural landscape elements. *Journal of Geography and Regional Planning*

Ameur F, Hamzaoui-Azaza F, Ben Cheikha L, Ahmed T, Gueddari M 2018: A GIS mapping assessment of the suitability of the Oued Rmel aquifer for irrigation in the Zaghouan district (north-eastern Tunisia). *Environmental Earth Sciences* 77:292

Borsodi AK, Anda D, Makk J, Krett G, Dobosy P, Büki G, Erőss A, Mádl-Szőnyi J 2018: Biofilm forming bacteria and archaea in thermal karst springs of Gellért Hill discharge area (Hungary). *Journal of Basic Microbiology* 58:11, pp. 928–937.

Cardona A, Banning A, Carrillo-Rivera JJ, Aguillón-Robles A, Rűde T, Aceves de Alba J 2018: Natural controls validation for handling elevated fluoride concentrations in extraction activated Tóthian groundwater flow systems: San Luis Potosí, Mexico. *Environmental Earth Sciences* 77:121

Cardona A, Ouyse S, Carrillo-Rivera JJ, Alonso-Torres S, Rivera-Armendáriz CA 2018: Groundwater flow systems definition and the control of changing water quality extracted by boreholes. *Arabian Journal of Geosciences*

Carrillo-Rivera JJ, Huizar-Álvarez R, Hatch G 2018: “Aporte científico del agua subterránea para identificar su funcionamiento, buscando protección y conservación sistémica ambiental” en Cuaderno de Trabajo, Centro de Invetigaciones Sobre América del Norte, UNAM, CDMX

Carrillo-Rivera JJ, Ouyse S 2018: Groundwater Salinity Due to Urban Growth. Chapter In: Meyers R. (eds) Encyclopedia of Sustainability Science and Technology. Springer, New York, NY

Erőss A, Csondor K, Izsák B, Vargha M, Horváth Á, Pándics T 2018: Uranium in groundwater - The importance of hydraulic regime and groundwater flow system's understanding. *Journal of Environmental Radioactivity* 195, pp. 90–96.

Enemark T, Peeters LJM, Mallants D, Batelaan O 2019, Hydrogeological conceptual model building and testing: A review. *Journal of Hydrology* 569, pp. 310–329.

Gouili N, Hamzaoui-Azaza F, Zammouri F, Zaghrarni F, Jarraya Horriche F, Teresa Condeso de Melo MF 2018: Groundwater quality assessment of the Takelsa phreatic aquifer (Northeastern Tunisia) using geochemical and statistical methods: implications for aquifer management and end-users. *Environ Sci Pollut Res Int.* 25:36, pp. 36306–36327.

Ghouili N, Zammouri M, Jarraya-Horriche F, Hamzaoui-Azzaza F, Carrillo-Rivera JJ 2018: Groundwater flow modelling of a multilayer aquifer in semi-arid context. *Arabian Journal of Geosciences*

Hassen I, Hamzaoui-Azaza R, Bouhlila R 2018: Establishing complex compartments-aquifers connectivity via geochemical approaches towards hydrogeochemical conceptual model: Kasserine Aquifer System, Central Tunisia. *Journal of Geochemical Exploration*

Hatch Kuri G, Carrillo-Rivera JJ, Huizar R 2018: La evaluación binacional México-Estados Unidos del Acuífero Transfronterizo Río San Pedro: una lectura crítica” en *Regions & Cohesions*, Luxembourg University

Hatch Kuri G, Schmidt S, Carrillo-Rivera JJ 2018: Elementos de análisis de la propuesta de Ley General de Aguas en México a partir de la visión del agua como derecho humano y sus repercusiones en el quehacer científico, docente y en la investigación. *El Colegio de San Luis, México. Año VII, No 13, enero-julio*, pp 30–61.

Havril T 2018: Numerical simulation of groundwater flow and heat transport over geological time scales at the margin of unconfined and confined carbonate sequences. PhD dissertation, 98 p.

Havril T, Tóth Á, Molson JW, Galsa A, Mádl-Szőnyi J 2018: Impacts of predicted climate change on groundwater flow systems: Can wetlands disappear due to recharge reduction? *Journal of Hydrology* 563, pp. 1169–1180.

