

NEWS

& information

IAH - THE WORLD-WIDE GROUNDWATER ORGANISATION

Furthering the understanding, wise use and protection of groundwater resources throughout the world

DECEMBER 2018

Also in this issue:

International engagement
President's message
Member news and initiatives
Meeting reports
Media focus
Chapter updates
Events listing

and the regular IAH
announcements and news



A warm welcome was enjoyed at our 45th congress in Daejeon. In spite of busy schedules and, for some, long travelling distances, more than 700 people gathered from 63 countries. During the week a wealth of information was shared, and participants were able to network while exploring Korean culture.

Congress reports page 22 and throughout



CORPORATE OPPORTUNITIES

IAH is offering a new, more attractive and cost-effective corporate scheme to enable their staff to participate in global groundwater affairs and to publicise their services. *Page 7*



COMMISSIONS & NETWORKS

Read updates from IAH's commissions and networks, as they continue to contribute to the science of groundwater and undertake outreach, education and training. *Page 28*



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Food, Life, Protection



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HydraProbe

- One of the Most Widely Deployed Soil Sensors
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- Patented Technology



GroPoint Profile

- Measure Soil Moisture over Multiple Depths
- Single Probe
- No Excavation Required
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Water saving & protection



Watershed management



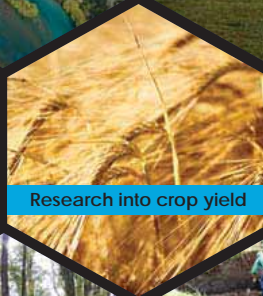
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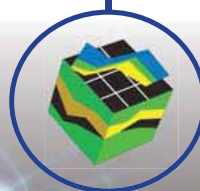
Visual MODFLOW Flex
Groundwater Modeling & Simulations



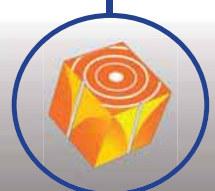
AquaChem
Water Quality Analysis



Hydro GeoAnalyst
Environmental Data Management & Visualization



AquiferTest
Pumping & Slug Test Analysis





GROUNDWATER MANAGEMENT AND GOVERNANCE
COPING WITH WATER SCARCITY

22nd - 27th SEPTEMBER 2019

MALAGA - SPAIN



CEHYUMA
CENTER OF HYDROGEOLOGY
OF UNIVERSITY OF MALAGA



UNIVERSITY
OF MALAGA

 United Nations
Educational, Scientific and
Cultural Organization

 International
Hydrological
Programme

The Congress is a contribution
to the 8th phase of the UNESCO
International Hydrological
Programme (IHP-VIII, 2014-2021)



We approach the end of another very busy year – hopefully it has been a productive one for you all.



Our 45th Congress in Daejeon now seems a while ago but we're sure that it will remain in the memories of all who were fortunate enough to attend. We are grateful to our Korean hosts who gave us such a warm welcome and enabled us to enjoy some excellent technical sessions and papers. For those of you who could not be there, there is a photo gallery and we are working towards uploading some of the keynote lectures to our Vimeo channel. And looking ahead, we send our best wishes to the organising committees responsible for the next congresses - Malaga in 2019, Sao Paulo in 2020 and Brussels in 2021...

The IAH Executive team and Council have been busy in 2018, including reviewing achievements under the Forward Look 10-year plan and identifying remaining priorities before the plan concludes in 2020. Future planning will of course be the responsibility of the next Council but all IAH members will want to consider what it is that our Association should be doing for everyone and for groundwater. We recognise that subscription fees is a factor for potential members in parts of the world; Council has instructed the Secretariat to look at various aspects of membership fees. Alongside this there is ongoing work to improve the benefits and service that members receive, such as improvements to the website, with information on hydrogeology courses now added and updates for education to be made available shortly. The Secretariat has also been busy in helping to set up more websites for commissions and networks and for national chapters. Could we help your group perhaps?

We will also be putting our revised scheme for corporate supporters into practice. Our aim has been to update and streamline the existing scheme, and to provide the basis for further development in the coming years. We hope that this will attract more supporters, which will mean that we can place less reliance on individual members' fees.

All that remains to say is – we hope you have a happy and peaceful end to 2018, and best wishes for 2019!

IAN DAVEY AND THE SECRETARIAT TEAM



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ADVERTISING AND COPY INFORMATION

IAH News and Information is published 3 times a year. It is distributed as an insert in Hydrogeology Journal and is also published via IAH's website and email alerts. It reaches all members and supporters of the International Association of Hydrogeologists – around 8000 people – and can also be freely downloaded by individuals worldwide for personal/not for profit use. We are happy to consider possible news articles from our members and others in groundwater-related professions.

We also accept commercial advertisements.

Advertising rates are €300 per full-page advert and €200 per half page. These rates apply for one issue. If you take an advert in two successive issues then the third is offered free of charge.

Corporate sponsors and corporate members of IAH are entitled to 50% off the above rates.

Copy dates are 1 March, 1 June and 1 October.

Email knicholson@iah.org for further details.



MEDIA FOCUS

A selection of groundwater features from around the world

IRAN: TEHRAN FACES CRISIS AS IRAN'S WATER SUPPLY RUNS LOW

Tehran could soon be the epicenter of the Iran's water crisis. The city has grown rapidly in recent decades, its population now near 8.5 million. As rural areas exhaust their water resources, Tehran is expected to grow even more.

<https://www.circleofblue.org/2018/middle-east/tehran-faces-crisis-as-irans-water-supply-runs-low/>

PAKISTAN: AS GROUNDWATER LEVELS PLUNGE, LAHORE BEGINS TURNING OFF TAPS

Fearing shortages, Pakistan's second-largest city turns to water rationing – and raises prices. "Fresh underground water is a precious resource, which we can't allow anyone to misuse."

<http://news.trust.org/item/20181010133945-yv1op/>

INDIA: 21 CITIES PROJECTED TO RUN OUT OF GROUNDWATER BY 2020

At least 21 cities in India are facing a potentially catastrophic water crisis within the next two years as groundwater is depleted, and the resulting shortages could affect more than 100 million people, a recent report says.

<https://weather.com/science/environment/news/2018-10-16-india-cities-will-run-out-groundwater-2020>

DENMARK: "USE GROUNDWATER TO TOP UP COPENHAGEN'S STARVED LAKES IN SUMMER"

This summer, Copenhagen's lakes and ponds experienced massive water shortages, losing an unprecedented 90,000 litres of water every hour through evaporation during the drought. All of this could be avoided, contends the environmental foundation Miljøpunkt Nørrebro, as there is a huge water supply close at hand that could be used to top up the lakes and ponds and cool down the rest of the city: the rapidly rising groundwater.

<http://cphpost.dk/news/use-groundwater-to-top-up-copenhagens-starved-lakes-in-summer-urges-environmental-foundation.html>

INDIA: GROUNDWATER RUNS SHORT; WATER BATTLES GROW IN CHENNAI

When the thousands of water lorry drivers who shore up parched Chennai's overtaxed water delivery system went on strike for three days last month, to protest a ruling restricting their access to groundwater, a water crisis ensued.

<https://www.deccanherald.com/national/groundwater-runs-short-water-702028.html>

NETHERLANDS: CITIZENS OF ENSCHEDE MONITOR GROUNDWATER WITH INTERNET OF THINGS

A new approach to groundwater issues is about to start in Enschede: its residents will themselves be monitoring the groundwater level. This will be done within the framework of the Citizen Science pilot called Monitoring Groundwater, coordinated by DesignLab University of Twente. This month, the first monitoring wells were inserted into the ground in eleven households at the end of October. Soon, 'smart' open source sensors will be added too.

<https://www.utwente.nl/en/news/!/2018/11/313384/citizens-of-enschede-monitor-groundwater-with-internet-of-things>

Corporate Opportunities

Gain benefits while supporting IAH and its global membership in protecting groundwater for people and the environment

IAH is offering a new, more attractive and cost-effective corporate scheme that can help our corporate clients and their staff participate in global groundwater affairs and publicise their services. It expands the earlier benefits we offered and now provides opportunities to work with us more actively.

We understand that corporate relationships should cater to different needs. Some companies and organisations may be seeking membership for their staff and perhaps a few additional benefits, whereas others may be more interested in publicising services to IAH members and those who receive information from us, including through our News & Information magazine. In recognition of this, IAH's scheme now offers various pathways:

- **Corporate Member**
- **Corporate Supporter**
- **Gold Sponsor**, with the opportunity to **upgrade this to Corporate Partner**

We will also be offering some flexibility in our scheme. For those who choose to be Corporate Supporters, companies can select particular items, without having to take out Corporate Membership if they don't need this. If they do decide to take all the Corporate Supporter options, they can receive Corporate Membership as a bonus and become a Gold Sponsor. Alternatively, it will be possible to choose Corporate Membership, perhaps adding further options at a later time.

The cost for our corporate membership and sponsorship packages in 2019 will remain the same as in 2018. This is a gesture of thanks to our existing corporate members and sponsors. Hopefully more will also be encouraged to join us. We propose to include our existing corporate clients in the revised and improved scheme, and will be contacting them to discuss this and also to offer them the chance to review the options they currently have. We will also be contacting our National Chapters to discuss arrangements for their locally managed corporate clients. Do contact us if you have any comments; in any case we will make sure we resolve any questions or concerns that you may have.

We hope that this 'a la carte' approach will appeal to current and future corporate clients and we look forward to working with you. Look out for updates in your inboxes, on our website and on our social media networks.

SECRETARIAT

 [email info@iah.org](mailto:info@iah.org)



DECEMBER 2018



Dear IAH members, dear colleagues,

We are finishing 2018 and as we enter 2019, it is time to think about past and future initiatives and to look for the next set of challenges.

The world is changing quickly, and pressures on the environment continue to increase. The global population is rising and the need

for water is greater than ever, with risks to both quantity and quality. Developing technologies, such as fracking for oil and gas, bring further challenges for managing our groundwater resources. The counterpart to this is that technology helps, for example in reducing water use in agriculture, minimising shortages in urban environments, industry, etc. In this balance, we must recognise that in many parts of the world 'water-health' is suffering and something more must be done at all levels to avoid worse problems in the future. We know that many of the issues will not be solved by water specialists alone. We all need the support of international institutions for water, health, industry and agriculture, the backing of governments, adequate legislation, stakeholder and society engagement and responsible behaviour of individuals, for effective global water governance.

Water security is today an issue that must not be forgotten. Wars, poverty and a lack of education about water leads to high levels of threats, like contamination and water-related diseases, with associated enormous costs in health care, water treatment, loss of quality of life and even loss of lives.

In some regions we have news again of the issue of water and gender. Countries where young girls walk for kilometres to get water for the family or school, with 20 litres of water balanced on their heads. Or the extreme case of exchange of sex for water reported by international institutions in some parts of the world. These are issues of concern that society must fight to eradicate.

As hydrogeologists, we have a strong role in trying to avert these situations. We can help to find solutions, at local, national, regional and international level, using our knowledge and skills to study, explain, influence and bring new forms of groundwater use, protection, treatment, reuse and recharge. Hydrogeologists working with the fundamental science are essential for helping to understand and measure groundwater flow, to understand the complicated hydrochemical aspects of the water cycle, to study the way abstraction affects groundwater level and volumes, and the evolution of contaminants - but also to define solutions for the problems, including prevention or minimisation of the effects of human actions. Of equal importance are the hydrogeologists who apply this knowledge, working with practical issues like water supply and all other groundwater management.

IAH represents all the groundwater specialists for the good of mankind. In 2019 we need to continue to pursue our main goals, to help humankind to have access to water in decent conditions and to know, protect and manage properly our water resources.

I wish all our members an enjoyable and happy 2019. And a special word for all of you who dedicate your time and effort to the Association - members of the Council, coordinators of commissions or networks,

coordinators of national chapters, members of the editorial board of the journal and books and our secretariat and accountants - I wish you all the resolve to take forward our important tasks and to continue to defend our profession as a noble commitment for the people we serve.

