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Union Géographique Internationale

Commission for Water Sustainability

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Contents

For continuous updates:
– see Commission website http://water-sustainability.ph.unito.it

1. Meetings

1.1 The Asheville conference August 2007

The Commission held another highly successful conference at the Crowne Plaza in Asheville, North Carolina last summer. Committee member Prof. Peter Robinson put together a good team of local organisers from the University of North Carolina, the North Carolina State University and the National Climate Data Center. They all deserve a hearty vote of thanks. About 40 delegates attended the sessions and they delivered some 30 papers, which included a large number of sound research papers of international interest. As usual, it attracted a strong contingent from the "local" area – the USA and Canada, as well as long-standing members from Japan, Italy, Germany and South Africa. This was

totally our own meeting, as opposed to last year's where we were part of a full IGU Regional Conference, and it is always more intimate, with no parallel sessions to worry about.

Three fieldtrips covered the National Climate Data Center in Asheville, the famous US Forest Service experimental catchments at Coweeta (where hydrological theory was transformed in the 1960s), and an interesting multi-function hydropower dam complex in the Catawba-Wateree river basin run by Duke Energy, where we were particularly interested in the management procedures for hurricanes and droughts. It was a little saddening to see that not a lot of new hydrological research is currently being undertaken at Coweeta, and research focuses mainly on forest ecology, somewhat like the situation in the UK where the world-famous Institute of Hydrology has been merged and largely subordinated to ecological interests in the Centre for Ecology and Hydrology. Of course, Coweeta has always been a research station of the US Forest Service, but there is still much to be achieved in the development of hydrological theory and there is a severe dearth of long-term experiments worldwide. There is still no physically-based model for the hydrological effects of land cover change that is robust enough to transfer between hydrological or climatic regions, or even between some adjacent river basins, without considerable tweaking and some local data.

1.2 NATO Advanced Research Workshop, Yerevan, Armenia, October, 2007

Commission chair Tony Jones and committee member Trahel Vardanian were co-directors of a NATO ARW entitled: ***Natural Disasters and Water Security: Risk Assessment, Emergency Response, and Environmental Management*.** The ARW was held at the Hrazdan hotel in the Armenian capital, October 18-22. Dr Christina Hakopian did a very able job as secretary and translator, assisted by her language lecturer sister, Diana. Christina is now assisting the co-directors in editing a volume in the NATO series to be published by Springer (see section 3).

The ARW received extra support from a number of international embassies, the UNDP and Armenian water companies. These included the embassies of the United Kingdom, Poland and Georgia; the latter hosted a lively and memorable reception for delegates. Yerevan State University published the *Abstracts*. The British, Polish and Georgian Ambassadors delivered welcoming speeches at the official opening, with the Italian Chargé d'Affairs in attendance. Five television stations covered the opening ceremony and interviewed delegates.

The following extracts are taken from the official report to NATO.

Despite repeated efforts and resolutions by the international community, from UN International Decades, the Millennium Goals and the Water Action Plan of the 2003 G8 summit to the World Water Forums, aimed at improving water supply and sanitation around the world, we are losing ground. There are now more people without safe water and sound sanitation than there were a decade ago. A third of the world population lives in countries suffering moderate to severe water stress, rising to two-thirds by 2025. The burgeoning world population is the largest single cause of the looming water crisis – far more

important than climate change. It affects vulnerability to disasters and the effectiveness of response and environmental rehabilitation, particularly in developing nations through increased poverty and poor health.

Presentations and discussions during the ARW covered a wide range of issues affecting water security, both natural and man-made. Three Working Groups were set up to discuss and make recommendations on (1) climate change and extreme events, (2) terrorism and armed conflict, and (3) changes in water governance.

Working Group 1: Extreme events and the threat of climate change.

Chair: Professor Peter Robinson, University of North Carolina.

