



International
Water Association

IAHR/IWA Joint Specialist Group on URBAN DRAINAGE

Newsletter No. 23 April 2010

For updated information, please regularly visit our websites at:
http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=633912 and
<http://www.jcud.org>

CONTENTS

1. Joint Committee Contacts	2
2. Chairman's Thoughts	3
3. From the Secretary's Desk	5
4. Working Group Reports	7
5. News from IAHR and IWA	14
6. News from IWA Publishing	17
7. News from around the World	20
8. Reports on Conferences and Workshops	48
9. Future Meetings and Conferences	49
10. Recent Publications of Interest	55
11. Working Group Contacts	59

Editor: Dr Jiri Marsalek, Joint Committee Secretary
c/o National Water Research Institute, Environment Canada
867 Lakeshore Road, Burlington, Ontario L7R 4A6, Canada, jiri.marsalek@ec.gc.ca

Disclaimer: *This is not a journal, but a Newsletter issued by the IAHR/IWA Joint Committee on Urban Drainage. Statements made in this Newsletter do not necessarily represent the views of the Joint Committee or of IAHR/IWA. The use of information supplied in the Newsletter is at the sole risk of the user, as the Joint Committee and the IAHR/IWA do not accept any responsibility or liability.*

IWA is a registered charity (England) 1076690 at Alliance House, 12 Caxton Street, London SW1H 0QS, UK.
Tel: +44 (0)207 654 5500; Fax: +44 (0)207 654 5555; E-mail: water@IWAhq.org.uk; Web: www.IWAhq.org.uk

IAHR is at Paseo Bajo Virgen del Puerto 3, 28005 Madrid, Spain.
Tel: +34 91 335 7908; Fax: +34 91 335 7935; E-mail: iahr@iahr.org; Web: <http://www.iahr.org>

1. JOINT COMMITTEE CONTACTS

Dr Peter Steen Mikkelsen (Chairman)

DTU Environment
Technical University of Denmark
Department of Environmental Engineering
Miljoevej, Building 113
DK-2800 Kgs. Lyngby
DENMARK
Phone: 45 4525 1605, Fax: 45 2593 2850
Email: psm@env.dtu.dk

Prof D. Butler

Director, Centre for Water Systems
School of Engng, Computer Science and Mathematics
University of Exeter
Harrison Building, North Park Road
Exeter, EX4 4QF
UK
Ph.: 44(0)1392-264064, Fax: 44(0)1392-217965
E-mail: d.butler@exeter.ac.uk

Dr Tim Fletcher

Institute for Sustainable Water Resources
Dept. of Civil Engineering, Building 60
Monash University
Clayton, Vic 3800
AUSTRALIA
Ph: 61 3 9905 2599, Fax: 61 3 9905 4944
E-mail: tim.fletcher@eng.monash.edu.au

Prof J H W Lee

Department of Civil Engineering
The University of Hong Kong
Pokfulam Road
HONG KONG, PRC
Phone: 852 2859-2672, Fax: 852-2559-5337
Email: hreclhw@hku.hk

Prof Mohd Nor bin Mohd Desa

Hydrology and Water Resources
Universiti Tenaga Nasional
KM7, Jalan Kajang-Puchomng
43009 KAJANG
MALAYSIA
Ph.: 60 3603 8928 7254, Fax : +60 3 8921 2116
Email: mohamednor@uniten.edu.my

Prof Maria Viklander

Dept. of Civil, Mining and Environmental Engineering
Lulea University of Technology
S-971 87 Lulea
SWEDEN
Ph.: 46 920 491 634, Fax: 46 920 491 493
E-mail: Maria.Viklander@sb.luth.se

Prof N. Armitage

Department of Civil Engineering
Snape Building, Upper Campus
University of Cape Town, Private Bag X3
Rondebosh 7701
REPUBLIC OF SOUTH AFRICA
Phone: 27 21 650 2589, Fax: 27 21 689 7471
Email: Neil.Armitage@uct.ac.za

Dr Alberto Campisano

Dept. Civil and Environmental Engineering
University of Catania, Viale Andrea Doria 6
95125 Catania
ITALY
Ph: 39(0)95 738 2730, Fax: 39(0)95 738 2748
E-mail: acampisa@dica.unict.it

Prof H. Furumai

Department of Urban Engineering
The University of Tokyo
7-3-1, Hongo, Bunkyo-ku
Tokyo, 113-8656
JAPAN
Ph: 81-3-5841-6239, Fax: 81-3-5841-8535
Email: furumai@env.t.u-tokyo.ac.jp

Prof Nilo de Oliveira Nascimento

Federal University of Minas Gerais
Dept. of Hydraulics and Water Res. Engineering
Av. do Contorno, 842/8a.
30110-060 - Belo Horizonte, MG.
BRAZIL
Tel.: (+55.31)3238.1872, Fax: (+55.31)3238.1001
e-mail: niloon@ehr.ufmg.br

Dr Manfred Schuetze

ifak Magdeburg
Institut f. Automation und Kommunikation
Werner-Heisenberg-Strasse 1
39106 Magdeburg
GERMANY
Ph.: 49 391 990 1470, Fax: 49 391 990 1590
E-mail: Manfred.schuetze@ifak.eu

Dr Jiri Marsalek (Non-member Secretary)

National Water Research Institute
867 Lakeshore Road
Burlington, ON L7R 4A6
CANADA
Ph: 001-905-336-4899; Fax: 001-905-336-4420
E-mail: jiri.marsalek@ec.gc.ca

2. CHAIRMAN'S THOUGHTS

Dear friends and colleagues,

The end of 2009 saw the Copenhagen World Summit take place in Denmark, close to where I live. I happened to pass through the airport around that time and was astonished by the variety of people waiting for their luggage while communicating intensively with the outside world via their mobile phones and PDA's. You may imagine the impact of organising an event of this size has on a country of Denmark's relatively modest size. Climate change had suddenly become a political and economic reality for everyone, and for those of us working in the water world in particular. Looking back, it is of course discouraging that bigger decisions have not been made, but something has changed. "If" change will occur has been replaced by discussing "when" change will occur and how we can prepare for this in time. CO₂ neutrality and renewable energy has become a huge societal concern, and urban flooding due to more frequent and intense rain storms has become a phenomenon everybody can relate to. Climate change adaptation receives a lot of attention in professional circles: when does it pay to act, is it better to do up- or downstream control, or shall we simply change the service levels when realizing that the current drainage infrastructure no longer meets the needs? Urban planners and even politicians now ask these questions more and more often, and this increases the attention paid to the field of urban drainage.

