

International Association of Hydrogeologists
COMMISSION ON GROUNDWATER & CLIMATE CHANGE
CGCC

ANNUAL REPORT 2018

Chairs

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IAH-CGCC website: <https://gwclimate.iah.org/>

1. IAH-CGCC Aims

The mission of the IAH Commission on Groundwater and Climate Change (IAH-CGCC) is: **to improve understanding of (1) the relationship between groundwater and climate change, and (2) the role of groundwater in adaptation to climate variability and change.**

The IAH-CGCC will seek to fulfil its mission by:

1. promoting related research and development to advance scientific and technical knowledge;
2. fostering inter-disciplinary, international collaborations with research institutions, water resource managers, and water policy makers;
3. fostering linkages with related research and development activities in climate, hydrological, agricultural and health sciences;
4. engaging with key international organisations, agencies and programmes (*e.g.* UNESCO-IHP, WMO, FAO, UNICEF, WHO, IAEA-WRP, GEWEX, GWSP)
5. working with the International Groundwater Resources Assessment Centre (IGRAC) to promote the development of a programme and facility for the collection, evaluation, archiving and sharing of groundwater data including both ground-based observations and satellite measurements;
6. identifying and evaluating a series of representative case studies illustrating the relationship between groundwater and climate change and the role of groundwater in adaptation to climate variability and change;
7. disseminating research and development outcomes to the global research community including specifically the IPCC, and global development community including governmental and non-governmental organisations and those specifically concerned with enabling adaptation to climate change; and
8. creating awareness of the IAH-CGCC among IAH members, related professions and wider water resources and water supply communities.

2. Progress on IAH-CGCC objectives during 2018 through:

2.1 Knowledge dissemination initiatives

- The new website of IAH-CGCC was prepared throughout the last quarter of 2018 and launched early 2019. This was announced through the IAH communication channels and by a personalized email to current members of the Commission. It received many enthusiastic responses and requests from new members to join the IAH-CGCC. The website itself has information on the commission, its history (*in preparation*), its current members and their profiles (LinkedIn, ResearchGate) and contacts, links to other networks, commissions and organizations, challenges addressed by the commission, news and events, and relevant publications. Other components to be added, besides the commission's history, are opportunities, ideas and ongoing activities in which the commission is involved. This will be further discussed during the annual meeting to be held during the 46th IAH Congress (Spain) in Malaga in September 2019.
- Tibor Stigter is coordinator of the International Joint MSc programme on Groundwater and Global Change – Impacts and Adaptation (GroundwatCh, www.groundwatermaster.eu) offered by IHE Delft, TU Dresden and IST/University of Lisbon, as well as a large number of private and public associated partners. GroundwatCh seeks to offer a distinctive curriculum built on the cornerstones of hydro(geo)logy, climatology, impacts and adaptation, within a framework of human pressures, global change and feedbacks. Academic partners include universities from Colombia, Morocco, Mozambique, South Africa, Tanzania, Uganda, China and Vietnam. So far the programme has received 55 students from 31 different countries across the globe. One student of the programme, Fatima Monji from the Netherlands, has been largely involved in updating the website of the Commission. In June 2018 new funding for the programme was awarded by the European Commission, with a total of 4 million EUR, including 80 new scholarships.
- As the palaeogroundwater IFG (International Focus Group) leader of International Quaternary Union (INQUA), Jianyao Chen submitted a proposal to organize an international training course on groundwater and age dating in 2017, and the proposal was accepted with a seed funding. The course was organized in Guangzhou/Zhanjiang in the end of 2018. Five to six young researchers and researchers from developing countries with low income were invited with this funding.

2.2 Contributions to international conferences

2018, March **Keynote lecture, 26th Meeting of the German Chapter of IAH, 24 Mar 2018, Bochum (Germany).** Tibor Stigter was invited by the German Chapter of IAH to give a keynote lecture on “Adapting to climate and global change: the role of groundwater”

- 2018, September **Keynote lecture, GeoBonn 2018, Bonn (Germany).** Richard Taylor was invited to give a keynote lecture on “Groundwater in a warming world: the impact of changing climate extremes”
- 2018, Oct **XIV Congreso Latinoamericano de Hidrogeología, 23-26 Oct 2018, Salta (Argentina).** In his role as co-chair of IAH CGCC Tibor Stigter was present at the XIV Latin-American Hydrogeology Congress and gave a presentation on “Employing a multi-method approach to the study of wetland-groundwater interactions in different climatic settings”.
- 2018, Nov **AGUA 2018, 13-16 Nov 2018, Cali (Colombia).** In his role as researcher, but also as co-chair of IAH CGCC, Tibor Stigter was invited to give a keynote lecture on “Integration of hydrochemical, piezometric and geophysical studies with modeling to build scientific knowledge on groundwater-surface water connections”.