Finally, I wish success for our Association – and to all our members and all hydrogeologists in the world, all the best for 2019.

ANTÓNIO CHAMBEL

IAH AWARDS ANNOUNCED IN DAEJEON

The 2018 IAH awards were announced at the General Assembly (Annual General Meeting) of the Association, held on Tuesday 11 September during the Korea congress, and presented by Antonio Chambel, IAH President.

IAH's Applied Hydrogeology Award is presented to "a groundwater professional who has made an outstanding contribution to the application of hydrogeology, preferably in developing countries or in support of international development".

Nominations are invited from IAH members in March of each year; in 2018 IAH received 6 outstanding nominations and we are grateful to the panel of Jane Dottridge, Callist Tindimugaya and Willi Struckmeier for their careful considerations. The Award for 2018 was presented to Peter Ravenscroft, for his substantial and practical efforts concerning the arsenic pollution of groundwater.

The Presidents' Award is determined by the current and past presidents. In 2018 the award was given to Dr Bridget Scanlon, who has been an excellent ambassador for IAH and for groundwater overall, and is a worthy recipient. Amidst her busy working life, Bridget is currently serving on IAH's Commission for Groundwater and Energy. Bridget was unable to attend Korea, but subsequently received her award from Jack Sharp (2012 Presidential Awardee) in Austin, Texas.



The IAH Distinguished Associate Award is presented to a person who is not a groundwater professional but has made an outstanding contribution to the understanding, development, management and protection of groundwater resources internationally. The Award is made by the IAH Executive Committee following consultation. In 2018 the Award was presented to Dr Tushaar Shah, economist and public policy specialist, Senior Fellow of the Colombo-based International Water Management Institute and a former director of the Institute of Rural Management at Anand in India.

Last but not least, the title of Honorary Member is from time to time awarded to those who have given exceptional services to IAH over a long period. Following a recommendation by Council, the General Assembly voted for Dr Peter Dillon, founding Chairman of the IAH Commission on Management of Aquifer Recharge and organiser of six triennial international symposia on managed aquifer recharge (ISMARs).



SECRETARIAT

 <https://iah.org/about/awards>

Ask a Member...

A feature for IAH members to share thoughts, experiences and suggestions...

Daniela Ducci (Italy) is this issue's contributor. As well as being professor at the Department of Civil, Architectural and Environmental Engineering (DICEA) of the "Federico II" University of Naples, she is one of IAH's many volunteer "champions", devoting time to the Italian National Chapter's committee, which includes organising courses and other events.



Tell us a little about yourself....

I had chosen to focus on hydrogeology by the end of my studies. Initially studying Geology at the University of Naples (Italy) I then went on in 1982 to obtain my master degree discussing a thesis in Landslide susceptibility and Hydrogeology. Afterwards, I applied for a grant from the Spanish government to study hydrogeology at UPC (Universitat Politècnica de Catalunya). I was a student of the XVII Curso de Hidrología Subterránea of the International Center in Groundwater Hydrology (CIHS), finishing with a study on aquifers nitrate contamination. I cannot forget the stunning classes of hydrogeochemistry given by prof. Custodio! I saw him last year in Granada and it was very emotional... *[ed: Professor Custodio is an IAH Honorary Member, thanks to his renowned career and support to so many, as well as his role as IAH Past President]*

In 1985, I came back to UPC for my postgraduate studies about modelling (Advisors: J. Carrera and E. Custodio), taking advantage of Italian Government issued grants.

In 1986, I started working full time at the Engineering Faculty of the University of Naples and I begin my scientific activity, expressly devoted to Applied Geology and Hydrogeology. I was involved in several research projects and in teaching activities on Engineering Geology, Environment and Hydrogeology, with special focus on problems related to the assessment of aquifers vulnerability and risk to contamination. Successively, as Assistant Professor I developed my research activity on Hydrogeology, with special focus on problems related to GIS application to hydrogeological studies. After a period as

associate Professor, in 2011, I became Full Professor at the Department of Civil, Architectural and Environmental Engineering (DICEA) of the "Federico II" University of Naples. This is my present position and I carry out teaching activity and research and analysis in the fields of Research on Engineering Geology, Environment and Hydrogeology, with special focus on problems related to the protection, management and planning of groundwater resources, also in the framework of the European legislation on groundwater.

Tell us about your IAH experiences...

I joined IAH in 1983, at the end of my Course on Groundwater Hydrology at CIHS, and initially I was in the Spanish Chapter. After moving, I changed to the Italian Chapter. For many years I under-exploited the advantages that IAH membership can bring. I read carefully the Hydrogeology Journal and participated in Italian meetings regularly, but without what you might say was a personal involvement. This changed in 2011, with some Italian colleagues, when we decided to give a new impulse to the Italian Hydrogeology. In 2012, I was elected in the Italian National Chapter Committee and I was appointed as Secretary. In 2017, I was re-elected and appointed as Chair of the Italian Chapter.

The Chapter has devoted significant efforts in increasing the number of Italian IAH members, reaching almost 200 members in 2018, this figure having increased from 73 in 2011.

Since 2012, in Niagara Falls, I have attended, alongside the majority of the Italian Committee, all the IAH congresses over



“Hydrogeological research is very exciting, but we all have to keep in mind that a drop of drinking water for a child in disadvantaged countries with scarcity of water is more valuable than 100 papers published in prestigious journals...”

the world and other IAH meetings in Europe. This year 16 people from Italy attended Korea, and last year 35 people attended Croatia, all presenting very interesting work. I am very proud of this!

Biennially we organize a National Italian Meeting on Hydrogeology, named FLOWPATH; the last was in 2017 in Cagliari (Sardinia) and the next will be in 2019 in Milan, June 12-14 (*see end of article for link*). Generally, the participants are about 100-120, and not only from Italy. During this meeting we present the Zuppi award for the best PhD thesis in hydrogeology (dedicated to the memory of Professor Gian Maria Zuppi). The fees are very low for students and young researchers - this is because IAH Italy is especially keen to involve younger and early career members. For this reason, we also organize courses about different hydrogeological topics (models, wells construction, aquifers recharge, etc.)

My belief is that IAH is a family that works to enhance its members' knowledge and development overall, enabling them to share experiences and novel science - and I try to be a voice from the Italian people to IAH overall. And for me, IAH Italy is my “close” family, where I have to take care of everyone, but especially young people.

What have been the biggest turning points over your career?

In 1990, I attended a Course on Geographic Information Systems (GIS) taken by the professors of the International Institute for Aerospace Survey and Earth Sciences (ITC - NL). There, I really saw the great potential of the use of GIS in hydrogeology, not only for mapping, but also for the protection and management of groundwater resources, with special consideration of aquifer vulnerability and risk assessment. I think that the use of maps for aquifer vulnerability and risk to groundwater contamination is a basic tool for the protection and management of groundwater resources, especially at regional scale, in densely populated and intensely cultivated areas. Studies in this field have been aimed at the development of methodologies able to assess the vulnerability and risk of aquifers to contamination. In particular, I developed,

with some colleagues, innovative procedures based on geo-statistical tools and, in more recent time, on hydrostratigraphy of aquifers, drawn up by 3d modelling techniques, applied on real cases. Other studies have focused on the estimation of the pollution risk of porous aquifers to nitrate and to the longstanding problem of the definition of the intrinsic vulnerability in groundwater-protection assessment using the GIS.

I participated in many researches in this field supported by my University, the Education Ministry and the Italian National Research Council (CNR - Consiglio Nazionale delle ricerche).

Any other research areas in which you are involved?

At present, my scientific activity covers a wide variety of hydrogeology topics and focuses mainly on studies about evaluation of groundwater-resources and impact of climate change and hydrogeochemical characterization and geochemical background levels in groundwater.

In relation to the first topic, the effects of climate change variations on groundwater resources has been observed in Southern Italy. In my region, water quantities, calculated in a GIS environment, show a mean decrease of 30% of average recharge, within the climate scenario at the end of the last century. The most severely affected zones are the carbonate aquifers, with the springs discharges significantly reduced. Recently, a study, using a wide set of groundwater data, concerning piezometric and spring flow yield time series, shows the relevance of the overlapped effect of water demand and climate change, which is summarized by the widespread dramatic lowering of groundwater availability.

Finally, I tested in southern Italy with colleagues from ISPRA (Italian Institute for Environmental Protection and Research) a new approach to evaluate groundwater-resources at nationwide scale and their variability throughout the time. It is proposed that the approach, also based on big data available online, will be developed into an innovative

[continued over...]

MEMBER MATTERS

[...continued from previous]

web site, aimed at being of help to hydrogeologists and environmental technicians.

In relation to the second topic, the research activities concentrated on hydrogeochemistry deals with aquifers in densely populated, agricultural, and industrialized areas, extremely sensitive to contamination. The study method starts from the conceptual models of these study areas, based on the analysis of the spatial distribution of the chemical species, highlighting the dependence on the lithology of the aquifers and on the anthropogenic influence. To better discriminate between contaminated aquifers and aquifers with baseline water quality, in some cases, I estimated, in the framework of the European WFD/GWD, the Natural Background Levels (NBL) of selected species using statistical approaches. In particular, I proposed, with Portuguese and Italian colleagues, a novel method, based on the Indicator kriging analysis to identify, through probability maps of the potential contaminants, areas potentially polluted within groundwater bodies, facilitating the management of groundwater quality status.

What are your concerns now or for the future, relating to groundwater/hydrogeology?

During my studies, I have observed groundwater contamination in relationship to land use (e.g. nitrate contamination), in terms of agricultural and/or urban and peri-urban development, especially in coastal areas where development can be very dynamic. It demonstrates the strong interconnection between human activities and groundwater. Local communities have to improve their role, understanding the status of their groundwater resources and protecting them, and applying agricultural practices more appropriate for the protection of their environments... I have trust in the new hydrogeological approach, named "socio-hydrogeology", which promotes society's participation and cooperation in groundwater conservation and contamination reduction.

Your future plans? Challenges?

I see my life ahead spending more with my family and close to nature. But also... when I retire from my University, also

going to rural communities that still do not have safe access to adequate and reliable supplies of safe water. There, I will use my hydrogeological knowledge for community water supplies designing and constructing wells, and monitoring groundwater quality and quantity. Perhaps within the framework of IAH's Burdon Groundwater Network for International Development.

Any other comments?

Hydrogeological research is very exciting, but we all have to keep in mind that a drop of drinking water for a child in disadvantaged countries with scarcity of water is more valuable than 100 papers published in prestigious journals...

Last - but not least...

In Italian, HYDROGEOLOGY is a female word!

DANIELA DUCCI

 <http://www.iahitaly.it/>



REMINDER: CHECK YOUR RECORDS

Are you receiving your regular IAH messages and alerts with HJ link and latest news digests and initiatives?

Ensuring that our members receive their IAH entitlements such as the Hydrogeology Journal is important to us. Do you work for a large government/commercial/educational organisation? Many such employers have firewalls in place. You may have to provide an alternative email address to receive your member mailings, or speak to your IT department. IAH emails are always sent from an @iah.org address. Please check your details and IAH settings regularly - we'd hate you to miss out.

SECRETARIAT

 <http://iah.org/members/edit-details>

Report from IAH's Annual General Meeting

IAH's Annual General Meeting (AGM) took place in the Grand Ballroom of the Daejeon Convention Centre 11th September, attended by 86 IAH members and 14 non-members. Holding the annual general meeting is a formal requirement of the IAH's rules and a legal obligation. At least 50 members must be present.

In line with this, a summary was presented of the 2017 accounts for consideration by members, who were also asked for their agreement to reappoint Locke Williams Associates as our accountants for 2018-2019. In presenting, Teodora Szocs, Vice President for Finance and Membership, noted the effects of currency exchange variation, which in 2017 turned a healthy surplus into a small deficit.