Increased attention brings new opportunities, and 2009 has indeed been a busy year. Among the most important and visible JCUD activities in 2009 were the 8th Int. Conf. on Urban Drainage Modelling (UDM) in Tokyo 7-11 September, organised by Hiroaki Furumai, Fumiuki Nakajima and their colleagues at the University of Tokyo in collaboration with the JCUD Int. Working Group on Data and Models (IWGDM), and held in conjunction with the 2nd Int. Conf. on Rainwater Harvesting and Management. The event attracted more than 200 participants who attended sessions in four parallel tracks, one of which dealt with rainfall harvesting. As a new initiative the organizers issued two awards at the event: the "UDM Young Researcher Paper Award" (won by Robert Sitzenfrei from Innsbruck University, Austria) and a "UDM/RWHM Best Poster Award" that was awarded to six candidates.

Another recurrent JCUD event held in 2009 was the 8th Int. Workshop on Precipitation in Urban Areas, organised by Paulo Burlando and Peter Molnar from ETH Zürich in collaboration with the JCUD Int. Working Group on Urban Rainfall (IGUR), 10-13 December in St. Moritz, Switzerland. Around 70 scientists met there to discuss issues of current interest and it was interesting to note that after several triennial meetings the approaches and methods used in meteorology and urban drainage research now seem to converge.

Among many other important things that took place in 2009 I also wish to mention the 1st Int. Conf. on Urban Drainage and Road Salt Management in Cold Climate in Waterloo/Canada in May 2009, chaired by Prof. M. Stone, where Jiri Marsalek and Maria Viklander (chair of the Urban Drainage in Cold Climate Working Group) took part in the organisation and the 33rd IAHR Congress in Vancouver in August 2009, where our previous chairman Jean-Luc Bertrand-Krajewski contributed to organising a strand of sessions on urban drainage related issues. A new JCUD Working Group on *Urban Streams* was furthermore established in 2009, chaired by Ivana Kabelkova from the Czech Technical University. Interested individuals are invited to contact her (kabelkova@fsv.cvut.cz) to

become involved. Finally, the journal *Water Science and Technology* continues its positive development with several individuals involved in JCUD affairs among the editors, and the *Urban Water Journal* has now also been included in the ISI Science Citation Index, which makes it an attractive journal for publishing your latest research on urban drainage issues.

From my personal perspective as the sitting JCUD chairman, several new and very interesting developments took place in 2009. I attended the IWA Specialist Group Forum in The Hague in April 2009, which was held in parallel with a meeting of the IWA Programme Committee, in which I have become involved to contribute (the way I understood it) to placing urban drainage issues on the agenda of the IWA World Water Congresses. Representing one of IWA's largest specialist groups (more than 600 members as of March 2010) it was interesting to meet with leaders of the other specialist groups and hold discussions with other members of the Programme Committee. The first result could already be seen in the call for papers for the IWA World Water Congress in Montreal/Canada later this year, where urban drainage and stormwater was mentioned along with water and wastewater treatment, which have traditionally been in focus at these conferences, and the final programme will likely contain several sessions and workshops of interest to urban drainage specialists.

Many new JCUD activities will take place in 2010, and you will be able to find further information about many of these on the following pages of this newsletter. A (non-exhaustive) list of activities scheduled for 2010 includes:

- 7th Int. Conf. on Sustainable Techniques and Strategies in Urban Water Management (NOVATECH), Lyon /France, 27 June – 1 July.
- IWA World Water Congress and Exhibition, Montreal/Canada, 19-24 September.
- 6th Int. Conf. on Sewer Processes and Networks, Gold Coast/Australia, 7-10 November (<http://www.spn6.net/>).

In addition, I'd like to mention that deadline for extended abstracts for the 12th Int. Conference on Urban Drainage in Porto Alegre, Brazil (10-15 September 2011) is already August 1, 2010. I hope to meet many of you there and encourage you to visit the conference website on <http://www.acquacon.com.br/icud2011/en/> and submit an abstract.

The JCUD will have its next meeting prior to the NOVATECH conference in Lyon, on 26th June 2010 in the afternoon. The membership of the management committee has recently been consolidated after the first 3-year term was up for three members. David Butler (UK) and Alberto Campisano (Italy) were re-elected and I look very much forward to their continued contributions to the JCUD. Maria do Céu Almeida (Portugal) decided to step down to devote more time to her own research, and I thank her warmly for her contributions during the past three years. This means that we have one slot open, which we will seek to fill in a strategic manner to ensure worldwide coverage of the JCUD. If you are interested in contributing to JCUD activities or becoming member of JCUD working groups, I invite you to attend this meeting, which as usual will be held in an open atmosphere. Needless to say, you are of course also welcome to contact me or the JCUD Secretary, Jiri Marsalek, if you wish to become involved.

Peter Steen Mikkelsen

Chairman of the IAHR/IWA Joint Committee on Urban Drainage

3. FROM THE SECRETARY'S DESK

Committee Newsletter – our annual newsletter is published to serve the international urban drainage community and meet the requirements of our parental organisations. The main purpose of the newsletter is to facilitate communications and interactions among specialists in our field, rather than presenting detailed information. The latest newsletter can be found on our website <http://www.jcud.org>.

Both IWA and IAHR now distribute newsletters only electronically, and place the newsletter on their websites. IAHR also distributes some excerpts from our newsletter in their Newsflash. Furthermore, thanks to the past efforts of Mitsuyoshi Zaizen and Shoichi Fujita, our newsletter was regularly translated into Japanese and 200 hard copies were distributed in Japan. We will also distribute the Newsletter to more than 1,200 colleagues on our JC mailing list, which is based on the IWA and IAHR memberships, and participation in ICUD and NOVATECH conferences.

Please share your electronic newsletter copy (or the link to our website) with colleagues, or refer them to the IAHR, IWA and Joint Committee websites. Your comments on this issue and contributions to future newsletters are most welcome.

