



International Geographical Union
Union Géographique Internationale

Commission for
Water Sustainability



IGU Commission for Water Sustainability

Quadrennial Report 2008-2012

Chairs: Professor J.A.A. Jones, UK (2008-11);

Professor Claudio Cassardo, Italy (2011-12).

Vice-chair: Professor Kazuki Mori, Japan.

The Commission continued to be active, organising four conference meetings and being indirectly involved in a further two, publishing three books and contributing to the UN International Year of Planet Earth. The Commission also broke new ground in publishing conference papers in a new open access online journal *Water*, an imprint of the international scientific publishers MDPI of Basle, Switzerland. This was based mainly on papers delivered at the Commission's own conference in Turin in 2009, with an extra select few from the IGU meeting in Tunis the previous year. It began to come onstream in late 2010 and was fully online by mid-2011.

On New Year's Eve 2010, one of our principal projects came to fruition with the official publication of the book *Water Sustainability: a global perspective* by Hodder. The project aimed to analyse and map the challenges for water resources around the world in coming decades. It involved processing large quantities of data from a number of international data archives, such as the Global Runoff Data Centre, Koblenz, and the GEMS/Water water quality archive in Burlington, Ontario, mapping much of it for the first time. The IGU generously provided two tranches of funding to support a research assistant, and also helped secure additional funds from the International Council for Science (ICSU), which enabled the work to begin in earnest in 2004. Smaller grants from Aberystwyth University and some UK charities, together

with two summer internships for students from the Montpellier SupAgro International Centre for Advanced Studies in Agronomic Engineering enabled the project to be completed. Tony Jones directed the project and wrote the final text. Additional in-depth studies are presented as discrete specialist “boxes” authored by a number of experts, of which nearly half are members of the Commission. The book aims to bring together all aspects of relevance, including the global economy, international law, gender equality and war and terrorism, as well as climate change and the more usually considered physical constraints.

The group has now been operating since 1998, first as the Study Group on the Hydrological Impact of Extreme Events and since 2002 as the Commission for Water Sustainability. 2011 marked a change of leadership. After thirteen years as founding chairman, Tony Jones handed over to Claudio Cassardo in the summer of 2011 and we hope that the change will be ratified by the IGU at the 2012 Congress. Professor Cassardo has served the group since the outset. He has acted as webmaster and has been a very active member, regularly attending conferences and acting as chair of the organising committee for the Turin meeting in 2009. He was the unanimous choice of the members of the Steering Committee. One of Cassardo’s first tasks, apart from organising the Santiago meeting in 2011, has been a review of the membership, especially of the Steering Committee as so many members have now reached the stage of retirement. Our other stalwart member, Kazuko Mori from Tokyo, whose inside knowledge was invaluable when the Commission joined the World Water Forum in Kyoto, has indicated that he wishes to continue to serve as Vice-chair and provide continuity. Jones will also sit on the new Steering Committee to provide assistance.

1. Meetings

2008 was unusual with the Commission being involved in two conferences in one year. At the IGU meeting in Tunis the Commission hosted 7 sessions over two days of the Congress, together with the regular AGM. Speakers from 22 countries presented 27 research papers. It was particularly encouraging to be able to devote a session to water issues in North Africa and the Middle East. A very memorable paper

on water management in Algeria told of plans for a south-to-north transfer of water similar though on a far more modest scale to Libya's Great Man-made River, which was news to most listeners. Amongst the other sessions, a paper given by the doyen of Middle Eastern water resources, Professor Kliot from Israel, had the novel focus of water management and mismanagement in small island states, raising issues that are rarely if ever addressed by the world community.

Immediately prior to the Tunis meeting – and specially shifted through Professor Buttner's intervention so that we could participate in both meetings – the chair and a number of members of the Commission participated in the International Geological Congress in Oslo. This was to fulfil our commitment to the UNESCO IYPE (see Collaboration section below).