Havril T, Mádl-Szőnyi J 2018: Magyarország láthatatlan felszín alatti vizeinek nyomában. In Sandra S, Oláh Cs (eds): *Víz a gyógyászatban*. Budapest, Hungary, pp. 46–56. [in Hungarian]

Iván V, Mádl-Szőnyi J 2018: Vulnerability assessment and its validation: The Gömör-Torna Karst, Hungary and Slovakia. *Geological Society Special Publications* 466:1, pp. 261–273.

Janos D, Molson J, Lefebvre R 2018: Regional groundwater flow dynamics and residence times in Chaudière-Appalaches, Québec, Canada: Insights from numerical simulations. *Canadian Water Resources Journal*, Special Issue: Quebec PACES Projects

Jiang XW, Wan L, Wang XS, Wang D, Wang H, Wang JZ, Zhang H, Zhang ZY, Zhao KY 2018: A multi-method study on regional groundwater circulation in the Ordos Plateau, NW China. *Hydrogeology Journal* 26:5, pp. 1657–1668.

Karima S, Carrillo-Rivera JJ 2018: Improvement in quantity and quality of groundwater of an alluvial aquifer by the application of artificial recharge: Example of Ain Chabro-Tebessa (East Algeria). *Arabian Journal of Geosciences*

Kovács-Bodor P, Anda D, Jurecska L, Óvári M, Horváth Á, Makk J, Post V, Müller I, Mádl-Szőnyi J 2018: Integration of In Situ Experiments and Numerical Simulations to Reveal the Physicochemical Circumstances of Organic and Inorganic Precipitation at a Thermal Spring. *Aquatic Geochemistry* 24:3, pp. 231–255.

Mádl-Szőnyi J, Erőss A, Havril T, Poros Zs, Győri O, Tóth Á, Csoma A, Ronchi P, Mindszenty A 2018: Fluids, flow systems and their mineralogical imprints in the Buda Thermal Karst. *Földtani Közlöny* 148:1, pp. 75–96. [in Hungarian]

Ouyse S, Wehncke EV, Carrillo-Rivera JJ 2018: Geochemical and isotopic analyses of groundwater flow systems and their dependent-ecosystem in the Central part of Northern Baja California (Protected area of the Valle de Los Círios). *International Journal of Hydrology* 2:3, pp 1–11.

Tóth Á 2018: A Balaton-felvidék felszínalatti vizeinek hidraulikai kapcsolata a Bakonnyal és a Balatonnal. PhD dissertation, 172 p. [Groundwater flow systems and hydraulic connections in the Bakony–Balaton Highland–Lake Balaton region]

Zhang H, Jiang XW, Wan L, Ke S, Liu SA, Han GL, Guo HM, Dong AG 2018: Fractionation of Mg isotopes by clay formation and calcite precipitation in groundwater with long residence times in a sandstone aquifer, Ordos Basin, China. *Geochimica et Cosmochimica Acta* 237, pp. 261–274.

Zhang ZY, Jiang XW, Wang XS, Wan L, Wang JZ 2018: A numerical study on the occurrence of flowing wells in discharge areas due to the upward hydraulic gradient induced wellbore flow. *Hydrological Processes* 32, pp. 1682–1694.

Zhao KY, Jiang XW, Wang XS, Wan L, Wang JZ, Wang H, Li HL 2018: An analytical study on nested flow systems in a Tóthian basin with a periodically changing water table. *Journal of Hydrology* 556, pp. 813–823.

Conference Presentations

Benoit N, Marcotte D, Molson J, Pasquier P, Mulligan R 2018: Characterization of full 3D hydraulic conductivity tensors of hydrostratigraphic units applied to the Innisfil Creek watershed, Ontario. GSC-OGS Open House, Guelph, ON, March 2018

Carrillo-Rivera JJ 2018 : The importance of the conceptual groundwater model. International Water Forum Conference 2018, Hammamet, Tunisia, 19–21 March 2018

Carrillo-Rivera JJ, Cardona A, Ouyse S 2018: Groundwater flow systems definition and the control of changing water quality extracted by boreholes. International Water Forum Conference 2018, Hammamet, Tunisia, 19–21 March 2018

Mádl-Szőnyi J, Tóth Á, Havril T 2018: System approach for the understanding of groundwater – lake interaction and for prognosis of climatic effects. International Water Forum Conference 2018, Hammamet, Tunisia, 19–21 March 2018