Prof Jean-Luc Bertrand-Krajewski elected to the IWA Strategic Council

In early April, 2010, we have learned excellent news that our former chairman and current associate member of the Joint Committee, Prof Jean-Luc Bertrand-Krajewski, INSA Lyon, France, has been elected to the IWA Strategic Council. Jean-Luc's membership will give us an effective voice on this important body, which guides IWA strategic planning, advises the Executive Committee, stimulates and promotes specialist groups and strategic programmes, ensures coordination with IWA Publishing, and reviews policies and position materials. On behalf of the Joint Committee, I would like to congratulate Jean-Luc on this recognition of his standing in our profession and assure him of our full support in his service on the Council.

Joint Committee Activities – The annual Committee meeting was held in Tokyo, Japan, on Sep. 14, 2009. The minutes of the meeting can be found on our new website (thanks to Alberto Campisano). Future JC meetings: in 2010 at the NOVATECH Conference in Lyon, France (on June 26, 2010, in the afternoon, before the conference), and in 2011 in Porto Alegre, Brazil, during the 12th ICUD. Please note that the JC meetings are public – all are welcome.

From the Personal Department

Remembering Dr Peter Stahre

Our urban drainage community has suffered a great loss with the untimely passing of Peter Stahre in Malmo, Sweden, on April 1, 2009, at a relatively young age of 59. I fondly recall my collaboration with Peter spanning more than two decades, and will always remember his warm boyish smile and keen desire to promote and improve our profession. Peter maintained a wide international network of collaborators, and in recent years, devoted much of his energy to sustainable urban drainage, as documented by his latest book titled *Blue-Green Fingerprints in the City of Malmo, Sweden*. Recognizing Peter's frequent collaboration with US colleagues, it is fitting to present here a tribute to his life and career accomplishments prepared by his colleagues on the Urban Water Resources Research Council of the American Society of Civil Engineers.



The Passing of a Friend and Colleague

Peter Stahre, friend and colleague of many in our community, was lost to us in April of 2009, due to cancer. The facts of Peter's career are impressive. At the time of his passing, he was the deputy managing director of Malmo Water & Wastewater Works in Sweden, an operation he helped develop into a resource center which supported not only the needs of his own city but the needs of communities elsewhere in the region, and beyond that stood as a role model for many best practices in municipal water resources engineering everywhere. Complementing this practical activity was a record of accomplishment as a capable academic, attested to by a Doctor of Science in

water resources engineering at the Royal Institute of Technology in Stockholm, and by periods as a part-time professor at Lund University of Technology and as acting professor at the Royal Institute of Technology in Sweden. His professional activity and memberships in Sweden and Europe were extensive, and his activities in our own Institute, particularly in our Urban Water Resources Research Council, were valued for many years. His record of highly referenced publications made him a respected and well-known figure in water resources far beyond the borders of his homeland. 2008 recipient of the prestigious Water Prize from the Water Association, he was a father of green roof and integrated water management technologies and practices, promoting these ideas well before they became popular and nudging many of us towards better practices right up to the present.

These things are admirable, but at the end of the day we are perhaps less defined by the things we achieve than by the way we achieve them. This, too, is a place where Peter shone. He was a presence of persistent gentle humour, never shy in the face of disagreement but always taking the high road and always respectful of other views. Many of us remember his slim figure circulating at our community events, and it was a characteristic of the man that he always provoked a positive reaction and a smile, and the unstated sense that he was there for our common good. His capabilities and interests were as broad as they were genuine, and personal memories of Peter are a kaleidoscope of human experiences. One of us, an athletic individual himself, ruefully remembered being lost in Peter's wake on a day they went swimming in a lake while at a stormwater conference. Another recalled Peter's outstanding voice and his passion for singing. A third recalled the family man at home, and the visible pride with which he introduced his wife and daughter. The list goes on, and at the end of the day we remember not just an influential figure, but a man who was genuine and open, a friend of many dimensions, and a man who affected us personally and professionally in many positive ways. We are grateful for the times we spent together, and the legacy of knowledge and warm memories that Peter left. Thank you Peter, for what you gave us along the way.

UWRRC, ASCE

Jiri Marsalek
JC Secretary

4. WORKING GROUP REPORTS

4.1. International Working Group on Data and Models (IWGDM) (Chairman: Ana Deletic, Institute for Sustainable Water Resources, Dept. of Civil Engineering, Building 60, Monash University, Clayton, Vic 3800, Australia, Ph: 61 3 9905 2940, Fax: 61 3 9905 4944, E-mail: ana.deletic@eng.monash.edu.au ; Secretary: Prof Simon Tait, Pennine Water Group, School of Engineering Design and Technology, University of Bradford, Bradford, West Yorkshire, BD7 1DP, UK, Ph: 44 1274 233 878, Fax: , E-mail: s.tait@bradford.ac.uk).

Web site: <http://iswr.eng.monash.edu.au/iwgdm>

- (1) Prof. Hiroaki Furumai, Tokyo University, Japan, chaired the 8th International Conference on Urban drainage Modelling (8UDM), which was held in conjunction with the 2nd Inter. Conf. on Rainwater Harvesting and Management in Tokyo, Japan, Sept. 7-11, 2009.
- (2) Results of a joint project on ‘Evaluating uncertainty methodologies’ were presented at a workshop held in 2009 in conjunction with the 8UDM in Tokyo.
- (3) The 9th International Conference on Urban drainage Modelling (9UDM) will be held in 2012 in Belgrade, Serbia, to honour Prof Cedo Maksimovic’s career and contributions to urban drainage modelling. Prof Maksimovic, who plans to retire in 2012, started the group almost 25 years ago, and the Belgrade conference will offer a great opportunity to thank him for his long service to our profession. Assoc. Prof Dusan Prodanovic from Belgrade University agreed to Chair the 9UDM conference.

4.2. The Real-Time Control of Urban Drainage Systems (RTCUDS) Working Group (Chairman: Dr Alberto Campisano, Department of Civil and Environmental Engineering, University of Catania, Viale Andrea Doria 6, 95125 Catania, Italy, Phone: +39 (0)95 7382730, Fax: +39 (0)95 7382748, e-mail: acampisa@dica.unict.it). Secretary: Dr M. Pleau, BPR-CSO, 5100 Sherbrooke St. E., Suite 400, Montreal, Quebec H1V 3R9, Canada; Phone: 001-514-257-2439, Fax: 001-514-257-2414, E-mail: Martin.Pleau@bpr-cso.com).