IAH Council at their meeting had recommended that a proposal for a small increase to the membership fee be put to the AGM. The increase was agreed without objection. A further proposal by Council to award Peter Dillon with Honorary Membership was unanimously accepted. President Antonio Chambel also announced that Bridget Scanlon would receive the Presidents' Award, Tushaar Shah the Distinguished Associate Award and Peter Ravenscroft the Applied Hydrogeologist's Award (see separate article on Awards, page 9).

Bruce Misstear, Secretary General, described the progress that had been made with the Forward Look plan since its implementation in 2011. Membership numbers had increased to more than 4000, overall membership benefits had been improved and Hydrogeology Journal had gone from strength to strength. He also noted with sadness the passing of our colleagues, Paul Younger, Mario Hernandez and Balt Verhagen.

Dave Kreamer, Vice President for Science and Programme, reported on the activities of the Commissions and Networks, which he proclaimed were 'truly impressive!'. He announced that there was a proposal for a new commission on socio-hydrogeology and that further information would be available in due course.

Bartolomé Andreo, President of the Spanish National Chapter, gave a presentation on the next IAH Congress, which will take place in Malaga from 22 to 27 September 2019. He encouraged all those present, and their colleagues, to attend and assured them of a warm welcome in Spain in 2019.

This was followed by Olivier Lagneau, President of the Belgian National Chapter, who on behalf of his colleagues, accepted the challenge to host the 2021 IAH Congress in Brussels – and presented Antonio Chambel and Teodora Szocs with 'Team Belgium' T-shirts!

As with other formal IAH meetings, minutes from the AGM will be made available on the "Members' Area" of our website.

SECRETARIAT



<https://iah.org/members/iah-meetings>

MEMBER MATTERS

[...continued from previous]



New Members

A warm welcome to the following new members, who joined our Association in the period 14 June - 14 October 2018:

ALGERIA

Mr Abdelhadi DRIBAT

AUSTRALIA

Mr Anthony DURLAO
Mr Warren VINCENT-LAMBERT
Mr Douglass BECK
Abdinasir ALI
Tanya ALI
Shovon BARUA
Nishal BHIKHA
Quan BUI
Pascal CASTELLAZZI
Pankti DALAL
Jack EARNshaw
Jamie GRIMSHAW
James HOPKINSON
Dua KLAAS
Rohan LAST
Karen MACKENZIE
Andrew MESTHOS
Sam MINAHAN
Peter REEVE
Alice TYSON
Charl VAN DER MERWE
Matthew VAUGHAN
Thomas WALTERS
Joshua YU

BELGIUM

DE WATERGROEP (c)
Simon SIX
Bo VAN LIMBERGEN
Ms Sien BENOIT
Mr Ywan DE JONGHE

BENIN

Mr Iboukoun Christian ALLE
Ms Daado Olabissi Valerie KOTCHONI
Mr Fabrice Messan Amen LAWSON

CANADA

Mr Mike WILSON
Mrs Nicole LAYCOCK
Joanna OLESIU
Dr Young-Jin PARK
Connor DACQUAY
Mr Alberto MARENGO
Ms Angela MASON
Mrs Stephanie HUNTER
Mrs Ana ZAKNIC-CATOVIC
Mr Vinicius Ferreira BOICO
Godofredo CARPIO
Mr Steven COLEBROOK

CHILE

Mr Ignacio BERNARD
AMPHOS 21 CHILE (c)
Javier GONZALEZ
Jose Luis MENDOZA
WSP CONSULTING CHILE (c)
Marcia Escobar ZAMBRANO
Luciano ACHURRA
Pilar ENGUITA
Alberto LOBO

CHINA, PEOPLE'S REPUBLIC

Dr Xing LIANG
Dr Dongmei HAN
Dr Zaiyong ZHANG

COLOMBIA

Dr Saul Ernesto GUEVARA
Mrs Carlos Andres Moreno MEDINA

DENMARK

Mr John LINDLE

FRANCE

Mr Marcello SERRAO
Ningxin CHEN

Fabien MONTVIGNIER

Jean Bernard SALINERES
Laetitia SEHAD

GERMANY

Mr Marcel HOROVITZ
Simone SEIBERT
Jose David Henao CASAS
Dr Marc WALTHER

HUNGARY

Ms Éva GALICZ

INDIA

Dr Ratikanta NAYAK
Mr Habil ATTARWALA
Ms Nandini Vasanth RAMAN

IRELAND

Mr James DUNN
Dr Salem GHARBIA
Mr Brian O'SHAUGHNESSY

ITALY

Prof. Mario PARISE

JORDAN

Dr Ghaida ABDALLAT

KOREA, REPUBLIC OF

Dr Hyun A LEE
Dr Etienne BRESCIANI

MALAYSIA

Mr Ahmad Fauzi Adam BIN HASHIM

MEXICO

Mr Mario Alberto HERNÁNDEZ

MONGOLIA



Mr Sod-Erdene BAZARDORJ
Mr Sebastien HOCQUET

NEPAL
Mr Pushpa Raj DAHAL

NETHERLANDS
Dr Ane WIERSMA
Ms Fatima MONJI

NEW ZEALAND
Mr Stephen DOUGLASS
Chad SELBERT
Mrs Remalia SHARPLIN

NIGERIA
Ajibola OYEBAMIJI
Mrs Chinyere AMADI

NORWAY
Mr Christian BRYN

OCCUPIED PALESTINIAN TERRITORY
ABU HANTASH

RUSSIA
Mrs Oksana SEMENOVA

SOUTH AFRICA
Mr Johannes VAN DER WALT

SPAIN
Adrián PÉREZ BARBÓN

SUDAN
Mr Hussam Eldin ELZAIN

SWEDEN
Mr Jonatan STROMGREN

SWITZERLAND
Yves HOURIET
Olivier WATTS

TUNISIA
Mohamed Ali TBESSI
Mr Housseem SLIM

UGANDA
Ivan BIRUNGI
Mr Michael KAZINDA

UNITED KINGDOM
Mr Patrick THOMSON
Miss Hannah RITCHIE
Mr Andrew MCKENZIE
Mr Joel BLACKBURN
Mr Shaun MACLEOD
Mr David MACDONALD
Miss Holly CLARK
Mr Samuel PEARSON
Mrs Jennifer RUTHERFORD

Mr Alex EDWARD
Mr Fraser MCCALL

UNITED STATES OF AMERICA
Erin WHITE
Mr Alexander WOOD
Mauricio FLORES
Cecia BICKNELL
Mr Wyatt TATGE
Mr Graham THOMAS
Dr Joel GEIER
Ms Kalyn TEW
Dr Edwin ROMANOWICZ
Mr Robin DAVIS
Dr William HUTCHISON
Mr Todd UMSTOT

ZAMBIA
Mr Chingembu Dunstan SAWOMBA

NB: Those marked (c) are new IAH corporate members.

70: The total number of countries represented by new members registering between December 2017-October 2018.

129: The total number of countries represented by IAH members as at the end of 2018. We'd like to see this increase...

In the 2018 membership year, individuals from the following countries joined: Albania; Algeria; Argentina; Australia; Austria; Bahrain; Belgium; Benin; Bolivia; Botswana; Brazil; Canada; Chile; China; Peoples Republic of; Colombia; Congo; Democratic Republic of; Denmark; Egypt; Ethiopia; France; Germany; Ghana; Hungary; India; Indonesia; Iran; Iraq; Ireland; Italy; Japan; Jordan; Korea, Republic of; Lithuania; Malawi; Malaysia; Mexico; Mongolia; Morocco; Nepal; Netherlands; New Zealand; Niger; Nigeria; Norway; Occupied Palestinian Territories; Oman; Papua New Guinea; Paraguay; Peru; Poland; Qatar; Romania; Russia; Senegal; Serbia; Slovakia; Slovenia; South Africa; Spain; Sudan; Sweden; Switzerland; Thailand; Timor-Leste; Tunisia; Turkey; Uganda; United Kingdom; United States of America; Zambia. [Welcome!](#)

EDUCATION AND PERSONAL DEVELOPMENT



Reminder: Event, Degree Course and Short Course Listings

As we look ahead to 2019, we'd like to remind you that IAH has three listing areas on its website for hydrogeology/groundwater related events, degree courses, and for short courses (including webinars).

- The events listing is intended to provide information about conferences, meetings and seminars taking place around the world - this can range from just a few hours up to a week in duration.
<https://iah.org/events> ; submit to: <https://iah.org/submit-an-event>
- Our degree course listing is intended to provide details of Primary, Masters and Postgraduate degree taught courses in Hydrogeology, Groundwater Hydrology and formal CPD training courses in closely related disciplines.
<https://iah.org/knowledge/degree-courses> ; submit to: <https://iah.org/knowledge/submit-a-degree-course>
- The training course listing is intended to provide details of short courses and webinars - this might be single dates or over a number of dates over a short period.
<https://iah.org/knowledge/training> ; submit to: <https://iah.org/knowledge/submit-a-course>

The events and courses do not necessarily have to be taught or presented in English - organisers just need to advise the primary language(s) that will be used.

While all our listings should not be taken as IAH endorsement, we are most keen that they feature a good range of learning and networking opportunities from all around the world - this is obviously in the interests of everyone! If you are involved in organising an event and/or courses, please do use the opportunity our listings provide.

SECRETARIAT

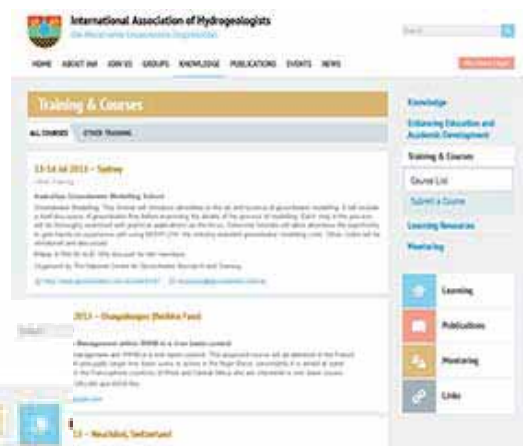
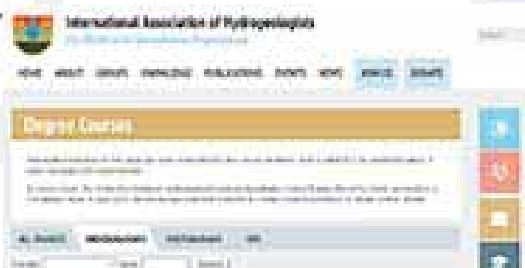


Events: <https://iah.org/events> ; <https://iah.org/submit-an-event>

Degree courses: <https://iah.org/knowledge/degree-courses> ; <https://iah.org/knowledge/submit-a-degree-course>

Training courses: <https://iah.org/knowledge/training> ; <https://iah.org/knowledge/submit-a-course>

Questions/comments? Email info@iah.org





Latest news on IAH Mentoring Scheme

We have almost finished processing applications from this year's round of registrations, with just a few outstanding queries and actions to address. We'd like to thank all those who submitted forms, and for everyone's patience while we have taken time to consider suitable approaches for each individual. The process has also helped inform us about members' interests and general needs from IAH and beyond.

As we are always seeking additional mentors we have kept registrations open for interested individuals. If you have time to spare to help support mentees, we know it would be appreciated.

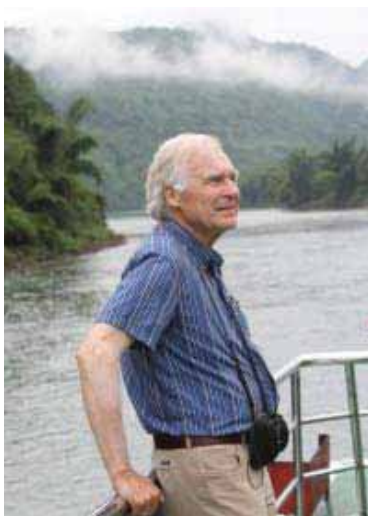
As part of IAH's "Forward Look" process, we will be undertaking a review of the scheme to date. Questionnaires will be sent to earlier participants of the scheme to obtain their feedback and suggestions. We will also be getting in touch with a number of national chapters for their possible input and views. Look out for further news in 2019.

