

International Association of Hydrogeologists  
**COMMISSION ON GROUNDWATER & CLIMATE CHANGE**  
**ANNUAL REPORT 2010**

**Chairs**

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<http://www.iah.org/gwclimate/>

**1. Aims**

The IAH Commission on Groundwater and Climate Change (IAH-CGCC) is dedicated to improving our limited understanding of the relationship between climate change and groundwater resources. To achieve this goal, the IAH-CGCC has the following key objectives: (1) to promote international and inter-disciplinary research among hydrogeologists, climate scientists as well as physical, social, and health scientists regarding the relationship between groundwater and climate change; (2) to facilitate the dissemination of knowledge and exchanges of experiences related to groundwater and climate change through the organisation of conferences, lectures and meetings as well as the preparation of books, journal articles and popular articles; and (3) to coordinate research activities and knowledge dissemination pertaining to groundwater and climate change with allied global initiatives.

**2. Progress on IAH-CGCC objectives during 2010**

*re: objective 1 - to promote international and inter-disciplinary research among hydrogeologists, climate scientists as well as physical, social, and health scientists regarding the relationship between groundwater and climate change*

The IAH-CGCC contributed with the UNESCO-IHP GRAPHIC programme and INQUA Group on Palaeogroundwater, to a training course and workshop, *Methods for the study of long-term groundwater dynamics*, from 1<sup>st</sup> to 5<sup>th</sup> November 2010 in Tozeur (Tunisia). The IAH-CGCC was also responsible for the preparation and delivery of a keynote presentation, *Groundwater and global hydrological change – current challenges and new insight*, in July 2010 at the UNESCO-IHP Kovacs Xth Colloquium in Paris (France) as well as discussion and debate on *Global Water Security* at the Cheltenham Science Festival (UK).

*re: objective 2 - to facilitate the dissemination of knowledge and exchanges of experiences related to groundwater and climate change through the organisation of conferences, lectures and meetings as well as the preparation of books, journal articles and popular articles*

In September 2010, the IAH-CGCC organised an important side event, *Groundwater and Climate*, at the 38<sup>th</sup> IAH Congress in Krakow (Poland) where the future direction of the IAH-CGCC was debated (see section 3 below). The side event was attended by 75 conference participants and has added much needed input and impetus to the direction and activities of the IAH-CGCC.

In 2010, the IAH-CGCC was centrally involved in the production of an edited volume, *Groundwater Response to Changing Climate*, published by CRC Press in the IAH Selected

Papers on Hydrogeology Series Volume 16 (p. 246). This volume was combined effort of the UNESCO-IHP GRAPHIC programme and IAH-CGCC involving Makoto Taniguchi (GRAPHIC Chair) and Ian Holman (IAH-CGCC Co-Chair) as editors. The volume contains 16 papers presented at the IAH Congress in Toyama that discuss case studies from around the world using knowledge from contemporary field investigations, water balance assessments, numerical simulations, satellite data, paleohydrology, stable and radioactive isotope analyses and monitoring studies.

The IAH-CGCC also led and coordinated an inter-disciplinary review of current challenges to developing an improved understanding of the relationship between groundwater and climate change with climate scientists, remote-sensing experts, land-surface modellers and database experts. The published review, listed below, was presented at the X<sup>th</sup> Kovacs Colloquium in 2010 and initiated at an IAH-CGCC (and UNESCO-GRAPHIC) side event at the 3<sup>rd</sup> World Climate Congress in 2009.

Taylor, R., Longuevergne, L., Harding, R., Todd, M., Hewitson, B., Lall, U., Hiscock, K., Treidel, H., Dev Sharma, K., Kukuric, N., Struckmeier, W. and Shamsudduha, M. (2010) Groundwater and global hydrological change – current challenges and new insight. In: Hydrocomplexity: New Tools for Solving Wicked Water Problems, Proceedings of the Xth Kovacs Colloquium, edited S. Khan and H. Savenije. IAHS Publication No. 338, pp. 48-58.