Web site: <http://www.dica.unict.it/users/acampisa/rtcwg/>

During the year 2009, the Working Group on Real Time Control of Urban Drainage System has been active in exchanging information, improving the Work Group Web Site (<http://www.dica.unict.it/users/acampisa/rtcwg/>), promoting the RTC technology for Urban Drainage Systems, and preparing a RTC workshop at the Novatech 2010, 7th International Conference on Sustainable Techniques and Strategies in Urban Management.

The RTC Workshop at Novatech 2010 is organized in partnership with the ICA group (president: Alejandro Vargas). This joint workshop will be an opportunity to develop a new synergy within the two groups and to promote RTC strategies integrating sewer systems and treatment plants. The morning session should be dedicated to RTC of sewer systems and wastewater treatment plants separately, focussing on basic technology and special aspects of both sectors. The afternoon session should be devoted to integrated RTC (sewer and WWTP together) with final discussion of benefits of this integrated approach.

Over the years, the RTC work group through its members has been involved in different publications describing and promoting the RTC technology for sewer systems. In 2009, these documents included the manual for Operating RTC in Urban Drainage (produced by Italian members belonging also to CSDU, i.e., the Urban Hydraulic Research Centre; the book deals with the implementation of RTC systems), the IWA State-of-the-Art Report on RTC (first published in 1989, this book is under review by some RTCUDS members working on updating the case studies), the “Planungshilfe Abflusssteuerung – PASST” (Planning Aid - Real Time Control) and the DWA Guideline M-180 (produced by some members of the DWA WG).

During the course of 2010, the Work Group intends to produce a leaflet on RTC. The leaflet would describe the main activities and objectives of the RTCUCDS WG. It would be translated into several languages and distributed to authorities, companies and municipalities interested in this technology.

Many active RTCUDS members have been involved in different RTC worldwide projects during 2009. A brief report on selected projects follows.

Canada: The Quebec City RTC project, Phases II and III, is now completed. This 130 M\$ project includes 14 storage tanks built to reduce CSOs. The objective is to reduce CSOs events discharging to the St. Lawrence River and the St. Charles River to 2 and 4 per year, respectively.

The Montréal City Phase II CIDI project should be completed in 2010. During Phase I, global optimal RTC was implemented at 10 control sites. At the end of Phase II, 36 RTC sites will be in operation. The main objective is to maximize treated flows and minimize CSO discharges at the sites that are less sensitive to urban pollution. Moreover, during the course of Phase II, the following tools were developed: An optimal control scheme independent of meteorological forecasts, a local control mode for the winter season and a rain gauge measurement validation algorithm.

Denmark: A 5-year RTC research project has started in 2008. The total budget for this project is 3 million pounds. The project deals with major aspects of RTC systems including meteorological forecasting, instrumentation, uncertainties and implementation problems. Different control strategies will also be investigated such as regional control and integrated control. This project involves both the public sector (universities) and the private sector (consulting firms).

France: In Paris, the Mages decision support system has been fully implemented in 2009. The Mages system provides a new tool for the operators to better manage flow rates in the sewer systems. During dry period, the objective is to maintain a constant flow rates at the Achères WWTP whereas during wet weather period, the main objective is to minimize CSOs by better using the in-line and off-line storage available in the sewer system. To reach these objectives, 57 flow regulators (pumps and gates) can be operated dynamically.

In Bordeaux, the RTC GD1 project is now in the final design stage. The implementation is scheduled for 2012. Seven RTC sites will be put in service to reduce CSOs during rainfall events. The total budget is approximately 7M of Euros. This project is conducted in parallel with an

important upgrade of the Louis Fargue WWTP that will allow to treat up to 3.2 m³/s of sewage (currently, the WWTP capacity is 2.4 m³/s) and the construction of a 22 000 m³ storage tank.

Germany: The research institute ifak has organised, together with the German Society of Engineers (VDI) and the German Association of Water, Wastewater and Waste (DWA), the biennial conference on measurement and control technologies for wastewater systems. This year's conference, attended by well over 100 participants from consultancies, water authorities and research establishments, showed a significant percentage of contributions on real time control.

The English version of the DWA M180 Guideline document has been finally published. This Advisory Leaflet "Framework for Planning of Real Time Control of Sewer Networks" provides practical help for planning, design and implementation of RTC systems. The approach is based on a step-wise procedure, evaluating the RTC potential first before embarking on a detailed study and implementation, thus avoiding unnecessary planning efforts in those cases where RTC shows only limited potential.

The "RTC Demonstrator" (freely available from ifak's website at <http://simba.ifak.eu>) allows to develop and test RTC strategies (rule-based and optimisation-based) for two simple catchments. Designed only as an educational tool (for "promoting" the concept of RTC to wastewater operators), it has been successfully used for teaching, including a summer course in South America.

The new version of the SIMBA simulator (SIMBA6) has additional features, making simulation and implementation of RTC for sewer systems (but also for wastewater treatment plants and analysis of dynamic impacts on receiving rivers) even easier.

In cooperation with an automation company, a general global control algorithm (developed by ifak) is being implemented as a building block in PLCs. This makes the control algorithm applicable with only a minimum configuration effort, thus cutting down costs on design and development of RTC systems. Its practical implementation in the system of a large city in Germany is currently underway.

4.3. Sewer Systems and Processes Working Group (SS&PWG) (Chairman: Dr. Ghassan Chebbo, CEREVE, 6-8 Avenue Blaise Pascal, Cité Descartes, Champs-sur-Marne 77455 Marne la Vallee, Cedex 2, France, Phone: + 33 164 153 641, gksc@terra.net.lb . Vice-Chairman and Secretary: Dr. Zhiguo Yuan, The University of Queensland, Sta. Lucia, QLD 4072, Australia, Phone: + 61 733 654 374, Fax: +61 733 654 726, E-mail: zhiguo@awmc.uq.edu.au. Website: <http://www.sspwg.org> .

The main activity of the working group during the last six months has been the preparation of its 6th International Conference on Sewer Processes and Networks (SPN6). The conference will take place during November 7-10, 2010 on the beautiful Gold Coast, Australia (<http://www.spn6.net/>).