In 2009, the Commission held an independent conference at Turin University organised by Claudio Cassardo and sponsored by the Piedmont Region Environmental Protection Agency, the River Po Regional Water Company, and a number of regional councils from the Province to the City of Turin. The Rectors of the University of Turin and the Polytechnic University of Turin spoke at the opening ceremony. Over 60 delegates attended the meeting from around the world, and two field trips were organised with the assistance of the International Research Centre at the Società Metropolitana Acque Torino (SMAT). Perhaps the most interesting of these was a guided tour of the facility designated to provide drinking water for the Russian and American space expeditions – each specifying their own separate standards for water purity and mineral content.

Unfortunately, the Steering Committee felt that they were not prepared to participate in the Tel Aviv meeting in 2010 in light of the continuing obstacles placed on the Palestinian people by the government of Israel, including river diversions, severe restrictions, even bans, on drilling wells whilst allowing unfettered pumping by the Israeli water authorities and by the new Israeli settlements on the West Bank, and especially the new wall, designated illegal by the UN, which cuts many villages and farmers off from their traditional water sources.

The Commission held a successful conference at the Escuela Militar in Santiago, Chile, in occasion of the IGU-UGI 2011 Regional Conference during last autumn (14-18 November 2011). For the first time since the birth of our Commission, there was an international IGU conference in an odd year (2011), at which our Commission was asked to hold its own sessions. The organizational apparatus had some serious

problems during the first phase of the preparations, but fortunately these were almost completely solved by the beginning of the conference. Sadly, the very high registration fee discouraged several people from poorest countries from participating to the conference. Finally, there were some local problems that did not favour the participation of students in the conference sessions. Despite these problems, the local organizational committee (LOC), with the help of the Commission, assembled a program containing 21 oral presentations and 10 posters. Unfortunately, it was impossible to organize field trips as we have done in most of the other conferences.

The presentations and posters included a large number of sound research papers of international interest, and were subdivided into four sessions: Climate change, energy and water policies; Hydrological processes and water balance; Resources, pollution and treatments; and Water sustainability and land use management. As usual, it attracted a strong contingent from the “local” area – Chile and central-southern America – as well as long-standing members from Asia, Europe, northern America and Africa. A very memorable couple of papers on water contamination in South Africa addressed the serious problem of preserving the water resources for human use.

2. Collaboration

2.1 NATO

In 2009, the Commission completed its collaboration with the NATO Science for Peace and Security programme, which began with the NATO Advanced Workshop on *Natural Disasters and Water Security: Risk Assessment, Emergency Response, and Environmental Management* held in Yerevan, Armenia, in October 2007. The Workshop was the brainchild of Professor Trahel Vardanian, who joined the Commission at the IGU conference in Seoul in 2000 (he also organised the Commission’s annual meeting in 2003). Tony Jones served as NATO Country Co-director and many longstanding members of the Commission delivered research papers and contributed to discussion groups, although unfortunately the Vice-chair and a few others were not able to attend because their countries are not members of NATO. Former Vice-chair of the Commission, Emeritus Professor Ming-ko Woo of McMaster University, Canada, was also a prominent contributor. A selection of the

best papers and the deliberations of the three Working Groups on Risk Assessment and Water Governance (chair: David Brooks, Friends of the Earth Canada), the Threat from Armed Conflict and Terrorism (chairs: Saul Arlosoroff, Israeli Water Company and Tony Jones), and Climate Change Impacts (chair: Steering Committee member Peter Robinson) were published by Springer in cooperation with the NATO Public Diplomacy Division in 2009.

2.2 UN International Year of Planet Earth

Commission members Tony Jones and Dr-Ing João-Paulo Lobo Ferreira acted respectively as leader and deputy leader for the IYPE Science Implementation Team for Groundwater. Vice-chair Kazuki Mori and Steering Committee member Amarendra Sinha also contributed papers to the sessions held in Oslo in 2008. The IYPE was organised to commemorate the 50-year anniversary of the International Geophysical Year, which was the springboard for international collaboration in the Earth Sciences. As part of the publicity effort, the IYPE Secretariat published two “coffee table” volumes, to which the chairman contributed three short articles highlighting the challenges for global groundwater resources (see Publications).