SECRETARIAT

 <http://iah.org/knowledge/mentoring> (general information)

<https://www.surveymonkey.co.uk/r/IAHmentor18> (mentor registrations)

In Memorium



We are sad to report that Ben Engelen, a prominent representative of IAH's Regional Groundwater Flow Commission (RGFC), passed away on 10 June 2018. He is the author of two very well-known books: *Developments in the analysis of groundwater flow system* and *Hydrological systems analysis: Methods and Applications*. In 2013 Ben presented a lecture about energy systems, and groundwater flow systems being a part of energy systems, during RGFC's Xi'an international symposium. Apart from hydrogeology, Ben was interested in a large range of fields: the systematic approach, number theory, atomic physics and soil erosion.

PROF. RENQUAN ZHANG, IAH RGFC.

MEMBER MATTERS

Renewals time...



IAH is ever grateful for its members' support, which helps in our aim to be the leading world-wide society for the science and practice of hydrogeology - informing you, and others, about groundwater knowledge and concerns...

Please renew promptly when you receive your notification to do so - this will ensure you continue to receive membership benefits and will help IAH in its efforts for 2019 and beyond. As agreed at this year's AGM fee rates have been raised only slightly for next year; IAH remains excellent value for money. We are also continuing to work hard to improve member benefits.

Existing members will shortly be receiving renewal notices either centrally from Sharon Warden, or locally via their National Chapter. If you would like to join IAH as a new member you can do so here: <https://iah.org/join-us>.

SECRETARIAT



<https://iah.org/members/your-membership>

Prize draw: win a copy of "Field Hydrogeology" by Rick Brassington

Thanks to WILEY Blackwell publishing, we have three copies of Brassington's "Field Hydrogeology" to give away to IAH members in a prize draw.

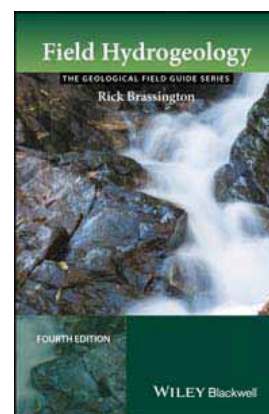
The fourth edition of this textbook has been fully revised in order to present the most up-to-date and comprehensive guide to completing a hydrogeological study. Presented with full colour photos and diagrams throughout, Field Hydrogeology retains its practical pocket size for easy use in the field. This new edition includes all the recent developments in the environmental regulations, with particular focus on the use of innovative technology. New topics include geothermal energy, soakaways, marrying manual water level readings with logger records, prediction of long-term drawdown and lateral extent of impacts, and flow measurement in locations with small head gradients.

With case studies and text boxes to aid comprehension, and a particular emphasis on practical application, this is a valuable tool for students taking Hydrogeology and/or field course modules in Geology, Earth Sciences, Hydrogeology and Engineering courses.

To enter to win one of three copies, complete your details including membership number here: <https://www.surveymonkey.co.uk/r/FieldHprize>

Terms and conditions:

Prize draw closes 12.00 GMT on Friday 1 February 2019. Entries are open to current IAH members only. One entry per individual (additional entries will be discarded). Three copies of the book are on offer for this draw - one book per winning individual. Winners will be picked by random draw and will be contacted by email soon after the closing date. The three winners will be also be announced in the May edition of "News and Information".



SECRETARIAT



<https://www.surveymonkey.co.uk/r/FieldHprize>



INTERNATIONAL ENGAGEMENT

IAH has a mix of ad hoc and planned engagement with other groups and 'sister organisations'. These help in our aim to 'further the understanding, wise use and protection of groundwater resources throughout the world'. They provide a variety of networking and knowledge-sharing opportunities, and help to improve the profile of groundwater and the professional community. In turn, as the IAH makes its voice heard clearly, we may also see an increase in the number of members worldwide.

Our 'Forward Look' reinforces these aims and includes as priorities, influencing global policy and enhancing alliances with external agencies. Key issues that concern the IAH and the international groundwater community, include protection of drinking water resources, agriculture and irrigation, the wider environment and ecosystems.

Council members have highlighted groundwater issues at significant meetings this year, including the World Water Forum in Brasilia, UNESCO events in New York and Perugia, World Water Week in Stockholm, UN Water in Vienna, and INBO in Rome. In addition, they have contributed to several consultations and initiatives during 2018, including reports for the various Sustainable Development Indicators, KINDRA (Knowledge inventory for hydrogeological research) and, in the UK, on 'environmental principles and governance' in preparation for Brexit.

National Chapters, Commissions and Networks maintain links with various organisations. For example, the Urban Groundwater Network has connections with IWA, IAHS, GRIPP, UNESCO, RWSN, UPGRO African research programme, and research programmes within South and South East Asia. In many cases, national chapters are closely connected with other national organisations e.g. ABAS (Associação Brasileira de Águas Subterrâneas).

Some of the organisations we have direct links with include:

Africa Groundwater Network (AGW-Net); EC Water Framework Directive Common Implementation Strategy Working Group (CIS WG GW); Global Water Partnership (GWP); Groundwater Solutions Initiative for Policy and Practice (GRIPP); International Network of Basin Organisations (INBO); International Association for the Promotion of Geoethics (IAPG); International Groundwater Resources Assessment Centre (IGRAC); International Union of Geological Sciences (IUGS); National Ground Water Association (NGWA); UN Environment GEMS (Global Environment Monitoring System); UN Water and its sub-groups UNESCO IHP (International Hydrological Programme); WHYMAP; World Water Council (WWC)

Our direct connections with various organisations in turn provide links with many others.

If you would like to know more about our links with other organisations, contact us at info@iah.org. Tell us too if you are involved in meetings and other activities with organisations on behalf of the IAH. It's quite clear that there is a lot of engagement that is taking place worldwide between IAH and other organisations. It would be good to bring this to the attention of all our News & Information magazine readers and will make our voice for groundwater even louder.

SECRETARIAT



[email info@iah.org](mailto:info@iah.org)

INTERNATIONAL LIAISON ACTIVITIES: THE SUSTAINABLE DEVELOPMENT GOALS

One of the objectives contained in our Forward Look Action Plan is to inform and influence global policy (<https://iah.org/news/iahs-forward-look-action-plan-now>). Clearly this is a very broad objective indeed, and we must therefore focus our activities (and limited financial resources) on trying to influence specific policies concerned with international water development.

The key policy framework that is underpinning water resource planning between now and 2030 is the Sustainable Development Goals, especially Goal 6 that relates to water and sanitation. One response to this by IAH has been the preparation in 2017 of a Strategic Overview paper that flags some of the key issues concerned with SDG Goal 6 and groundwater (this and the other Strategic Overview papers are available at https://iah.org/knowledge/strategic_overview_series).

A second activity has been to participate in various activities by UN Water, and its partner organisations, relating to the SDGs. As Secretary General, I am collaborating in a GEMS/Water project (managed by its Capacity Development Centre based at University College Cork, Ireland) that is developing a methodology for assessing SDG indicator 6.3.2 – the proportion of bodies of water with good ambient water quality. As readers with a hydrogeological background will understand, there are major challenges involved in trying to develop targets and criteria for determining that groundwater bodies are of “good ambient quality”, especially since the methodology will have to be applied globally, taking account of wide variations in data availability. I attended a workshop in Dublin in October 2018 and, together with IAH colleague Ralf Klingbeil from Germany who was also at the workshop, we were able to highlight many of the issues and complexities involved in monitoring and evaluating groundwater systems.



The GEMS/Water Capacity Development Centre workshop held in Dublin on 2nd and 3rd October 2018, and attended by Bruce Misstear and Ralf Klingbeil of IAH

In August 2018, I attended the UN Water partners meeting in Stockholm (held just before the main Stockholm World Water Week events). The two-day meeting mainly involved various updates from UN agencies on past or future meetings and reports. Importantly for IAH, attendance at this meeting led to an invitation from UN Environment for IAH to participate in a new World Water Quality Assessment (WWQA). This project will run in parallel to - and feed into - projects concerned with SDG targets and indicators, such as the GEMS/Water project mentioned above. The analytical brief for the WWQA project focuses on surface water (<http://www.wwqa-documentation.info/analytical-brief.html>), but the involvement of IAH should help in promoting a greater groundwater component.

Another activity by international agencies which is of relevance to IAH is the annual World Water Development Report (WWDR), coordinated by the World Water Assessment Programme (WWAP) Secretariat of UNESCO (this year's report is on the topic of Nature-Based Solutions for Water). Our Vice President for Western Europe, Marco Petitta, participated in a WWAP-led workshop in Perugia, Italy, in September 2018 during which the 2020 WWDR was scoped out. The theme of that report will be Water and Climate Change, and it is important that groundwater aspects are properly represented.

Of course, IAH is not alone in engaging with international agencies to increase the awareness about groundwater. For example, we collaborate on certain activities with IGRAC (International Groundwater Resources Assessment Centre), and we are a core member of GRIPP (Groundwater Solutions Initiative for Policy and Practice), which organised a special session on groundwater-based natural infrastructure during World Water Week in Stockholm in August (in line with the Nature-Based Solutions for Water theme of this year's WWDR, as mentioned above).

These are just some examples of our recent activities aimed at increasing the profile of groundwater in international policies and reports.

BRUCE MISSTEAR

IAH SECRETARY GENERAL



WORLD WATER DAY 2019

World Water Day 2019 will have the theme of 'Leaving No One Behind' and has particular emphasis on human rights and refugees. Access to water and sanitation are recognized by the United Nations as basic human rights. This reflects the fundamental nature of these elements in every person's life. Lack of access to safe, sufficient and affordable water, sanitation and hygiene facilities has a devastating effect on the health, dignity and prosperity of billions of people. There can also be significant consequences for the realization of other human rights.

Water for personal and domestic use must be safe - free from micro-organisms, chemical substances and radiological hazards that could be a threat to health. Drinking-water safety is usually defined by national or local standards for drinking-water quality.

Groundwater of course is an important and generally safe source of drinking water – and as our Strategic Overview Series paper on 'Human Health and Groundwater' says, '...the high quality of most groundwaters, consequent upon the self-purification capacity of subsurface strata, has long been a key factor in human health and wellbeing.'

It's true that groundwater is frequently of good quality, but it can become polluted or could be naturally of poor quality. It certainly needs to be protected and managed, to ensure that it can continue to be used or developed further as a safe source of water, one which is often close to the point of use.

Access to good groundwater is vital in ensuring that no-one is left behind. If you are planning activities that include groundwater in support of World Water Day on 22 March 2019 let us know about them, by emailing info@iah.org.

SECRETARIAT

Studies in Africa and Asia show that the poorest 20% of the population spend between 3 to 11% of their household income on water. This calculation does not include the cost of the time women spend on collecting water and managing water and sanitation facilities. (UNDP, 2006).

MEETING REPORTS

IAH 45th Congress, Korea

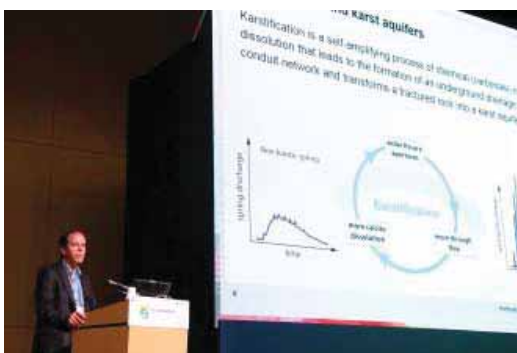
The Korean National Chapter of the International Association of Hydrogeologists, with their partners KIGAM (Korean Institute of Geoscience and Mineral Resources) and KoSSGE (Korean Society of Soil and Groundwater Environment), welcomed us to the Convention Centre in Korea's 'high technology city' of Daejeon, for the 45th Annual Congress on 'Groundwater and Life: Science & Technology into Action', which took place from 9th to 14th September.