For the first time, SPN6 will bring together the knowledge and experience developed through the SPN series of conferences (last held in Delft, Holland in 2007 as SPN5) with the great wealth of knowledge and experience of the Sewer Operation & Maintenance (SOM) conferences (last held in Vienna, Austria in 2006). Conference themes include (more details can be found at www.spn6.net):

- Sewer design, operation and maintenance (Sewer leakage, infiltration and exfiltration; Management of sewer blockage; Ventilation design and optimisation; Sewer condition assessment; Sewer rehabilitation; Combined sewer overflows; Real time control of sewer systems; Sewer systems and Water Sensitive Urban Design (WSUD); Alternative sewerage for developing countries)
- In-sewer physical, chemical and biological processes (Sewer biofilms and sediments; Solute and sediment transport; Wastewater characterisation, micro-pollutants, and source control; Water quality monitoring in sewers; In-sewer biological processes under aerobic, anoxic and anaerobic conditions; Technologies for sulphide control in liquid phase; Gas transfer through the liquid-gas interface; Methane emission from sewers as a greenhouse gas; Modelling of in-sewer processes and hydraulics)
- Odour measurement and treatment (Measurement of odour and odorous compounds from sewers; Odour removal using physical, chemical and biological methods; Odour dispersion modelling)
- Corrosion processes and protection (Concrete corrosion; Metal structure corrosion; Surface protection through coating), and
- Other aspects (Interactions between sewers and wastewater treatment systems; Impact of sulphide and odour control strategies on wastewater treatment plants; Knowledge management and decision support tools)

A new WG website has been created: www.sspwg.org ; the webmasters are Jes Vollertsen and Asbjørn Nielsen.

4.4. Working Group on Source Control for Stormwater Management (SOCOMA)

(Chairman: Gilles Rivard, Aquapraxis Inc, 948 Donat-Belisle, LAVAL (PQ), Canada H7X3W5; Phone: 001-450-689-2967, Fax: 001-450-689-2969, E-mail: GRivard@aquapraxis.com; Vice-chair & Secretary: Sylvie Barraud, INSA Lyon - LGCIE - Bâtiment Coulomb, 34 Avenue des Arts, F-69621 Villeurbanne Cedex. Phone: 04 72 43 83 88 - Fax: 04 72 43 85 21 - E-mail: sylvie.barraud@insa-lyon.fr).

The SOCOMA working group studies source controls, which are defined as all measures applied to control stormwater before it enters sewers or the surface receiving waters. The group's objective is to facilitate the development of these techniques, by conducting research and experiments, and disseminating the results by various means. As compared to the WSUD (Water Sensitive Urban Design) working group, which has related interests but in a more holistic and institutional outlook, SOCOMA focuses more on technical aspects related to source control technologies as applied to urban drainage. The activities and participation at workshops would therefore be more oriented to provide a forum for exchanging technical details of design and implementation of source control mechanisms or BMPs. The group includes researchers, practitioners and policy-makers and represents a great opportunity to present and debate new ideas.

The Working group did not have an official meeting in 2009; all current affairs and coordination of the activities planned for 2010 have been dealt with by e-mail. The next meeting will be held during the NOVATECH Conference in Lyon (France), probably during the first days of the conference (June 27th to July 1st 2010). This conference will include many sessions dedicated to source control planning, analysis and design and will therefore provide an excellent forum for discussing new

ideas. Some members of the group have been asked to review papers and the conference will indeed include many excellent papers.

As part of a renewal process of the group's membership, a survey has been prepared and sent in October 2009 to the existing members and individuals who were identified as being interested in the topics discussed within the group. The survey, developed and compiled by Tim Fletcher of Monash University in Melbourne (Australia) (e-mail: Tim.Fletcher@eng.monash.edu.au) and Sylvie Barraud (INSA Lyon - URGC - sylvie.barraud@insa-lyon.fr), with the assistance of Gilles Rivard, had also as objective to identify and plan future activities.

The activities planned for 2010 include:

1. Updating and populating the Working group web site. The web site will be used for sharing research and practice articles on source control technologies, including infiltration systems, biofiltration systems, swales and trenches, as well as non-structural techniques. The site will include design guidelines, research papers and related documents as well as links to useful and relevant sites. The site will probably be on-line in early 2010, and may be hosted by the GRAIE (who organizes the NOVATECH Conferences). Members will be informed and asked for contributions for the site.
2. Develop and maintain a discussion forum.
3. A workshop will be organized at the NOVATECH Conference (June 27th to July 1st 2010), on June 27th (Sunday before the main sessions). The topic of the Workshop, coordinated by Sylvie Barraud (INSA, Lyon) and Tim Fletcher (Monash University in Melbourne (Australia)), will be **Design, modelling and implementation of stormwater source control technologies**. This workshop will explore technical and social aspects of source control technologies and techniques. The morning session will focus on new techniques for modelling and design, whilst the afternoon will focus on the practical lessons from implementation and adoption. The program has been developed to provide an interesting overview and in-depth discussions with international speakers.
4. Another workshop is planned for the 2010 IWA World Water Congress, to be held in Montreal (September 19-24 2010). The Workshop is organized jointly with the Urban Drainage in Cold Climate Working Group (Prof. Maria Viklander, Lulea University of Technology, Sweden - Maria.Viklander@sb.luth.se) with a general topic: **Stormwater source control for cold climates: technologies, incentives and regulation**. Design, policies and case studies for implementation of source control measures in cold climate will be discussed with an international panel of speakers. Coordinators: Gilles Rivard (GRivard@aquapaxis.com) and Maria Viklander (Maria.Viklander@sb.luth.se).
5. Publish a review article on stormwater infiltration as a source control measure, discussing advances and issues in stormwater infiltration technology (in 2010).
6. Develop a more general technical document discussing different techniques that could be used for source control, striving to produce an international terminology for the professionals involved in the design and implementation of these technologies. This document could be presented preliminarily and discussed at the 2010 conference in Lyon, France.

Strong links should also be maintained and developed with other Working groups, especially the WSUD (Water Sensitive Urban Design) group, which has many common interests with SOCOMA, and with the Urban Drainage in Cold Climate Working Group.