2.3 Projects and Publications

- The IAH-CGCC by way of *The Chronicles Consortium* (<https://www.un-igrac.org/special-project/chronicles-consortium>), led by former IAH-CGCC Co-Chair Taylor, coordinated a Topical Section in Hydrogeology Journal under the heading/focus “Determining groundwater sustainability from long-term piezometry in Sub-Saharan Africa”, ISSN: 1431-2174 (Print) 1435-0157 (Online).
- *The Chronicles Consortium* involving 32 scientists from across Africa and beyond has compiled and analysed 14 multi-decadal groundwater-level records from across sub-Saharan Africa; these time series data will be made available from the IGRAC website in the summer of 2019 and the outcomes of the analysis of these records, “Observed controls on resilience of groundwater to climate variability in sub-Saharan Africa” has been accepted for publication in *Nature*.
- A plan to publish a special issue on Groundwater and Global Palaeoclimate Signals in Quaternary International was accepted in 2017, and approximately 20 papers are to be published in the end of 2019.
- IAH-CGCC contributed to a Topical Collection in Hydrogeological Journal on “Climate-change research by early-career hydrogeologists”, a joint initiative initiated in 2017 by IAH-ECHN, UNESCO-IHP and IAH-CGCC; the introductory essay co-authored by Tibor Stigter, was published in 2018 (Re et al., 2018, Topical Collection: Climate-change research by early-career hydrogeologists. Hydrogeology Journal 673-676, doi: 10.1007/s10040-018-1730-5).
- A proposal submitted to National Science Foundation of China (NSFC) on “Reconstruction of palaeoclimatic signals from groundwater in large aquifers - with a case study in Leizhou Peninsula” was accepted in 2017 and funded for four years from 2018 to 2021.

- *GEWEX Project*. The IAH-CGCC is currently leading a large network of researchers in an inter-comparison of modelled and *in-situ* observations of groundwater recharge in Africa under *The Chronicles Consortium* forming a new contribution to the Global Energy and Water cycle Exchanges (GEWEX) project.

2.4 Engagement with international programmes and scientific agenda:

Besides looking at climate change impacts on groundwater, the importance of drivers such as population growth, development, urbanisation and changing dietary preferences in large emerging countries, which all lead to increased (ground)water demand, also merit attention within the activities of IAH-CGCC, as does the role of groundwater in adaptation. For this reason, contacts are sought with other relevant commissions within IAH, such as the Commission on Managing Aquifer Recharge, as well as with international programmes (e.g. UNESCO GRAPHIC), organizations (e.g. IGRAC) and networks (e.g. ECHN). A few examples:

(i) INQUA and IGCP

- IAH-CGCC Co-chair Jianyao Chen serves also as INQUA IFG Palaeogroundwater leader, which enables the close communication between INQUA, IGCP and the IAH and contributes to the Commission with knowledge of global change from large aquifers.

(ii) UNESCO-IHP GRAPHIC Programme

- IAH-CGCC continues to work closely with the GRAPHIC programme including the development of conference sessions and workshops, as well as joint MSc supervision.

- IAH-CGCC has also contributed to mapping the actions of NGOs in official partnership with UNESCO, which contribute to the attainment of the UNESCO Strategy for Action on Climate Change, enabling the UNESCO Members states to gain a greater awareness about their work.

(iii) International Groundwater Resources Assessment Centre (IGRAC)

- IAH-CGCC and IGRAC are involved in joint activities including awareness raising, knowledge dissemination and MSc supervision.

- IGRAC hosts the website for *The Chronicles Consortium* and acts as the portal for a pan-African dataset of multi-decadal groundwater-level records recently compiled under this initiative.

(iv) Early Career Hydrogeologists' Network (ECHN)

- Contribution to Topical Collection on "Climate-change research by early-career hydrogeologists" (Re et al., 2018)

(v) Inter-governmental Panel on Climate Change (IPCC)

- IAH-CGCC member Taylor was appointed as a *Contributing Author* to the IPCC 6th Assessment Report WGI: Chapter 8 *Water Cycle Changes* in December 2018.

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