We began with the traditional and relaxed ice-breaker party, with an introduction for many to the excellent Korean cuisine, in the evening sunshine on the terrace overlooking the Gapcheon River. In spite of busy schedules, more than 700 had travelled, in many cases long distances, to take up daytime residency at this state-of-the-art venue in Daejeon's science park area.

Keynote lectures included consideration of demographic changes in Asia and their impacts on groundwater. How these potential impacts might be managed sustainably in Korea and China were the subjects of other keynote presentations. The topic of sustainable management of groundwater resources took in economic value and social contribution, while another keynote lecture concerned groundwater and ecosystems. Technological matters were also discussed, including a review of electrical techniques for understanding our hidden resource and a further presentation on the relationship between groundwater, fluid injection and seismicity. It is our intention to host a number of the keynote lectures on a Vimeo channel: <https://vimeo.com/channels/1415869>. IAH members will have the benefit of a short preview period before general release. As we write this article, the first video has already been uploaded - Kang-Kun Lee, PhD, presenting "Exploring better and new utilizations of groundwater in Korea". Look out for further announcements on our website, in your inboxes and on our social media.

IAH Commissions and Networks were well-represented in both separately submitted papers and also special sessions. These included 'Innovation in regional groundwater flow understanding' (IAH-RGF), 'Socio-hydrogeology for ground water development in low-income countries' (IAH-BGID), with papers, including a keynote, on karst hydrogeology. The China University of Geosciences hosted a special session on 'Groundwater sustainability in China', which showcased papers published in the special issue of *Hydrogeology Journal* published in August 2018.

Commissions and Networks held their annual meetings and were able to hold informal discussions in between the congress sessions. Peter Dillon declared that, 'This was an amazing conference for MAR with 25 oral papers presented on this topic, 17 within the MAR theme and 8 within related themes'. There



In numbers: 700 participants from 63 countries; 10 keynote lectures, 398 presentations, 176 posters

was also a productive meeting of the MAR Commission, with the formation of a new working group on 'MAR suitability mapping' and three working groups reporting publication outputs: Global Inventory, Economics of MAR, and 60-year history of MAR. As usual, meetings and participation in C&Ns continued to be open to all, not just IAH members, allowing a wide range of views to be represented. It also displayed the range of IAH activities and the benefits of being members so that hopefully more will be encouraged to join.



The midweek field excursions featured Korea's long and rich history and its technological progress, alongside hydrogeological matters. Examination of geothermal systems, underground research facilities, bank filtration systems and karst caves was combined with visits to ancient burial mounds, historic temples and traditional villages, several of these being UNESCO World Heritage sites. The trip to Maisan geologic park and wine cave was a combination that, unsurprisingly, got the vote of many delegates.

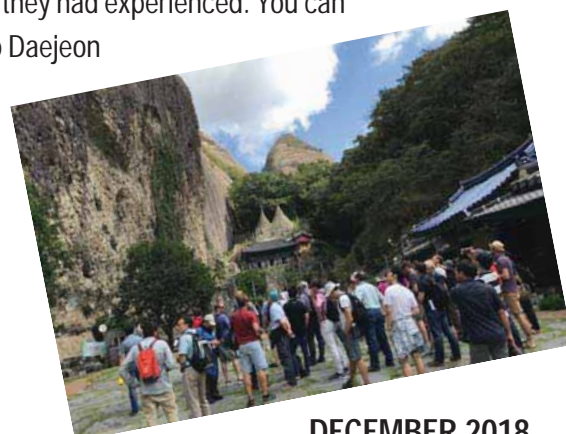
The IAH stand in the exhibition hall was a popular destination for delegates to seek information on our activities and in many cases to find out how to join, with many enquiries from those based in Korea and China. For some it was also a location to meet with colleagues away from the intensity of the congress proceedings (though it may also have been because the adjacent stand had free beer on offer...)

Feedback was generally very favourable, with high ratings for the variety of the presentations as well as the venue's facilities, the technical support to speakers and participants, and the catering. Each day delegates were treated to examples of Korean culture, with traditional music and drumming, Taekwondo and images of traditional dress. And as for the Gala Dinner I doubt many present could believe that chopping cabbage in the kitchen, as demonstrated by the Nanta Theatre Group, could be so energetic and entertaining.... (for those who couldn't be there, take a look at this <https://www.youtube.com/watch?v=3QG4YsLV2CA>). There were various lucky draw prizes provided by sponsors, including a dipper that probably by now has found its way to groundwater in Guinea-Bissau.



The photo finale, presented on screen at the Gala Dinner, with so many snapshots of presenters and participants as they dashed from one session to the next reminded everybody of the great time they had experienced. You can find the photos at <https://www.iah2018.org/0803>. No doubt these will help Daejeon 2018 live long in everyone's memory.

Of course, none of this would have been possible without the hard work, the years of preparations and the attention to detail of all members of the organising committee and the partner organisations. We thank you!



IAN DAVEY



Photos: <https://www.iah2018.org/0803>

Keynote videos: <https://vimeo.com/channels/1415869>

DECEMBER 2018

MEETING REPORTS

SADC Groundwater Conference, South Africa

In September regional and international water experts convened at the inaugural SADC-GMI Groundwater Conference in Johannesburg, which was organised in collaboration with UNESCO, IGRAC, the Government of South Africa, IWMI, GWP-SA and GRIPP. The primary objective of the conference was to provide an annual platform for all groundwater stakeholders to advance knowledge sharing on sustainable management of groundwater at national and transboundary levels across SADC Member States. The conference was attended by top groundwater experts, policy makers, government officials, young professionals and students who all agreed that groundwater is the solution to future-proof and navigate the region from the impact of the climate change.

The theme for the conference was “Adapting to Climate Change in the SADC Region through Water Security – A Focus on Groundwater”. One of the key challenges in groundwater management is the lack of consolidated, up-to-date information about the resource in the SADC region, so the conference provided an opportunity to share knowledge and expertise amongst its participants. It was noted that groundwater is critical to national and regional socio-economic development, trade and integration. Keynote speakers included Lindiwe Lusenga (Deputy Director General at Water and Sanitation Department, South Africa), Dr. Karen G. Villholth (IWMI-SA), Prof. Jason Gurdak (UNESCO – IHP), Roger Parsons (Parsons & Associates), Dhesigen Naidoo (Water Research Commission, South Africa), Dr. Callist Tindimugaya (IAH’s Vice President for Sub-Saharan Africa) and Gavin Kode (Western Cape Government, South Africa). Together they tackled groundwater’s critical role in dealing with development, economic and environmental challenges in the SADC region.

These were among the takeaway messages at the end of the conference deliberations: i) The need for science to inform policy; ii) greater integration of groundwater management into river basin organisations’ institutional structures; iii) effective groundwater monitoring systems; iv) stronger national structures in order to strengthen regional structures; v) channel funding in the right direction to ensure sustainable groundwater management; vi) “package” groundwater messages correctly for varying stakeholders; vii) share knowledge at national and regional levels; and viii) the water, food and energy nexus. Monitoring, maintenance and development of groundwater infrastructure is key to future proofing the region. Those who attended the conference said they looked forward to the recommendations of the conference being taken up by the African Ministers Council on Water (AMCOW) in conjunction with the African Union Commission in the upcoming meeting “Toward Achieving Water Security and Safely Managed Sanitation for Africa” in Libreville, Gabon.

We are particularly grateful to our sponsors who generously supported this event and made it a reality and would also like to thank everyone who participated.

THOKOZANI DLAMINI



<http://sadc-gmi.org/sadc-gmi-iwmi-sa-groundwater-conference/>



Hydro'2018, Turkey

We are pleased to report the successful National Symposium on “Hydrogeology and Water Resources-Hydro-2018” organized jointly by the Turkish National Chapter of IAH, The Turkish Association of Hydrogeologists and Water Resources Research and the International Research Center on Karst Water Resources (HU-UKAM) of Hacettepe University.

More than 180 participants from universities, governmental organizations, private sector and non-governmental organizations assembled at the Beytepe Campus between 27-29 September 2018, in Ankara, discussing 43 papers presented in 10 sessions. The sessions were: Characterization of Groundwater Systems, Hydrology, Calculations of Water Potential and Water Budget, Mathematical Modeling in Hydrogeology, Hydrogeochemical Methods, Hydrogeothermal Systems, Groundwater Pollution Karst Hydrogeology, Sustainable Water Management, Hydropolitics and Transboundary Waters. In addition, there was a plenary session entitled “The Present State and Future Projections of Groundwater Management in Turkey”.

Participants also undertook a field excursion to a two-aquifer groundwater system with overlay of soda-ash deposits, managed by solution mining techniques.

The symposium papers are published in the Proceedings Book “Hydrogeology and Water Resources” which is available on the website www.hidroder.org.tr.

PROF. DR. MEHMET EKMEKCI



www.hidroder.org.tr



Europe-INBO 2018, Spain

From 17 to 20 October 2018, IAH was represented by President António Chambel in the 16th International Conference “Europe-INBO 2018”, in Seville, Spain. The event, dedicated to the Implementation of the European Water Directives, was organised by the International Network of Basin Organisations (INBO).



The conference was organised around a workshop on “Invasive Alien Species”, with four round tables dedicated to the following topics:

- Prevention of Drought: Adaptation Planning at the Basin Level, Reuse and Desalination;
- Efficiency and Multiple Benefits: The Interest of Combining Hydraulic Infrastructure and Nature-Based Solutions to face the issues of climate change;
- International Cooperation: Twinning and Peer-to-Peer Exchanges, Neighbourhood Area, Transboundary Waters;
- Revision of the Water Framework Directive (WFD): Improving Coordination with other European Directives (MarineSFD, Flood, Renewable Energy Directives).

42 papers were presented and discussed.

The conference concluded with reports from the international and regional initiatives of partners, which featured climate change, UN SDGs, governance and cooperation. IAH's report was concerned with “International cooperation for the management of transboundary aquifers”, describing our participation in WHYMAP and the international cooperation needed to achieve good results in transboundary waters.

[continued over...]

DECEMBER 2018

MEETING REPORTS

[...continued from previous]

The event provided an opportunity to recall that for INBO members, the term “basin” (or basin district in Europe) covers the basins of local, national and transboundary rivers, lakes and aquifers.

Proceedings also took time to honour Jean-François Donzier, INBO Secretary General for the last 24 years, for his constant and effective commitment to the network, with great dynamism and enthusiasm. In recognition of this, the title of Honorary Secretary General of the Network was conferred on him. Forthwith, the new INBO secretary will be Eric Tardieu.

The declaration of Seville, resulting from this meeting, can be found in <https://www.riob.org/sites/default/files/EUROPE-INBO%20Declaration%20of%20Seville%202018-Final.pdf>

ANTÓNIO CHAMBEL

 <https://www.riob.org/en>



Image source: <https://www.riob.org/en/events/europe-inbo-2016>

Australian Geoscience Council Convention

The Australian Geoscience Council Convention (AGCC) was held in Adelaide, 14th – 18th October, 2018. The overall theme of the AGCC 2018 was BIG ISSUES AND IDEAS IN GEOSCIENCE. The conference was very well attended with some 1000 delegates from around Australia and overseas. The groundwater sessions were well attended with some 50-100 attendees in the various groundwater sessions at any time. There was excellent representation from industry, government, research and academic sectors. A big congratulations go out to all the groundwater speakers and attendees at the conference. It was an excellent turnout.