4.5. International Working Group on Urban Rainfall (IGUR) (Chairman: Dr. Patrick Willems, Katholieke Universiteit Leuven, Hydraulics Division, Kasteelpark Arenberg 40, B-3001 Leuven, Belgium; Phone: +32-16-321658, Fax: +32-16-321989, e-mail: Patrick.Willems@bwk.kuleuven.be. Secretary: Dr. Thomas Einfalt, hydro & meteo GmbH & Co. KG, Breite Strasse 6-8, D-23552 Lübeck, Germany. Phone: +49-451-7027333 Fax: +49-451-7027339, e-mail: einfalt@hydrometeo.de. Group's web site: <http://www.kuleuven.be/hydr/gur>

The 2009 annual meeting was held during the 8th Workshop on Precipitation in Urban Areas, held from December 10 to 13, 2009 in St. Moritz. The IGUR was involved in the organisation and review of abstracts for this workshop. In total, 33 abstracts were accepted for oral presentation, and 25 abstracts for poster presentation. Every abstract was reviewed by 2-3 persons.

The IGUR is in the process of preparing a review document on the topic of climate change impact in urban drainage. An abbreviated version has been presented as a short paper at the 8th Workshop on Precipitation in Urban Areas: Willems P., Arnbjerg-Nielsen K., Olsson J., Nguyen V.T.V., "Climate change impact assessment on urban rainfall extremes and urban drainage: methodologies and difficulties".

The most recent information related to IGUR activities as well as the annual meeting reports can be found on the IGUR website which is regularly updated, visit www.kuleuven.be/hydr/gur.

Future meetings and conferences: Novatech 2010, Lyon, France, 27 June – 1 July 2010 (<http://www.novatech.graie.org>), and IWA World Water Congress and Exhibition, Montreal, 19 – 24 September 2010 (<http://www.iwa2010montreal.org/>)

4.6. Technology Exchange, Transfer and Training Working Group (TETTWG) – the group is being re-activated under Prof M. Nor leadership (Prof Mohd Nor bin Mohd Desa, Hydrology and Water Resources, Universiti Tenaga National, KM7, Jalan Kajang-Puchong, 43009 KAJANG, MALAYSIA, Phone: 603 8928 7254, Fax : +603 8921 2116; Email: mohamednor@uniten.edu.my)

4.7. Urban Drainage in Cold Climate Working Group (UDCCWG) (Chair: Prof Maria Viklander, Dept. of Civil, Mining and Environmental Engineering, Lulea University of Technology, S-971 87 Lulea, Sweden, Ph. 46 920 491 634, Fax: 46 920 491 493, Email: Maria.Viklander@sb.luth.se; the Secretary position is currently open).

The group collaborated with the University of Waterloo, Waterloo, Canada, on holding the 1st International Conference on Urban Drainage and Road Salt Management in Cold Climates: Advances in Best Practices", May 25-29, 2009, University of Waterloo, Waterloo, Ontario, Canada. The conference attracted almost 100 participants and addressed both urban hydrology in cold climate, and road salt issues. Maria Viklander was one of the keynote speakers. Selected papers from the conference will appear in a special section of the Water Quality Research Journal of

Canada to be published later this year. The conference chair, Dr M. Stone, and Jiri Marsalek are the guest editors.

4.8 Working Group on Water Sensitive Urban Design (Chair: Dr Rebekah Brown, Monash University, Faculty of Arts, Menzies Building, Victoria 3800, Australia, tel +61 3 9905 9992; fax +61 3 9905 2948; E-mail: Rebekah.Brown@arts.monash.edu.au; Secretary: Prof Richard M. Ashley, Pennine Water Group, Dept. of Civil and Structural Engineering, University of Sheffield, Sir Frederick Mappin Building, Mappin Street, Sheffield S1 3JD, UK, Phone: 44(0) 114 222 5766, Fax: 44(0) 0114 222 5700, E-mail: r.ashley@sheffield.ac.uk).

Message from the Group Chair:

Dear Working Group members,

On the 1st of February 2010, the new Monash University 'Centre for Water Sensitive Cities' will be launched in Melbourne, Australia. Furthermore, the Centre for Water Sensitive Cities recently secured \$8.7M (AUS) in research funding from government and government agencies to deliver the research program 'Cities as Water Catchments'. The program will be directed by a multidisciplinary team from four faculties at Monash University (Engineering, Arts, Science and Business and Economics). The centre is committed to research excellence, post graduate training, advancing sustainable urban water management practices and influencing 'blue-prints' for sustainable cities. Research projects span from social research on transitioning towards more sustainable urban water practices, to the development of more innovative stormwater treatment technologies. It is envisaged that the Centre for Water Sensitive Cities will soon become the leading research institution in the field of sustainable urban water management and liveability of cities based on fundamental and applied scientific integration across social and physical sciences, economics and engineering.

For further information, please contact Rebekah Brown.

4.9 Working Group on Urban Streams (USWG) - *Newly established in 2009* (Interim Chair: Dr Ivana Kabelkova, Department of Sanitary and Ecological Engineering, Faculty of Civil Engineering, Czech Technical University in Prague, Thakurova 7, 166 29 Prague 6, Czech Republic, Phone: +42 (0)2 24321292, e-mail: kabelkova@fsv.cvut.cz.)

The Joint Committee accepted the proposal of the Czech Water Association and the Czech Technical University in Prague to form a new JC working group on Urban Streams aiming to protect streams and their ecosystems in the urban environment.

Main objectives:

- Bring together water management engineers, biologists and landscape planners.
- Bridge the gap between various specialists' communication outlets, co-ordinate research activities and encourage information exchange.
- Identify research needs and motivate innovative research.

Main topics:

- Development of a good ecological status or potential for streams affected by urban drainage, including contradictory issues, such as urban streams restoration vs. flood protection.

- Establishment of guidelines for cost-effective assessment methods for ecological deficits of urban streams (e.g. screening biological sampling and sample processing and its uncertainties, scope and critical values of key parameters), and
- Evaluation of efficiency of different protective measures and recommendations.

Potential members are welcome to contact Dr. Ivana Kabelkova; the first meeting of the group is tentatively planned during the NOVATECH 2010 conference in Lyon, France.

5. NEWS FROM IAHR AND IWA

5.1 IAHR News

IAHR Secretariat contacts: IAHR, Paseo Bajo Virgen del Puerto 3, 28005 Madrid, Spain; Tel: +34 91 335 7908; Fax: +34 91 335 7935; E-mail: iahr@iahr.org, URL <http://www.iahr.org>. For more information on IAHR activities and free subscription of the IAHR e-newsletter 'NewsFlash', please contact the IAHR Secretariat: IAHR@IAHR.org

Note that the 2010 membership fees are now due (for more information, visit the IAHR website). Since 2005, IAHR offers an "electronic" membership, which includes all normal membership benefits except the printed Journal of Hydraulic Research. Electronic access to the *Journal of River Basin Management* and the subscription to the *Urban Water Journal* are offered at a special reduced rate for IAHR members.