The following issues are of particular relevance to the Caucasus Region:

1. Infrastructure improvements needed: a) Adopt policies to adapt infrastructure, including urban design, to changing flood regime; b) Ensure that land-use changes, however caused, are incorporated into planning activities; c) Plan domestic water supply systems with particular attention to wastewater treatment.
2. Operations & Management: a) Develop strategies for assessing optimal agriculture; b) Create better flood/drought forecast models; c) Examine strategies for flood forecasting and management; d) Review dam operation, hydropower generation and irrigation strategies; e) Organize sub-regional consortia to manage international effects.
3. Education: a) Enhance flood-related education for managers, decision makers and the public; b) Educate agriculturalists to ensure adequate response to changed conditions.
4. Experts noted that there is not enough knowledge to make definitive statements in assigning weights to the various climatic and human drivers of change in the region.
5. Further, there is a major need to ensure that the best data, quality-controlled, long-term and readily accessible, are used in analyses. Data archives should be freely open, and current and continuous monitoring should be encouraged.

Working Group 2: The threat of terrorism and armed conflict.

Chairs: Dr Saul Arlosoroff, National Water Corporation of Israel, & Professor Tony Jones, Aberystwyth University & IGU Commission for Water Sustainability.

Recommendations for Armed Conflicts:

1. Creating special sections of the military or under military control that are more specialised in water and sanitation provision and restoration than the current military engineers to take the strain off NGOs and to enter the arena before it is safe for NGOs.
2. A pre-existing emergency plan should be developed wherever possible with community leaders organising the initial response.
3. The military should take control of restoration/rehabilitation as soon as possible.
4. The UN might develop a formal set of rules for responsibilities concerning protection and restoration of water supply and sanitation in armed conflicts.

The WG recommends the following order of priority in emergencies:
1. Provision of any water is the first priority – quantity is more important than quality especially for sanitation rather than for drinking: disease is the most immediate danger.
2. Continuity of supplies is the second most essential element.
3. Provisions should be extended to the whole population.
4. Attend to water quality if necessary. But part of the community plan should be: a) education of the people in what to do in an emergency, especially filtering, boiling and otherwise purifying their own water and the dangers of specific diseases, and b) the availability of cheap, basic equipment with which to do this.

Recommendations on terrorism:
1. Priority must be given to intelligence information and to continuous online monitoring. Further development of online monitoring systems is needed to increase effectiveness and the number of parameters covered, including DNA analysis, luminescence and live animals, and to reduce the currently very high costs ($100,000 per instrument). This has an important feedback to WG3 in terms of the possible willingness or ability of private water companies to afford the equipment – who should control security measures?
2. Removal of sensitive information from the public domain.
3. Training of medical community in identifying signs of an attack, e.g. increases in diseases and disorders.
4. Improving cyber security and vetting of employees – disablement of computer control systems by hackers is an increasing threat as systems become more automated.
5. Improved physical protection of facilities – fencing, security cameras, etc.

Working Group 3: Changing water governance.
Chair: Dr David Brooks, Friends of the Earth, Canada.

1. Most experts believed that globalization and privatization threaten sustainable management, but Russian speaking members preferred to focus on more regional issues.
2. First, regardless of the degree or nature of the risk, wider public participation was needed to define appropriate ways to cope with and to define acceptable levels of risk, in order to ensure that officials and agencies could cope effectively with threats.
3. Environmental resources have been undervalued, particularly during the Soviet period.
4. Special environmental resources, e.g. the Aral Sea, deserved to be kept in an ecologically healthy state and their productive use should not impinge upon their ecology.
5. Nations upstream or upflow (in aquifers) have the responsibility to ensure that water that flows across (or under) their border should not be significantly degraded in quality.

The following priorities were identified:
1. Need to establish/enhance international cooperation on regional transboundary waters.

2. Improved monitoring and modelling of water resources, quality and ecology, and forecasting for extreme events, including greater use of satellite & GIS systems.
3. Development of education on water and community participation in decision making.

Professor Jones added that foreign ownership of water systems can threaten national interests, especially in smaller developing nations and where politically-oriented "sovereign wealth funds" might be involved, e.g. the China State Investment Corporation.

1.3 IGC Tunis, August 2008

Because 2008 is the International Year of Planet Earth (see section 2.1) and the Commission is involved in the year's Groundwater theme, the sessions in Tunis will include a special focus on groundwater issues, aiming in particular to place groundwater sustainability within the broader context of general water sustainability, as well as including papers on all aspects of global water resources.