Some 35 oral presentations and a number of poster presentations on groundwater topics were given across broad-ranging science, management and policy themes including:

- Groundwater challenges and opportunities
- Pre-competitive geoscience data and information to understand groundwater systems
- Evaluating the potential impacts to groundwater from resource development
- Groundwater science for policy development and decision making
- New groundwater technologies and approaches

In the groundwater sessions, Craig Simmons (NCGRT) gave an opening keynote address on “The Groundwater Grand Challenge”. Narelle Neumann (Geoscience Australia) gave a keynote address on “Exploring for the Future – New innovative groundwater data and information for Northern Australia”. David Post (CSIRO) gave a keynote address on “Using surface and groundwater models to conduct cumulative impact assessments: The Bioregional Assessment Programme”. Ken Lawrie (Geoscience Australia) gave a keynote address “Groundwater and Critical Zone Science: Innovation and Transformation”. Jane Coram (CSIRO) gave a keynote address on “Groundwater science contributions to water policy development and decision making in the 21st century”.

There was an impressive line-up of great groundwater speakers and talks. See the full program here: https://docs.wixstatic.com/ugd/d3911b_cdc92c131e6c4a2a986e1edfcc66e73e.pdf

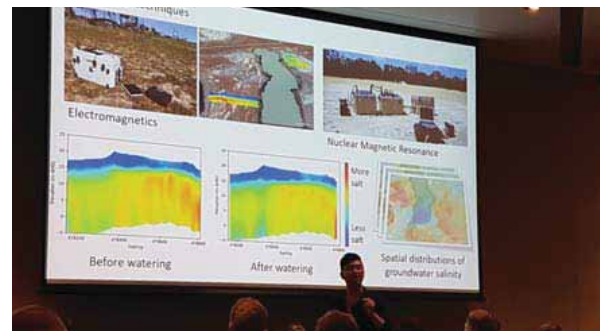
It is not possible to summarise all these excellent talks here. But, to briefly highlight just one or two talks, Phil Commander (Australian pioneering hydrogeologist and former IAH Australia President) gave an entertaining talk on “Public perceptions of groundwater issues”. Phil demonstrated that misconceptions about groundwater start in the nursery: Jack and Jill may have gone up a hill to fetch a pail of water, but that no self-

respecting hydrogeologist would ever put a well on the top of a hill! Steve Barnett (SA Department for Environment and Water) reminded us of the impediments in using science for decision making. Glen Walker (formerly CSIRO) talked about using a risk framework to guide groundwater modelling and data collection to analyse future environmental impacts from extractive industries.

A big thanks go to Narelle Neumann (Geoscience Australia), Craig Simmons (Flinders University and NCGRT), Dylan Irvine (Flinders University and NCGRT), Ilka Wallis (Flinders University and NCGRT) and Steven Lewis (Geoscience Australia) who took responsibility for groundwater related aspects of the conference as members on the Theme 3 “Resources – discovery, development, use and sustainability” organising committee.

CRAIG SIMMONS, STEVE BARNETT AND PHIL COMMANDER

 <https://www.agcc.org.au/>



Chris Li “rapid fire” talk on salinity in the Murray Darling Basin
Credit: @DylanJlrvine

Join IAH because...

...you can network with other hydrogeologists and groundwater-related specialists from around the world – and be part of the IAH “family”.



COMMISSIONS & NETWORKS

Activities of IAH's commissions and networks include contributing to the science of groundwater and undertaking outreach, education and training. Many participate in IAH and other events worldwide. We encourage you to find out more and to make direct contact with them (you do not have to be an IAH member to participate). We also welcome suggestions for new topics or activities.

SECRETARIAT



<https://iah.org/groups/commissions-networks>

Questions, ideas or comments? email info@iah.org

REGIONAL GROUNDWATER FLOW COMMISSION (RGFC)

The Regional Groundwater Flow Commission (RGFC) continues to be very active. In Korea, the commission organised one of the congress sessions 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. In addition, Co-chair Joel Carrillo's short course prior to congress highlighted the importance of the 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.

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

As we compile this newsletter, RGFC North American regional co-Chair John Molson, together with René Therrien of Université Laval, are co-chairing a proposed Special Session at the upcoming GSA, entitled Advances in the development and application of hydrogeological models. It will be co-sponsored by the GSA Karst Division.

Last but not least, RGFC will be supporting sessions at

EGU2019 (7–12 April 2019, Vienna, Austria). We are pleased to invite you to present your work - information, including abstract deadline can be found at https://egu2019.eu/abstracts_and_programme/how_to_submit_an_abstract.html.

RGFC COMMITTEE



<https://regionalgwflow.iah.org/>

GROUNDWATER AND ENERGY COMMISSION

The IAH Groundwater and Energy Commission website is now up and running! As you can read, a subcommittee of the commission is conducting a review of impacts of oil and gas development on groundwater resources. This review is comparing and contrasting the impacts of different types of oil and gas development including but not limited to conventional and unconventional oil and gas and coal seam gas. Data and case studies are currently focused on North America and Australia. Anyone interested in contributing data or experiences from other regions should contact grant.ferguson@usask.ca.

GRANT FERGUSON



<https://gwenergy.iah.org/>



EARLY CAREER HYDROGEOLOGISTS' NETWORK (ECHN)

The IAH Early Career Hydrogeologists' Network (ECHN) was very happy to attend the 45th IAH Congress in Daejeon, South Korea. The congress was again a momentous occasion to meet and socialize with early career hydrogeologists, especially from East Asia.

Among all the excellent scientific contributions from early career hydrogeologists, we are pleased to congratulate Suraiya Fatema (Institute of Applied Geosciences, Technical University of Darmstadt, Darmstadt, Germany), as the winner of the ECHN best oral presentation, and Batdemberel Bayanzul (Tohoku University, Sendai, Japan) for the best poster presentation. The total number of participants in the running for this year's awards were 20 for poster, and 40 for oral.

The ECHN activities started on Monday afternoon with the Annual General Meeting (AGM). About 25 attendees were present, most of whom were keen to learn more about how the network operates. The AGM was the occasion to welcome the network's new Chair, Jared van Rooyen (South Africa) and Co-chair Stefania Stevenazzi (Italy).



The Steering Committee and ECHN as a whole would like to extend its deepest gratitude to the outgoing chair, Carlos Maldaner, and co-chair, Rui Hugman, for their incredible contributions to the growth and success of the ECHN.

As soon as the AGM finished we all moved to the themed venue for the now "traditional" ECHN Social Function. A large number of early careers, mid-career and more senior members took part in the meeting, making it a massive success! Attendees were challenged in drawing hydrogeological concepts, from the easiest such as "confined aquifer", to the more challenging ones like "water stress". We called this game "PictoHydro",

and each team had to guess

as many words as possible drawn by each illustrator in 1 minute. Try it yourself in your local ECH National Branch!

This year the congress was closed by a keynote lecture from an early career hydrogeologist. Jared van Rooyen shared his experience in the use of social media for promoting scientific research. The lecture was well received by the congress participants, noting down tips and experiences Jared shared, and we certainly know that early careers will enhance their communication skills through the social media in the near future...

We would like to extend our most grateful thanks to IAH 2018 Organizing Committee, IAH's Council, Executive and Secretariat for continually supporting the ECHN. Given the location of this year's congress, we also acknowledge the travel grant given to aid the ECHN's steering committee members to attend, as well as the more regular support in the organization of the ECHN social function. Without such help, which is partially funded also by members' donations, we would not have had the opportunity to strengthen our connections within and outside the ECHN so effectively this year in Daejeon. Thank you!

ECHN tries to be always on the crest of the wave in supporting scientists at the beginning of their careers, promoting activities for developing new connections and network and sharing knowledge on hydrogeology and world's conservation. Be up to date on latest news and developments and visit our website ([www.echn.iah.org](http://echn.iah.org)) and follow us on our social media Instagram (@echn_iah), Twitter (@ECHN_IAH) and Facebook (ECHN)!

ECHN STEERING COMMITTEE



<http://echn.iah.org/>

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DECEMBER 2018



Commissions & Networks

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COMMISSION ON KARST HYDROGEOLOGY

Karst hydrogeology and the activities of our commission were represented in many ways during IAH's congress in Korea. Nico Goldscheider, past-chair of the Karst Commission, was invited to present a plenary keynote lecture with the title "Global challenges and local solutions in karst hydrogeology". One of the nine main topics was "Advances in Karst and Fractured-Rock Hydrogeology", with KC members Nico Goldscheider and Judit Madl-Szonyi as conveners, together with Young-Jin Park and Sung-Hoon Ji for fractured rock hydrogeology. The topic also included a UNESCO-IGCP special session on the IGCP project "The Critical Zone in Karst Systems" by the Institute of Karst Geology (CAGS).

In the opening ceremony, the UNESCO representative mentioned the World Karst Aquifer Map (WOKAM) as a major recent achievement of the cooperation between IAH and UNESCO. During the general assembly, David Kreamer, IAH Vice President for Science and Programme, also mentioned WOKAM as an important accomplishment of our commission. Last but not least, KC member Bartolomé Andreo presented and advertised the next IAH Congress that will take place from 22 to 27 September 2019 in Malaga, Spain, and that will also offer great opportunities for karst hydrogeology.

As this newsletter is being written, the committee is busy planning for a number of training courses and events. The 2018 International Training Course on Karst Ecological Geology and Karst Landforms, organized by the International Research Centre on Karst under auspices of UNESCO (IRCK) from Guilin, China, is taking in Nanning, Jishou (Xiangxi) and Guilin between 13 and 26 November, 2018.

Next year, from 15 – 18 June the commission is organising a Geo Trip to the Carpathian karst, prior the 4th Conference of the Central European Group (CEG) of IAH. The Geo Trip is open not only to the KC members but for all interested. The organisers have made an effort to reduce the cost as much as possible: thus, for the KC Geo Trip no fee will be required other than what is needed to cover the real expenses (based on sharing). The

tour includes visit of attractive karst surface features, springs, caves along the southern margin of Carpathian Mountains in the two countries, between Danube and Olt rivers (Donji Milanovac – Baia de Arama – Trgu Jiu – Horezu). More information, leaflet, photo gallery and application form can be found on www.karst.edu.rs.

Karst will also be featuring in IAH's congress in Malaga next year - look out for information on this, including abstract submission information, on the congress website.

KARST COMMISSION COMMITTEE



<https://karst.iah.org/>

COMMISSION ON MANAGING AQUIFER RECHARGE (IAH-MAR)



The 10th International symposium on Managed Aquifer Recharge (ISMAR10) will be held 20-24 May 2019 at La Nave, Madrid. Coordinator, Enrique Fernandez Escalante, co-chair of IAH-MAR, has received just shy of 200 abstracts to the call that closed on 10 November. However, if you have an outstanding paper to present, please get it to Enrique immediately on the template by the submission portal <http://ismar10.net> so it can be considered. Eighteen papers will be selected for publication without author charges in a special issue of the MDPI open access journal Water, (SI 2.1) to be entitled Managed Aquifer Recharge for Water Resilience. IGME will also produce a proceedings covering all papers. UNESCO has offered travel scholarships for postgraduate students or early career scientists from developing countries, and MDPI also has 2019 travel awards for PhDs and post-docs. See <https://recharge.iah.org/ismar10-madrid-may-2019>

There are seven workshops and short courses programmed for 20 May: <https://www.ismar10.net/en/pre-and-post-conference-seminars/> Three technical tours are on offer.

Stay tuned for more information, and plan to be there.