The XXXIII Congress of IAHR on Water Engineering for a Sustainable Environment was held in Vancouver, Canada, 9–14 Aug. 2009. The congress was highly successful; if there is room for improvement, then perhaps it is to limit the number of "invited" papers at future congresses and thereby keep more space for contributed papers.

In conjunction with the congress, IAHR held meetings at which new organizational structure of IAHR and its governance were discussed and approved by the congress plenary. The new structure comprises three divisions: IAHR Hydraulics, Hydro-Environment, and Innovation and Professional Development. We fit under the second division. Each division operates a number of committees, led by Leadership Teams (6-8 members). LT elects the chair, vice-chair, and the past chair also continues serving. They have a right to co-opt members, for one term (2 years) only. Maximum service duration appears to be 10 years. Committees report on their activities at biennial congresses; it is expected that during the 2-y period they produce at least one review article, monograph, and a specialty conference. Committees meet annually (it can be a virtual meeting) and publish annual newsletters. Jiri Marsalek observed that the JC constitution shows many similar features as the IAHR recommended rules of operation; deviations of Committees operating jointly with other associations will be subject to IAHR approval (it is expected to be granted). Some features of the IAHR structure could be adopted by JC to our benefit (e.g., the positions of a vice-chair and past chair).

5.2 News from IWA HQ

Individuals renew your IWA Membership for 2010 online today!

Thank you to all members of the Specialist Group Urban Drainage who have already renewed their IWA membership for 2010.

For those that have not yet renewed, you can do so online at the following link:

<https://www.portlandpress.com/iwa/membership/renewal.cfm>

Membership to the IWA connects you with over 10,000 peers and water professionals around the world. There are a host of events and activities planned for 2010 which our IWA members have the opportunity to become involved in- the highlight of course- being our World Water Congress & Exhibition in Montreal in September. Remember - IWA members receive significant discounts on registration fees for the congress so [join or renew your membership to the IWA online now to benefit from these discounted rates.](#)

If you have any queries regarding your membership please feel free to contact us at members@iwahq.org

Don't be a stranger...

Ensure that we have your correct **contact details** at all times. Please **update** any changes at <https://www.portlandpress.com/iwa/membership/change.cfm> or email members@iwahq.org

New from IWA – the IWA Water Wiki!

Invitation to Contribute

www.iwaterwiki.org

The **Water Wiki**, a new website providing a place to interact and share knowledge online has been launched by IWA for the global water community. Like **Wikipedia**, the **Water Wiki** is a freely accessible online information resource that is growing rapidly into an invaluable reference for water professionals. It also provides networking features enabling you to discuss your work and interact with colleagues and peers across the world. You can register on the site here:

<http://www.iwaterwiki.org/xwiki/bin/view/XWiki/Registration>

We invite members to represent their Specialist Group on the **Water Wiki** by becoming a **Specialist Group Water Wiki Editor**. This will involve inviting submissions, editing and reviewing articles, and engaging with other site users to encourage participation. This will be a key role in developing an active community on the website. For full details on this important role please contact Victoria Beddow, Water Wiki Community Manager (vbeddow@iwap.co.uk).

We'd love to hear your comments and ideas for this exciting new project.

Victoria Beddow
IWA WaterWiki Community Manager
vbeddow@iwap.co.uk



Project
Innovation
Awards



SEE WHO'S MADE A SPLASH.

**The 2010 IWA Project Innovation Awards
Regional Awards Ceremonies for Europe, East Asia and Asia-Pacific**

Join us as we recognize and celebrate the best in water engineering innovation and excellence at the PIA Regional Awards Ceremonies.



**Europe Regional Awards Dinner
and Ceremony**

Date: 10 May 2010
Venue: La Torre dels Lleons,
Barcelona, Spain
*in conjunction with the
IWA Utilities Conference*
Time: 8.00PM - 11.30PM

**East Asia Regional Awards
Lunch and Ceremony**

Date: 4 June 2010
Venue: The Marble Hall, The
Portman Ritz-Carlton
Hotel, Shanghai, China
*in conjunction with
Aquatech China*
Time: 12.00PM – 2.30PM

**Asia Pacific Regional Awards
Dinner and Ceremony**

Date: 30 June 2010
Venue: The Megu Event Hall,
Singapore Flyer, Singapore
*in conjunction with the
Singapore International
Water Week*
Time: 7.30PM – 11.0PM

Tickets for the regional awards ceremonies are now open for sale.
For enquiries and bookings, please contact Ms Brenda Lai at pia@iwahq.org.

About the IWA Project Innovation Awards

The IWA Project Innovation Awards is a prestigious global competition which recognizes innovation and excellence in water engineering projects around the world and highlights IWA's belief that solutions to global water challenges can be achieved through practical and innovative applications. The Winners of the four PIA regional bases - Asia Pacific, East Asia, Europe and North America - will advance to compete for the Global PIA which will be presented at the IWA World Water Congress in Montreal, Canada on 22 September 2010.

For more information on the Awards, please visit www.iwa-pia.org.

Global sponsors of the 2010 Project Innovation Awards:



6. NEWS FROM IWA PUBLISHING

Water Sensitive Cities

Editors: Carol Howe and Cynthia Mitchell

Today's urban water managers are faced with an unprecedented set of issues that call for a different approach to urban water management. These include the urgent changes needed to respond to climate change, population growth, growing resource constraints, and rapidly increasing global urbanization. Not only are these issues difficult to address, but they are facing us in an environment that is increasingly unpredictable and complex. Although innovative, new tools are now available to water professionals to address these challenges, solving the water problems of tomorrow cannot be done by the water professionals alone. Instead, the city of the future, whether in the developed or developing world, must integrate water management planning and operations with other city services to meet the needs of humans and the environment in a dramatically superior manner.

This book has been developed from selected papers from 2009 Singapore Water Week "Planning for Sustainable Solutions" and also papers taken from other IWA events. It pulls together material that supports the water professionals' need for useful and up-to-date material.