One of the principal roles of the Groundwater SIT was to sift through and rate nearly 20 applications for financial support for research projects to commemorate the IYPE. In the end, despite intense efforts by the Executive Director of the IYPE International Secretariat, Eduardo de Mulder, the hoped for support from the oil industry was not forthcoming and only one project was nominated. Although no financial support was given, “badging” of the project by the Groundwater SIT did enable the principal investigator, Stephen Silliman of Notre Dame University, Indiana, to obtain funds from other sources to support a 4-year project. Silliman’s report was published in the resulting Springer book in August 2011 (see Publications). Of the 13 chapters, 5 are penned by members of the IGU Commission.

3. Publications 2008-2012

3.1 Books

Jones, J.A.A., T.G. Vardanian and C. Hakopian (eds) 2009: *Threats to global water*

security. NATO Science for Peace and Security – C: Environmental Security, Springer, Dordrecht, 400pp. ISBN 978-90-481-2343-8 (pb), ISBN 978-90-481-2336-0 (hb), ISBN 978-90-481-2344-5 (ebook); Library of Congress Control Number 2009927446.

Jones, J.A.A. 2010: *Water Sustainability: a global perspective*. London, Hodder Education, 464 pages. £39.99. ISBN 978 1 444 10488 2 (paperback), 9781444104882 (ebook), 1444128655 and online in eb20 format.

Jones, J.A.A. (ed.) 2011: *Sustaining Groundwater Resources: A Critical Element in the Global Water Crisis*. Springer Verlag, Dordrecht, Heidelberg, London and New York, 228 pages. Price £87.00. ISBN 978-90-481-3425-0, e-ISBN 978-90-481-3426-7, doi 10.1007/978-90-481-3426-7, Library of Congress Control Number 2011930881.

3.2 Book chapters

Jones, J.A.A. 2008: “Waterworld” & “Going to ground” (titles not ours!) In: E. Derbyshire (ed.) *Planet Earth – International Year*. The Official Publication of the International Year of Planet Earth, Boston Hannah International, London, 146pp., pp. 46-50.

Jones, J.A.A. 2009: Water crisis! What crises? In: E. Derbyshire (ed.) *Planet Earth – International Year II*. The Official Publication of the International Year of Planet Earth, Boston Hannah International, London, 130pp., pp. 104-107.

Jones, J.A.A. 2011: Groundwater in peril. In: J.A.A. Jones (ed.) *Sustaining Groundwater Resources*, Springer, Dordrecht, pp. 1-19.

3.3 Special Issues of International Journals

Cassardo, C. and J.A.A. Jones (eds) 2010: *Managing Water in a Changing World: Selected Papers from the 7th Conference of the Commission on Water Sustainability*. *Water*, ISSN 2073-4441, MDPI Publications, Basle, online open access at www.mdpi.com/journal/water.

3.4 Papers on peer reviewed journals

Holger Hoff, Christopher Bonzi, Brian Joyce and Katja Tielbörger, 2011: A Water Resources Planning Tool for the Jordan River Basin. *Water*, **3(3)**, 718-736; doi:10.3390/w3030718