Tóth Á, Mádl-Szőnyi J 2018: Central Europe's largest lake in the context of groundwater flow systems. International Water Forum Conference 2018, Hammamet, Tunisia, 19–21 March 2018

Carrillo-Rivera JJ, Cardona A, Ouyse S 2018: Groundwater flow systems definition and the control of changing water quality extracted by boreholes. Higher Institute of Water Sciences & Techniques of Gabés, Tunisia, 2 April 2018

Carrillo-Rivera JJ, Huizar-Alvarez R, Ouyse S, Cardona A 2018: The understanding of Tothian groundwater flow systems functioning for proposing adequate groundwater management in Mexico City. EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Csondor K, Tóth Á, Müller I, Erőss A 2018: Hydrogeological characterization of the lukewarm spring lake in Kistapolca (South Hungary). EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Erőss A, Csondor K 2018: Radionuclides in groundwater flow systems – case studies from drinking water supply systems in Hungary. EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Kovács-Bodor P, Győri O, Kovács Z, Post V, Mádl-Szőnyi J 2018: Experimental evolution of thermal water-related precipitates. EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Laurencelle M, Lefebvre R, Parent M, Molson J 2018: Paleo-hydrogeological evolution of a fractured-rock aquifer since the Champlain Sea incursion in the St. Lawrence Valley (Quebec, Canada). EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Iván V, Mádl-Szőnyi J 2018: Possibilities of recession curve analysis in karst water management, Gömör-Torna Karst, Hungary and Slovakia. EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Mádl-Szőnyi J, Zentai-Czauner B, Simon Sz, Tóth Á 2018: Workflow for the involvement of regional fluid pressure regime evaluation in geothermal resource characterization. EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Szijártó M, Galsa A, Tóth Á, Mádl-Szőnyi J 2018: Numerical investigation of the combined effect of basin-scale forced and free thermal convection. EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Verweij H 2018: 3D spatial variation in salinity of shallow to deep groundwater in the Dutch on- and offshore. EGU General Assembly 2018, Vienna, Austria, 8–13 April 2018

Erőss A, Csondor K 2018: Radionuclides in groundwater flow system - case studies from drinking water supply systems in Hungary. VI. Terrestrial Radioisotopes in Environment: International Conference on Environmental Protection, Veszprém, Hungary, 22–25 May 2018

Kovács-Bodor P, Horváth Á, Bihari Á, Mádl-Szőnyi J 2018: In situ experimental study of natural radioactivity of microbiological and chemical precipitates in a flowing thermal water. VI. Terrestrial Radioisotopes in Environment: International Conference on Environmental Protection, Veszprém, Hungary, 22–25 May 2018

Kovács-Bodor P, Erőss A, Mádl-Szőnyi J, Freiler-Nagy Á, Horváth Á, Bihari Á 2018: Natural radioactivity of evolving biogeochemical precipitate in thermal spring caves of Gellért Hill area, Budapest. VI. Terrestrial Radioisotopes in Environment: International Conference on Environmental Protection, Veszprém, Hungary, 22–25 May 2018

Ouyse S, Wehncke EV, Carrillo-Rivera JJ 2018: Regional Paradigm for Studying Ecosystems Conservation in Baja California Peninsula (Central Desert Region). International Symposium Ecology, Kastamonu, Turkey. 18–22 June 2018

Hamzaoui-Azaza F, Ameer M, Chaouch R, Gueddari M 2018: Suitability of groundwater for domestic and agricultural use: Bouficha aquifer (north-eastern Tunisia). First Palestine International Water Forum, Integrated Water Resource Management: Best Practices and Technology Transfer, Ramallah, Palestine, 25–28 June 2018

Ameer M, Hamzaoui-Azaza F, Gueddari M 2018: Geochemistry of Fluoride and Major Ion in the Groundwater Samples of Sminja aquifer (North Eastern Tunisia), Through Hydrogeochemical, GIS and Statistical Analyses. First Palestine International Water Forum, Integrated Water Resource Management: Best Practices and Technology Transfer, Ramallah, Palestine, 25–28 June 2018

Cochand M, Molson J, Barth JAC, van Geldern R, Lemieux J-M, Fortier R, Therrien R 2018: Monitoring the hydrogeochemical evolution of groundwater in a small watershed in a discontinuous permafrost zone, Québec, Canada. EUCOP5, Chamonix, France, 23 June – 1 July 2018