The following is taken from the Call for Papers circulated to members some months ago. There is still time to submit an Abstract and remember that the remit is not limited to groundwater. That is simply a special, topical focus for this year – papers on any aspect of water sustainability are welcome.

The Commission will be holding sessions during the IGU Congress in Tunis, August 12th to 15th, 2008. Please see the details in the Call for Papers below:

CALL FOR PAPERS

The Commission will be holding sessions as part of the 31st International Geographical Congress in Tunis, August 12th to 15th 2008, on the theme:

Water Sustainability and Groundwater Resources in the International Year of Planet Earth

Papers are solicited on themes relevant to water sustainability. Since Groundwater is one of the 10 major themes of the UN International Year, the Commission will be especially interested to receive papers relating to groundwater resources. However, papers covering other water-related issues are welcomed.

Details of the Congress, including registration, hotels and transport can be found at http://www.igc-**tunis**2008.com

Brief Abstracts should be submitted via the IGC website by May 31st, as indicated below.
Here is the most relevant section from the Abstracts section of the website:

The abstracts (paper or poster) have to respect the following technical characteristics:
- Language: English or French
- Maximum word number: 200 (Title is not included)
- Text: Word
- Font: Arial
- Size: 12
- Justification of the text from right to left
- Bold and centered title.
- The name of the author at the centre, below the title
- Institution and post & e-mail addresses at the centre below the authors name
- No figures, maps, or statistic tables.

Abstract Submission
You are kindly invited to fill out the "Abstract Submission form" in the dynamic module, in order to download your abstract. Whenever you have validated your form, we will immediately receive it and send you a confirmation message. If you have not received this confirmation message, please feel free to contact us at the following email: abstracts@igc-tunis2008.com This e-mail address is being protected from spam bots, you need JavaScript enabled to view it.

Attention: The deadline for abstract submission is fixed for May 31st 2008

2. Research and collaboration with other Unions

2.1 The International Year of Planet Earth

Following on from the Commission's collaboration in the International Council for Science (ICSU) GeoUnions Joint Science Programme in 2004-6 (see Commission Newsletter No. 7, 2006), the Commission chair was appointed to the organising committee for the Groundwater theme of the International Year of Planet Earth. The IYPE is a joint project of UNESCO and the International Union of Geological Sciences (IUGS) and 12 other organisations, including the IGU. It is intended as a celebration of 50 years since the International Geophysical Year in 1957-8. It has been approved by the UN General Assembly as an official UN Year.
The IGY gave a much-needed boost to earth science in the 1950s. Although water sciences were only represented by glaciology in the IGY, it was surely no coincidence that the IAHS set up the International Hydrological Decade soon afterwards in order to foster field research and process studies. The IHD established benchmark research basins with minimal human interference to act as yardsticks of natural change and Experimental Basins, in which the effects of human-induced land cover changes could be tested. The IHD was the grandfather of the current International Hydrological Programme.
In December 2007, Tony was elected Leader of the Science Implementation Team for Groundwater and appointed Commission member Professor J-P. Lobo Ferreira, Head of the Groundwater Division at the Portuguese Institute of Civil Engineering, as Deputy Leader. Tony contributed two short pieces for the IYPE fund-raiser book (section 3.1), and is now organising the IYPE Groundwater

session to be held at the International Geological Congress in Oslo in August 2008, followed by editing a special volume in the Springer Legacy Series devoted to groundwater, due out towards the end of the IYPE in 2009.
Tony Jones attended planning meetings for the IYPE in Amsterdam in October 2007 and at the headquarters of the Geological Society of France in Paris in February 2008. He subsequently attended the official launch of the IYPE at the UNESCO headquarters in Paris in February 2008.

2.2. NATO Advanced Research Workshop

The ARW was a great success in terms of both scientific content and collaboration between scientists from a wide variety of disciplines, organisations and countries. Over 40 delegates participated, including delegates from 19 NATO countries and 27 Partner countries. In addition to the two co-directors from the IGU Commission, former vice-chair Prof. Ming-ko Woo (Canada) joined four others from the USA, Russia, Israel and Armenia on the organising committee, and three other members of the Commission's Steering Committee offered papers. Unfortunately, NATO rules precluded participation from many countries, including our vice-chair from Japan, Prof. Kazuki Mori.