- Claudio Cassardo and J. Anthony A. Jones, 2011: Editorial: Managing Water in a Changing World. *Water*, **3(2)**, 618-628; doi:10.3390/w3020618
- Olga E. Scarpati, Maria I. Botana, Alberto D. Capriolo, Veronica Pohl Schnake, Yamile Puga and Edgardo Salaverry, 2011: Present Characteristics of Northwestern Patagonia (Argentina) *Water*, **3(2)**, 576-589; doi:10.3390/w3020576
- Frank Winde 2011: Peatlands as Filters for Polluted Mine Water?—A Case Study from an Uranium-Contaminated Karst System in South Africa—Part III: Quantifying the Hydraulic Filter Component *Water*, **3(1)**, 356-390; doi:10.3390/w3010356
- Frank Winde 2011: Peatlands as Filters for Polluted Mine Water?—A Case Study from an Uranium-Contaminated Karst System in South Africa—Part II: Examples from Literature and a Conceptual Filter Model *Water*, **3(1)**, 323-355; doi:10.3390/w3010323
- Frank Winde and Ewald Erasmus 2011: Peatlands as Filters for Polluted Mine Water?—A Case Study from an Uranium-Contaminated Karst System in South Africa—Part I: Hydrogeological Setting and U Fluxes *Water*, **3(1)**, 291-322; doi:10.3390/w3010291
- Olga Eugenia Scarpati, Liliana Beatriz Spescha, Juan Alberto Forte Lay and Alberto Daniel Capriolo 2011: Soil Water Surplus in Salado River Basin and Its Variability during the Last Forty Years (Buenos Aires Province, Argentina) *Water*, **3(1)**, 132-145; doi:10.3390/w3010132
- Jay Krishna Thakur, Rinku Kumari Thakur, AL Ramanathan, Manish Kumar and Sudhir Kumar Singh 2011: Arsenic Contamination of Groundwater in Nepal—An Overview *Water*, **3(1)**, 1-20; doi:10.3390/w3010001
- Caterina Francone, Claudio Cassardo, Federico Spanna, Laura Alemanno, Davide Bertoni, Renzo Richiardone and Irene Vercellino 2010: Preliminary Results on the Evaluation of Factors Influencing Evapotranspiration Processes in Vineyards *Water*, **2(4)**, 916-937; doi:10.3390/w2040916
- Roberto Cremonini and Renzo Bechini 2010: Heavy Rainfall Monitoring by Polarimetric C-Band Weather Radars *Water*, **2(4)**, 838-848; doi:10.3390/w2040838
- Silvia Terzago, Claudio Cassardo, Roberto Cremonini and Simona Fratianni 2010: Snow Precipitation and Snow Cover Climatic Variability for the Period 1971–2009 in the Southwestern Italian Alps: The 2008–2009 Snow Season Case Study *Water*, **2(4)**, 773-787; doi:10.3390/w2040773
- Izak J. van der Walt, Stephanus J. Pretorius and Carel B. Schoeman 2010: The Role of Geohydrology in the Determination of a Spatial Development Framework in the Vredefort Dome World Heritage Site *Water*, **2(4)**, 742-772; doi:10.3390/w2040742
- Valeria Tigini, Valeria Prigione, Pietro Giansanti, Antonella Mangiavillano, Antonella Pannocchia and Giovanna Cristina Varese 2010: Fungal Biosorption, An Innovative Treatment for the Decolourisation and Detoxification of Textile Effluents *Water*, **2(3)**, 550-565; doi:10.3390/w2030550
- Riccardo Bonanno, Nicola Loglisci, Silvia Cavalletto and Claudio Cassardo 2010: Analysis of Different Freezing/Thawing Parameterizations using the UTOPIA

Model *Water*, **2(3)**, 468-483; doi:10.3390/w2030468

Roberto Cavallo Perin and Dario Casalini 2010: Water Property Models as Sovereignty Prerogatives: European Legal Perspectives in Comparison *Water*, **2(3)**, 429-438; doi:10.3390/w2030429

Marco Galli, Seungmin Oh, Claudio Cassardo and Seon Ki Park 2010: The Occurrence of Cold Spells in the Alps Related to ClimateChange *Water*, **2(3)**, 363-380; doi:10.3390/w2030363

Antonello Pasini and Rocco Langone 2010: Attribution of Precipitation Changes on a Regional Scale by Neural Network Modeling: A Case Study *Water*, **2(3)**, 321-332; doi:10.3390/w2030321

Jones, J.A.A. 2010: Soil piping and catchment response. *Hydrological Processes* **24**, 1548-1566.