Dagenais S, Molson J, Lemieux J-M, Fortier R, Therrien R 2018: Numerical simulations of groundwater flow and permafrost thaw in a discontinuous permafrost zone, Umiujaq, Québec, Canada. EUCOP5, Chamonix, France, 23 June – 1 July 2018

Csondor K, Godányi J, Tóth Á, Müller I, Dezső J, Erőss A 2018: Hydrogeological characterization of the lukewarm springs in Kistapolca (South Hungary). Eurokarst2018, Besancon, France, 2–4 July 2018

Csondor K, Tóth Á, Dezső J, Leél-Őssy Sz, Erőss A 2018: Comprehensive hydrogeological study of a hypogenic cave in South Hungary. Eurokarst2018, Besancon, France, 2–4 July 2018

Kovács-Bodor P, Rába I, Győri O, Mindszenty A, Mádl-Szőnyi J 2018: Application of in situ experimental results in the problem of evolving precipitates in thermal water systems. Eurokarst2018, Besancon, France, 2–4 July 2018

Kovács-Bodor P, Győri O, Kovács Z, Bihari Á, Post V, Mádl-Szőnyi J 2018: In situ experimental study of chemical and biogeochemical precipitates of a flowing thermal water. Eurokarst2018, Besancon, France, 2–4 July 2018

Tóth Á, Mádl-Szőnyi J 2018: Hydraulic assessment of a large lacustrine ecosystem at the interface of unconfined and confined carbonates. Eurokarst2018, Besancon, France, 2–4 July 2018

Lemieux J-M, Fortier R, Murray R, Dagenais S, Delottier H, Therrien R, Pryet A, Parhizkar M 2018: Hydrogeology of the Tasiapik Valley (Umiujaq, Nunavik). Annual meeting Centre d'études nordiques, Quebec City, August 2018

Cardona A, Banning A, Carrillo-Rivera JJ, Aguillón-Robles A, Rűde TR, Aceves de Alba J 2018: High fluoride concentration control in extraction boreholes through the understanding of the prevailing Tóthian Groundwater Flow Systems response: a 20 years comparative results assessment in San Luis Potosí, Mexico. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Havril T, Molson J, Mádl-Szőnyi J 2018: Sustainable use of groundwater as a source of heat. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Jiang XW, Wan L, Wang XS 2018: Regional groundwater circulation in the Ordos Plateau, NW China. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Jiang XW, Zhang ZY, Wang XS, Wan L, Wang JZ 2018: The mixing of groundwater in flowing wells due to upward gradient induced wellbore flow and its implications for groundwater sampling. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Kovács-Bodor P, Csondor K, Erőss A, Szieberth D, Bihari Á, Braun M, Horváth Á, Leél-Őssy Sz, Mádl-Szőnyi J 2018: Peculiar discharge features of regional groundwater flow systems – physical and chemical properties of biofilms in thermal springs. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Kovács-Bodor P, Győri O, Kovács Z, Bihari Á, Óvári M, Post V, Mádl-Szőnyi J 2018: In situ experimental study of the chemistry of discharging thermal water and related precipitates. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Kovács-Bodor P, Csondor K, Czuppon Gy, Horváth Á, Szieberth D, Erőss A 2018: Application and comparison of stable isotopes and natural radionuclides for the characterization of ongoing mixing processes in an underwater cave (Budapest, Hungary). 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Mádl-Szőnyi J, Szijártó M, Tóth Á, Iván V, Galsa A, Havril T, Molson JW 2018: Patterns and origin of heat anomalies in a carbonate system - joint interpretation of measured data and numerical simulations. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Ouyse S, Wehncke EV, Carrillo-Rivera JJ 2018: Investigating Groundwater Flow Systems Governing the Baja California Central Desert. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Tóth Á, Kovács-Bodor P, Mádl-Szőnyi J 2018: Springs as natural tools for groundwater flow understanding. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Tóth Á, Mádl-Szőnyi J 2018: On the trail of missing component of water budget – case study of the Lake Balaton, Hungary. 45th IAH Congress, Daejeon, Republic of Korea, 9–14 September 2018

Budapest, 11 February 2019

Ádám Tóth, Secretary of RGFC

Judit Mádl-Szőnyi, Chair of RGFC