For a full report of proceedings, see section 1.2, and for the forthcoming book see section 3.

3. Publications

The Commission published two books in 2007. We are especially pleased to have completed the first book in the new IGU *Home of Geography* series that has largely physical geography content. Professor Peter Robinson was the leading editor at the same time as busily organising the highly successful Asheville conference (section 1).
The Home of Geography series editor, Professor Giuliano Belleza, said in his Preface that the Home of Geography "welcomed the proposal of the Commission for Water Sustainability to publish this highly topical volume, as it is about a liquid whose true importance has not yet been properly grasped by public opinion….. This is an excellent testimony to how far geography is from the view held by public opinion: not lists to be learned by rote, but research which takes account of the relationships between mankind an ecosystems, in order to study how to improve them."
The book gives a sample of the work undertaken by members of the Commission, ranging from the ethical underpinning of water management, through explorations of the physical and chemical aspects of hydrological processes to studies of the roles of individuals and societies in using, misusing and restoring water resources.

The Commission also brought to fruition two publications initiated at the annual conference held in Buenos Aires in 2005: a book published in English in Argentina and a Special Issue of *GeoJournal* devoted to the water resources of South America (section 3.1). Perhaps the most abiding impression given by these two publications is that of a rapidly changing water supply situation, partly

due to climate change and especially the melting of the Andean glaciers that have been the lifeblood of so many of the important rivers in the region, and partly due to expanding human interference - population growth, the drift to the cities, the thirst for hydroelectricity and changing landuse, from decimation of the tropical rainforests to the planting of soyabeans. South America still has one of the highest per capita water resources in the world, but demand is rising and supplies are falling, and the large intra-regional differences are increasing.
Finally, the chairman was commissioned to write two short pieces for the so-called "coffee table" book to launch the UN International Year of Planet Earth - one on water resources in general and the other specifically on groundwater, the main water theme in the IYPE. The pieces are intended as an accessible introduction for the general public to the main issues currently facing water and groundwater resources.

The Commission's Atlas of Water Sustainability is due for submission to the publisher in 2008.

3.1 Books and Special Issues of international journals 2007-8

Robinson, P.J., M-K Woo and J.A.A. Jones (eds) 2007: ***Managing water resources in a changing physical and social environment.*** Home of Geography Series, IGU, Rome, 177pp. ISBN 978-88-88692-35-7.
Scarpati, O.E. and J.A.A. Jones (eds) 2007: ***Environmental change and rational water use***. Orientación Gráfica Editora S. R. L, Buenos Aires. ISBN 978-987-9260-46-3
Scarpati, O. and J.A.A. Jones 2007: ***Barriers and solutions to water sustainability in Latin America***. Special Issue, *GeoJournal*. ISSN 0343-2521.

3.2 Chapters in book commemorating the International Year of Planet Earth

Jones, J.A.A. 2007: Groundwater: the hidden resource. In: *International Year of Planet Earth*, Boston and Hannah, London.
Jones, J.A.A. 2007: Water futures: reduce consumption or find new sources? In: *International Year of Planet Earth*, Boston and Hannah, London.

3.3 Publications in preparation

Jones, J.A.A. and T. Vardanian (eds) in prep: ***Threats to global water security***. NATO Advanced Research Series, Springer. (Due 2008.)
Jones, J.A.A. (ed.) in prep: ***Sustaining groundwater resources***. Legacy Series, Springer. (Due 2009 for IYPE.)
Jones, J.A.A. in prep: ***World Atlas of Water Sustainability***. Hodder.
Reinfeld, I. and S. Bender in prep: ***Water sustainability issues in the Asia-Pacific rim***. Special Issue, *GeoJournal*.

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University Website: http://www.aber.ac.uk/iges/staff/jonestony.shtml
UN International Year of Planet Earth Website: http://www.esfs.org/organisation.htm
(Leader, Science Implementation Team for Groundwater)
NATO Website: http://www.aber.ac.uk/iges/nato
(Nato-country Director, Advanced Research Workshop)