IAH's Daejeon Congress contained a huge amount of information and great connections for those interested in MAR. There was an excellent tour to the Daesian Clean Water Centre, Korea's first riverbank filtration water plant, built near Changwon adjacent Nakdong River following investigations in 1997. Prof H. Kim who did these investigations and established the project was on hand to explain. A report, summarises some of the 25 papers on MAR and other relevant papers, and is mounted at <https://recharge.iah.org/45th-iah-congress-daejeon-korea-9-14-september-2018>. An important development at the IAH-MAR plenary was the announcement of a new working group being formed to address methods for mapping suitability for MAR. Its first major function will be a workshop at ISMAR10, led by Jose Bonilla and Catalin Stefan. <https://recharge.iah.org/mar-suitability-mapping>



In the August newsletter the Commission reported that the working group on 60 years history of MAR had mounted national summaries for 16 countries on its website. In September a set of case study photos and descriptions were added, that could be useful for educators in hydrogeology. *Hydrogeology Journal* published on line a summary paper on 60 years' global progress in MAR, which is open access, thanks to support from UNESCO IHP. This covers the recent development of MAR from a technology perspective involving streambed recharge structures, bank filtration, spreading methods and recharge wells. It summarises the advances in scientific knowledge that have helped to sustain the uptake and diversification of MAR, addresses governance aspects and gives national, regional and global summaries of the reported applications of MAR. It's citation and web address is:

Dillon, P., Stuyfzand, P., Grischek, T., Lluria, M., Pyne, R.D.G., Jain, R.C., Bear, J., Schwarz, J., Wang, W., Fernandez, E., Stefan, C., Pettenati, M., van der Gun, J., Sprenger, C., Massmann, G., Scanlon, B.R., Xanke, J., Jokela, P., Zheng, Y., Rossetto, R., Shamrukh, M., Pavelic, P., Murray, E., Ross, A., Bonilla Valverde, J.P., Palma Nava, A., Ansems, N., Posavec, K., Ha, K., Martin, R. and Sapiano, M. (2018). Sixty Years of Global Progress in Managed Aquifer Recharge. *Hydrogeology Journal* <https://doi.org/10.1007/s10040-018-1841-z> .

A series of international collaborative research and applied projects involving MAR have recently commenced. These include colleagues from China, Denmark, Germany, Latin America, India, Australia, Sri Lanka, Myanmar, Laos, Vietnam, USA and others. Some outputs of these initiatives will be presented at ISMAR10.

Finally, as is mentioned elsewhere in this newsletter, commission member Karen Villholth (IMWI) led a GRIPP workshop on Nature-based Groundwater Infrastructure at the Stockholm Water Week.

IAH-MAR COMMITTEE



<https://recharge.iah.org/>

<https://www.ismar10.net/en/ismar10-3/>

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DECEMBER 2018

Commissions & Networks

[...continued from previous]

BURDON GROUNDWATER NETWORK FOR INTERNATIONAL DEVELOPMENT (IAH-BGID)

The IAH-BGID Network would like to thank all participants to the special session: Socio-Hydrogeology for Ground Water Development in Low-Income Countries Convenors: Viviana Re (University of Pavia, Italy & IAH-BGID) and Theresa Fromme (BGR, Germany). The session enabled colleagues actively involved in international development to meet and discuss the role of socio-hydrogeology in poverty reduction, thus contributing to achieving SDG 6 (Clean Water and Sanitation). The talks showed different benefits arising from including the social dimension in hydrogeological investigations and led to a lively debate with the audience. The session has raised several important issues which can be taken forward for future actions.



We would also like to thank the participants who took time to attend our Annual General Meeting. It was a good occasion to exchange ideas on how to improve the network's activities and we look forward to working on those next year and beyond.

IAH-BGID STEERING COMMITTEE



<https://burdon.iah.org/>



URBAN GROUNDWATER NETWORK (UGN)

We are delighted to confirm that membership of the network has now reached around 200 individuals. Full information for all our 2019 activities planned can be found on our website here: <https://urbangw.iah.org/activities>

We are holding an urban groundwater session at the IAHS Groundwater Quality Conference, in Liege Belgium 2019. Abstract submissions for this open 1st December! <http://aimontefiore.org/GQ2019/index.php> All submissions welcome.

The website also now features new resources: <https://urbangw.iah.org/resources>

Please note that EGU (7-12 April 2019, Vienna) is this year also holding an Urban Groundwater Session. The Convenors welcome all abstracts – which can be submitted here: https://meetingorganizer.copernicus.org/index.php?trg=abstractsubmission&cotree=600.31016&tpl=page_as&

Further activities are planned and under discussion, including a session in next year's IAH Congress in Malaga. Look out for further updates in the new year. And, if you have any other activities you would like to connect with IAH UGN please let us know!

HELEN BONSER AND UGN COMMITTEE



<http://urbangw.iah.org>



FROM THE IAH BOOK SERIES...



Selected Papers on Hydrogeology (IAH-SP)

Series editor Nick Robins, formerly of British Geological Survey, Wallingford, UK

Solving the Groundwater Challenges of the 21st Century

Edited by Ryan Vogwill

Groundwater is integral to many human and environmental systems but there are significant challenges in dealing with the impact of anthropogenic activities on groundwater systems. These challenges need innovative solutions.

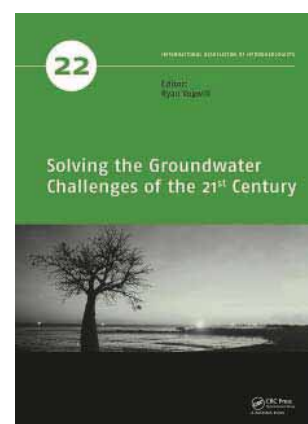
This book contains a wide range of content, from a discussion of the Australian regulatory framework for unconventional hydrocarbons, the extraction of which have the potential to significantly impact groundwater systems, to the best way to apply numerical models to help solve complex, real world problems. The impact of urbanisation on groundwater systems in the developing world is also discussed, at both a local scale in Nigeria and at a world scale. The use of innovative tools such as managed aquifer recharge, a critical tool in solving the groundwater challenges of the 21st century, is also discussed. The framework used to manage the legacy of agricultural contamination in Denmark, covering investigation to regulation and remediation, is also presented, focussing on how the many challenges in implantation were solved.

This book is targeted at professional hydrogeologists, experts in governance, law and policy as well as other professionals that need to incorporate an understanding of groundwater. The book will also appeal to politicians, resource managers, regulators and others interested in sustainable water supply.

ISBN 9781138027473 - CAT# K25534

Available in various formats: hardback, ebook and ebook rental (30% book discount for IAH members)

<https://www.crcpress.com/Solving-the-Groundwater-Challenges-of-the-21st-Century/Vogwill/p/book/9781138027473>



International Contributions to Hydrogeology (IAH-ICH)

Series editor Nick Robins, formerly of British Geological Survey, Wallingford, UK

History of Hydrogeology

Edited by Nicholas Howden, John Mather

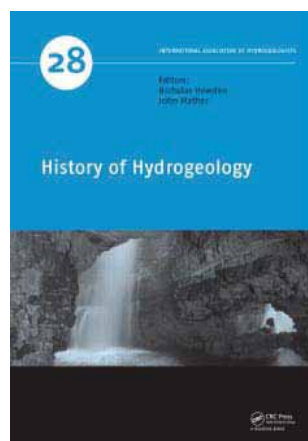
The History of Hydrogeology, is a first attempt to bring the story of the evolution of the science of hydrogeology together from a country- or region-specific viewpoint. It does not cover history to the present day, nor does it deal with all countries involved in groundwater studies, but rather takes the story for specific key countries up and until about the period 1975 to 1980. This is when hydrogeology was still evolving and developing, and in some areas doing so quite rapidly.

The book has been written not only for practitioners of hydrogeology and hydrology but also for teachers and students to see the context of the evolution of the science around the globe. The History of Hydrogeology will also be of interest to science historians and all those interested in the role that individuals, institutes and nations have played over the years in defining modern day studies of groundwater.

ISBN 9780415630627 - CAT# K15478

Available in various formats: hardback, ebook and ebook rental (30% discount for IAH members)

<https://www.crcpress.com/History-of-Hydrogeology/Howden-Mather/p/book/9780415630627>



COUNCIL MEET IN DAEJEON

Antonio Chambel, IAH President, welcomed Council to the annual meeting, which was held during the Congress in Daejeon, South Korea.

Teodora Szocs led the discussion on IAH financial matters. Council aims to be cautious in managing the central budget, conscious that the Association's income is primarily from membership subscriptions. Teodora reported that IAH had spent less than the amount proposed in the 2017 budgeted, as it was not possible to carry out some of the activities that had been planned. Despite this, the lack of stable exchange rates meant that an overall loss was recorded in our formal accounts for 2017. We receive income in euro, dollars and pounds but as an organisation registered in the UK, our accounts are in pounds.

Activities and expenditure not undertaken during 2017 have been included in our plans for 2018, which has required careful monitoring of the budget throughout this year. Membership numbers, including corporate members, and income were largely as expected at the time of the Council meeting, but it was not clear if this, with expected further registrations, would be sufficient to maintain our reserves at an adequate level. Because of this and some increases to costs, Council decided, after much debate, to ask members at the AGM for their agreement to a further small increase in the membership fee. As reported on page 13, this was accepted without objection at the AGM. Council also agreed that IAH should now start implementing the new corporate supporters' scheme. Further information on this is featured earlier on page 7 of this newsletter.

Bruce Misstear, IAH Secretary General, summarised the successes that had been achieved under the Forward Look strategic plan. This included developing the website and increasing the quality of Hydrogeology Journal. The Early Career Hydrogeologists' Network was now established, a mentoring scheme was in place and membership numbers had risen considerably. The latest paper to be published in the Strategic Overview Series concerned groundwater and the Sustainable Development Goals and he reported that a further paper on mining and hydrogeology was in preparation, led by Dave Kreamer, Vice President for Science.

Information on degree courses was now available in the website and Council members discussed the possibility of promoting other materials for education support, such as videos. Antonio Chambel reported that the Executive had made a proposal to the UN for a World Groundwater Day or Year, to help raise the profile of groundwater with a wider audience.

Hydrogeology Journal was in good health and remained one of the premier earth sciences journals. It was continuing to accept submissions from across the global hydrogeological community in line with the aims of the journal. Its usage factors had been particularly encouraging, with more than 270 000 downloads of articles in 2017 and a median of 323 downloads for articles published in 2016/17.

There was a review of recent congresses and bids for future congresses were considered. It was recognised that for many other organisations conferences are critical for maintaining financial health. In the case of IAH, formal agreements for congresses are made with the organising committee for the national chapter. These encourage sharing of any additional congress income, to help cover central IAH support. It was noted that not



all congresses are able to make significant profits, though this would not rule out a national chapter from being considered as potential hosts for future congresses.

Antonio Chambel provided an update on the proposal for a congress in Sao Paulo, Brazil, which had been under consideration for a number of years. This would be a joint event with ALHSUD and ABAS. In a subsequent meeting with Council, Rodrigo Lilla of the Brazilian National Chapter confirmed detailed proposals for the congress, which would focus on groundwater contamination matters, and described the numerous advantages of hosting a congress in Sao Paulo, which benefits from good travel connections, an excellent and varied range hotels, superb restaurants and its rich history and culture!

Olivier Lagneau led a large and enthusiastic delegation from the Belgian National Chapter, who presented their bid to hold the 2021 Congress in Brussels. He noted that there was a long history of geology and hydrogeology in Belgium, with the first national group being set up by Paul Fourmarier in Belgium in 1958. The proposed theme is 'Inspiring groundwater' and topics under consideration include mining impacts and transboundary aquifers. They already have in mind some key sponsors and also hope to enlist the support of the European Commission, which is based in Brussels.

Council approved both bids (the Sao Paulo proposals were also approved separately by the partner organisations) and offered their congratulations to the organising teams – which signalled the starting point for much further hard work by our Brazilian and Belgian colleagues to finalise all the details.

As with other formal IAH meetings, minutes from the Council meeting will be made available on the "Members' Area" of our website.



IAN DAVEY



<https://iah.org/about/council>

<https://iah.org/members/iah-meetings>



FINAL CALL: THE FUTURE OF HYDROGEOLOGICAL SCIENCE AND ENGINEERING

IAH would like your input on what you view to be the future, biggest challenges in hydrogeology. What new areas of groundwater investigation do you view as on the horizon for our science, and what are the next topics that will dominate our discussions in the coming years? As part of IAH's Forward Look, a preliminary panel of Clifford Voss (Executive Editor of our Hydrogeology Journal), Wendy Timms (Vice President for Australasia and the Pacific) and David Kreamer (Vice President for Science and Programme) are asking for your vision, and what you predict will be the most exciting and needed areas of research and investigation in groundwater science in the coming years. Please contact Dave Kreamer at dave.kreamer@unlv.edu with your questions, ideas, and feedback. Your insights are greatly appreciated.