*re: objective 3 - to coordinate research activities and knowledge dissemination pertaining to groundwater and climate change with allied global initiatives*

In 2010, members of the IAH-CGCC have been actively involved in research assessing the resilience of groundwater in Africa to climate change ([www.bgs.ac.uk/GWResilience](http://www.bgs.ac.uk/GWResilience)) and thereby improving input from Africa hydrogeologists to the activities of the IAH-CGCC. Specific aspects of this research to be taken up by the wider community include (1) the mapping of groundwater resilience and (2) the use of historical data archives, combined with contemporary monitoring to reconstruct long-term relationships between groundwater and climate. In relation to the latter, the IAH-CGCC plans in 2011 to work with UNESCO-IHP IGRAC in order to promote the sharing of ground-based and satellite-derived (GRACE) datasets of groundwater storage changes.

### **3. Future Plans and Meetings**

The IAH-CGCC is hopeful that the IAH Secretariat will approve an application to revitalise and extend the IAH-CGCC for another 4 years and, assuming that this extension shall be granted, has embarked on an ambitious programme of activities planned in 2011 and 2012 described below. Two new Co-Chairs Professors Bridget Scanlon and Jianyao Chen will replace outgoing chairs Dr. Ian Holman and Professor Zaihua Liu who have provided dedicated leadership to the IAH-CGCC since its inception as an IAH Working Group in 1998.

The IAH-CGCC along with UNESCO-IHP GRAPHIC will run 2 training workshops seeking to equip hydrogeologists and other water scientists, particularly from developing countries in Africa

and Asia with knowledge of, and tools to assess, the relationship between groundwater and climate change and the role of groundwater in enabling adaptation to climate change in 2011:

- *The role of groundwater in enabling adaptation to the impacts of climate on water resources*, BIARI 2011: Climate Change and Its Impacts: Water in a Changing Climate, 15-17 June 2011, Brown University, Providence (USA)
- *Methods for Assessing Impacts of Climate Change and Human Activities on Groundwater Resources*, UNESCO-IHP GRAPHIC and IAH-CGCC Initiative, 31 October to 4 November 2011, Sun Yat-sen University, Guangzhou (China)

The IAH-CGCC together with UNESCO-IHO GRAPHIC is leading 3 special conference sessions at the AGU Fall Meeting in 2011, the IAH Congress in 2012, and a special lead-up meeting to the major Rio+20 conference that will take place in London in March 2012:

- Conference Session: *Groundwater and climate change: evidence from ground-based and satellite monitoring*, AGU 2011 Fall Meeting, 5-9 December 2011, San Francisco (USA)
- Conference Session, *The role of groundwater in enabling adaptation to the impacts of climate on water resources*, Planet Under Pressure: New knowledge towards solutions, 26-29 March 2012, London (UK)
- Conference Session: *Groundwater and climate change: linkages and adaptation*, IAH 39<sup>th</sup> Congress 2012 Confronting Global Change, 16-23 September 2012, Niagara Falls (Canada)

In 2011 and 2012, the IAH-CGCC is leading the production of one publication, a state-of-the-art review of the relationship between groundwater and climate change involving leading scientists from the GRACE satellite community, IPCC AR5 authors, and UNESCO-IHP GRAPHIC programme, and is contributing to a new volume on groundwater in adaptation in the IAH Blue Book Series (ICH: International Contributions to Hydrogeology). The former is intended to inform directly discussion of groundwater in the 5<sup>th</sup> Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC).

- *Groundwater and climate change: a critical review*. To be published in *Nature Climate Change* or *Earth Science Reviews*
- *Groundwater as a key for adaptation to changing climate and society*, International Contributions to Hydrogeology (editors: Jason Gurdak, Jose-Luis Martin Bordes & Holger Treidel)

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