DAVE KREAMER



dave.kreamer@unlv.edu

CHAPTERS SHARE THOUGHTS IN KOREA

We are pleased to report that we were again able to hold a national chapters' meeting during congress week, and would like to thank all those who took time to attend. The following summarises the matters raised:

- **Training/workshops:** The Belgian National Chapter reported on their continued programme of meetings and evening courses, having recently published the 'groundwater book of Belgium'. The Spanish NC organise at least one course each year on modelling. The Nigerian NC holds its national conference each November, awarding certificates in recognition of members' activities, further motivating members to be involved in IAH activities. Similarly, the Indian NC presents awards for hydrogeological research, applied hydrogeology and for students.
- **Membership fees/benefits:** The Italian NC noted that their 2-yearly national conferences are included in the membership fee. The Italian chapter also pays the IAH membership fee for a number of former students as the increase from student to full fee was high for young hydrogeologists. This concern was shared by the Spanish NC. The Indian National Chapter also considered that the IAH membership fee more generally was expensive and would like to see this reduced. Teodora Szocs, Vice President for Finance and Membership informed meeting participants that the IAH Secretariat had been tasked by Council to carry out an investigation of fees.
- **Education/other benefits:** Marco Petitta, VP for West and Central Europe, commented on the need to offer members more than just general IAH benefits. He noted that more educational materials will be made available on the website and that further meetings in Europe, with discounts for IAH members, were proposed for 2019. Makoto Taniguchi, VP for Asia, added that he continued to promote regular meetings, seminars and workshops.
- **Connecting/networking between chapters:** It was clear that the participants, particularly those from relatively new chapters such as New Zealand, found the National Chapters' meeting useful and that there was a desire to learn from each other. Judith Flügge and Raquel Sousa encouraged those present to promote more activities between chapters.



We looked forward to hearing new initiatives during the next few months. Improving means of communication between our national chapters is a planned activity for 2019 - we'd be happy to receive suggestions from representatives. Email knicholson@iah.org.

SECRETARIAT



<https://iah.org/groups/national-chapters>



www.facebook.com/iah.org



Germany

"Groundwater and Climate Change" at GeoBonn 2018

The joint DGGV, DMG, and DVGeo 2018 conference took place at Rheinische Friedrich-Wilhelms-Universität Bonn from 2-6 September. During the conference the German Fachsektion Hydrogeologie and the German Chapter of IAH held a "Groundwater and Climate Change" session (following the great response to an earlier, similar session held at the FH-DGGV meeting in Bochum). Our joint contribution integrated well into the programme of GeoBonn 2018, given as there were other sessions on the subject of "Climate Change". The keynote speaker was Prof. Richard Taylor (University College London and former Chair of IAH's Commission for Groundwater and Climate Change), who presented a rousing lecture on "Groundwater in a warming world: the impact of changing climate extremes". This was followed by three further lectures on groundwater in Europe, groundwater vulnerability and groundwater and paleo-soil in the context of climate change. The session was well attended with around 50 people continuing discussions with intent, particularly so thanks to the thought-provoking lectures.

TRAUGOTT SCHEYTT AND CHRISTOPH NEUKUM

 <https://germany.iah.org/>



New Zealand

Technical presentations and a new website

The New Zealand Chapter of IAH has recently launched its website. It can be accessed at <https://newzealand.iah.org/> and is designed and maintained by Sally Lochhead.

Already with plenty of interesting content, the website includes information about its technical presentations, with some early news regarding an upcoming technical workshop scheduled for the start of 2019. If you are interested in joining the New Zealand Chapter or have any material for the website that may be of interest to our Chapter, you can contact any of our committee members.

SALLY LOCHHEAD



 <https://newzealand.iah.org/>



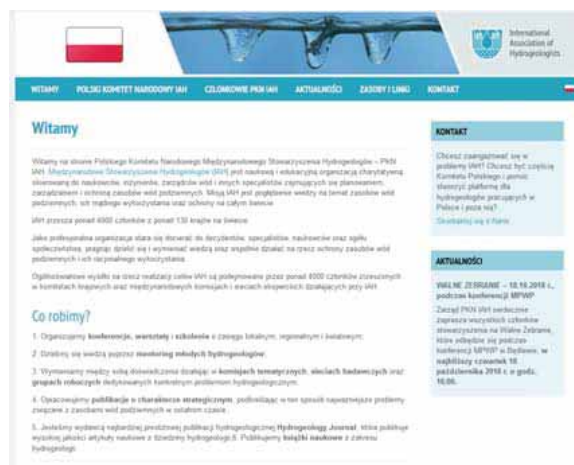
Poland

A new website

We are delighted to announce that colleagues from Poland have been working to create a new website - in both Polish and English languages. The link is below - already the site contains useful information and resources, and will feature future events, etc.

SECRETARIAT

 <https://poland.iah.org/> (Polish)
<https://poland.iah.org/en/> (English)



[continued over...]

CHAPTER NEWS

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USA

International Service Award

Dr Wendy Robertson of Central Michigan University is this year's worthy recipient of the US Chapter's "International Service Award". The Award recognises the efforts of hydrogeologists based in the United States who have shown an outstanding commitment to assisting the international community with groundwater-related needs.

Wendy receives the Award in recognition of her tireless and selfless work over the past eight years with "Well Aware", an international nonprofit organisation that provides drinking water systems in areas of water scarcity. Wendy's work as lead hydrogeologist has been instrumental in successfully providing clean and sustainable water systems for 52 communities and over 220,000 people in east Africa. She has performed this work largely in her own time, while maintaining a full-time faculty position at Central Michigan University. As an Assistant Professor in the Department of Earth and Atmospheric Sciences at CMU, she further shares her passion for helping communities in desperate need of clean water by mentoring students involved with projects providing water to critical need areas.

The Award was presented to Wendy during the GSA Hydrogeological Division Luncheon and Award Ceremony during GSA's annual meeting (GSA2018). We extend our congratulations to Wendy.

JIM LAMOREAUX



<http://iah-usa.org/>



ABOUT OUR NATIONAL CHAPTERS

IAH's National Chapters are a valuable means of bringing scientific, professional and social benefits to our members and community, and also enable the Association to promote sound and sustainable groundwater use at a country and regional level. Some even collect fees in local currency for the convenience of our members. National chapter committees are run on a voluntary basis by members and we are hugely grateful for their efforts. We currently have over 40 national chapters - information regarding these, including contact details are provided on our website. Furthermore, conversations are taking place about setting up new IAH chapters in **Malawi and Ecuador and enquiries have been received from colleagues in Panama, Lebanon and Nepal about the possibility of doing so.**

Being a world-wide organisation, we are always keen to establish National Chapters in additional countries; this may only require a group of around 6 or so enthusiastic individuals to do so. If this is of interest to you do get in touch.

SECRETARIAT



info@iah.org



Dr Wendy Robertson receiving her Award from Dr. Jim LaMoreaux, IAH USNC President (L). Shown also is her nominator and former adviser, Dr. Jack Sharp (R).



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46th IAH Congress, Malaga

The IAH Spanish Chapter (IAH-GE) and the Centre of Hydrogeology of the University of Malaga (CEHIUMA) are honoured to host and invite you to the 46th IAH Congress in Malaga, Spain in 2019.

The theme “Groundwater Management and Governance - Coping with Water Scarcity” will highlight the water resources stresses forecast as a result of global change, which will be especially relevant in the Mediterranean region. Specific topics are:

- Groundwater management and governance
- Groundwater and climate change
- Impact of growing population and changes in land use on groundwater resources
- Groundwater sustainability
- Groundwater footprint and virtual water
- Tools, methods and models to study groundwater
- Groundwater, wetlands and natural heritage
- Groundwater and socio-economic development in Latin-America

The congress will take place at the Malaga Congress Centre from Sunday, 22 September to Friday 27 September 2019. Malaga is one the oldest cities in Europe, with 2800 years of history, and has experienced civilizations from the Phoenicians and Greeks to the Romans. As a result, Malaga is rich in culture, from historical monuments to modernity, and is the birthplace of Pablo Picasso.

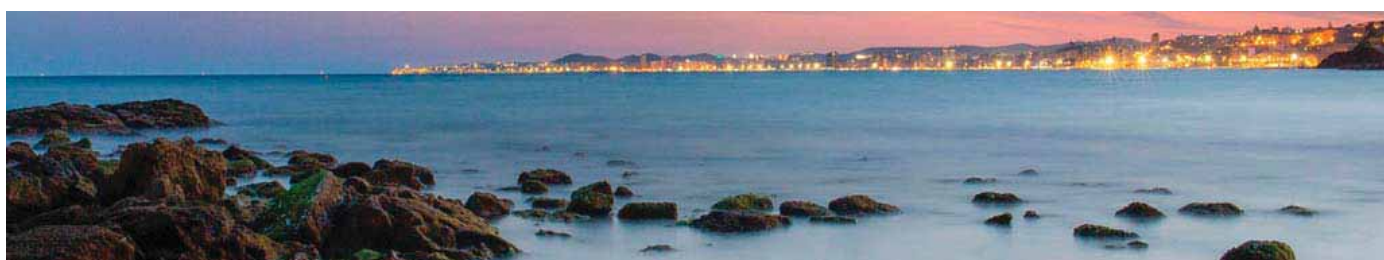
Key dates:

Abstract deadline: 30th March 2019

Abstract acceptance: 15th June 2019

Early-bird registration: 30th June 2019

 [Congress website -www.iah2019.org/](http://www.iah2019.org/)



2019 - SELECTION

18-21 March - Stockholm, Sweden

Geoscience and Society Summit: Bridges to Global Health, Resilience, and Sustainability

Building bridges to facilitate cross-border cooperation, and to develop models for interdisciplinary engagement and science diplomacy. The Summit aims to create a highly interactive forum for effective cooperation between scientists and users of scientific information to better tackle global and local challenges around sustainability of natural resources and systems, global health, and resilience. Organised by American Geophysical Union and Geology in the Public Interest, assisted by the Bolin Centre for Climate Research and other organizations.

Website: <https://connect.agu.org/gss/home>

22 March - Worldwide

World Water Day – Leaving No One Behind (Human Rights and Refugees).

Website: <http://worldwaterday.org/>

25-29 March - Denver, USA

11th National Monitoring Conference

Hosted by the National Water Quality Monitoring Council. All water stakeholders—including federal, state, tribal and local water professionals, non-profits, academia, and volunteer citizen scientists—are welcome at this important national forum.

<https://acwi.gov/monitoring/conference/2019/index.html>

28-30 March - Hammamet, Tunisia

AGIC2019 Applied Geosciences for Groundwater

AGIC2019 is the 2nd International Congress of Atlas Georesources. 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. Organised by Georesources Laboratory and Tunisian Committee of IAH.

Website: <https://lgr-certe.com.tn/>

12-15 May - Québec City, Canada

GAC-MAC-IAH Québec 2019

Where geosciences converge. Three geological provinces converge toward Québec City: the Grenville, the St. Lawrence platform and the Appalachians. Three geoscientific associations 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 it. Come and join us!

Website: <http://gacmac-quebec2019.ca/>

20-24 May 2019 – Madrid, Spain

ISMAR 10: International Symposium on Managed Aquifer Recharge

On behalf of the IAH MAR Commission and the Organizing Committee, we cordially inform you and invite to contribute to a successful ISMAR 10. There are 20 themes and topics envisaged, covering most of the Managed Aquifer Recharge and Water Management Worlds. Organized by: Tragsa Group, Instituto Geológico y Minero de España (IGME) and International Water Resources Association (IWRA). Co-organizers: International Association of Hydrogeologists (IAH) and partners.

Website: <http://ismar10.net>



<http://iah.org/events>

For a fuller list of conferences, events and meetings and to submit an event



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