ISBN: 9781843393641 • Pre-order (October 2010) • 224 pages • Paperback

IWA Members price: £ 59.25 / US\$ 106.65 / € 79.99

<http://www.iwapublishing.com/template.cfm?name=isbn9781843393641>

Sustainable Water Infrastructure for Villages and Cities of the Future

China and the World

Editors: Xiaodi Hao, Vladimir Novotny, Valerie Nelson

A new model for water management is emerging worldwide in response to water shortages, polluted waterways, climate change, and loss of biodiversity. Cities and towns are questioning the ecological and financial sustainability of big-pipe water, stormwater, and sewer systems and are searching for "lighter footprint" more sustainable solutions. Pilot projects are being built that use, treat, store, and reuse water locally and that build distributed designs into restorative hydrology.

This book has been developed from the conference on Sustainable Water Infrastructure for Villages and Cities of the Future (SWIF2009) held in November 2009 in Beijing (China) which brought together an international coalition of experts in urban water and drainage infrastructure, landscape architecture, economics, environmental law, citizen participation, utility management, green building, and science and technology development.

Sustainable Water Infrastructure for Villages and Cities of the Future presents an understanding of past successes and failures of efforts to control pollution and reduce floods and offers promising alternatives to provide adequate amounts of clean water for all beneficial uses, water and energy reclamation, and reduction of the carbon footprint. Sustainable urban waters are the lifeline of cities and a focus of the movement towards more sustainable and emerging "smart and green" cities. Particular emphasis is placed on learning lessons from the many innovative projects being designed in China and other initiatives around the world.

ISBN: 9781843393283 • Pre-order (September 2010) • 500 pages • Paperback

IWA Members price: £ 74.25 / US\$ 133.65 / € 100.24

<http://www.iwapublishing.com/template.cfm?name=isbn9781843393283>

Urban Hydroinformatics

Authors: Roland Price and Zoran Vojinovic

This book is an introduction to hydroinformatics applied to urban water management. It shows how to make the best use of information and communication technologies for manipulating information to manage water in the urban environment.

The book covers the acquisition and analysis of data from urban water systems to instantiate mathematical models or calculations, which describe identified physical processes. The models are operated within prescribed management procedures to inform decision makers, who are responsible to recognized stakeholders.

The application is to the major components of the urban water environment, namely water supply, treatment and distribution, wastewater and storm water collection, treatment and impact on receiving waters, and groundwater and urban flooding. **Urban Hydroinformatics** pays particular attention to modeling, decision support through procedures, economics and management, and implementation in developing countries. The book is written with Post-graduate students, researchers and practicing engineers in all aspects of urban water management in mind.

ISBN: 9781843392743 • Pre-order (September 2010) • 500 pages • Paperback

IWA Members price: £ 67.50 / US\$ 121.50 / € 91.13

<http://www.iwapublishing.com/template.cfm?name=isbn9781843392743>

Assessing Infiltration and Exfiltration on the Performance of Urban Sewer Systems

APUSS

Authors: Bryan Ellis and Jean-Luc Bertrand-Krajewski

Sewer systems constitute a very significant heritage in European cities. Their structural quality and functional efficiency are key parameters to guarantee the transfer of domestic and industrial wastewater to treatment plants without infiltration nor exfiltration. Infiltration of groundwater is particularly detrimental to treatment plant efficiency, while exfiltration of wastewater can lead to groundwater contamination.

The European research project APUSS (**Assessing infiltration and exfiltration on the Performance of Urban Sewer Systems**) was devoted to sewer infiltration and exfiltration questions. It was structured in three main Work Areas dealing respectively with i) the development of new measurement methods based on tracer experiments and accounting for detailed uncertainty analyses, ii) the implementation of models and software tools to integrate structural and experimental data and to facilitate data display, operational management and decision-making processes and iii) the integration of economic and operational questions by means of cost estimation, economic evaluation, performance indicators and multi-criteria methods applied to investment/rehabilitation strategies.

This final report describes the objectives, methods and main results for each Work Area. References to detailed methods, protocols, reports and tools are given in this final report which will be an invaluable source of information for all those concerned with the performance of urban sewer systems.

This title belongs to the [European Water Research Series](#)

ISBN: 9781843391494 • February 2010 • 200 pages • Paperback

IWA Members price: £ 48.75 / US\$ 87.75 / € 65.81

<http://www.iwapublishing.com/template.cfm?name=isbn184339149x>

SELECTED RESEARCH REPORTS

Collection System Ventilation

WERF Report 04-CTS-1A

Authors: Dirk Apgar and Jay Witherspoon

Publication Date: August 2009 • ISBN: 9781843392880

Pages: 100 • Online Only

IWA Members price: £74.03 / \$133.25 / € 99.94

<http://www.iwapublishing.com/template.cfm?name=isbn9781843392880>

Decentralized Stormwater Controls for Urban Retrofit and Combined Sewer Overflow Reduction, Phase 2

WERF Report 03-SW-3A

Authors: Neil Weinstein

Publication Date: June 2009 • ISBN: 9781843393535

Pages: 150 • Paperback

IWA Members price: £ 77.25 / US\$ 139.05 / € 104.29

<http://www.iwapublishing.com/template.cfm?name=isbn9781843393535>

Fats, Roots, Oils, and Grease (FROG) in Centralized and Decentralized Systems

WERF Reports 03-CTS-16T + 16TA & 16TB

Authors: Joel J. Ducoste, Kevin M. Keener, John W. Groninger

Publication Date: February 2009 • ISBN: 9781843395232

Pages: 210 • CD-ROM

IWA Members price: £ 105.00 / US\$ 189.00 / € 141.75

<http://www.iwapublishing.com/template.cfm?name=isbn9781843395232>

For more information on IWA Publishing products or to buy online visit www.iwapublishing.com
Or contact one of IWA Publishing's distributors:

UK, Europe and Rest of World:

Portland Customer Services

Commerce Way

Colchester

CO2 8HP, UK

Tel: +44 (0)1206 796 351

Fax: +44 (0)1206 799 331

Email: sales@portland-services.com

North America:

BookMasters, Inc.

P.O. Box 388

Ashland

OH 44805, USA

Tel: +1 800 247-6553 (+1 419 281-1802 from Canada)

Fax: +1 419 281-6883

Email: order@bookmasters.com

7. NEWS FROM AROUND THE WORLD

AUSTRALIA AND NEW ZEALAND (REPORTED BY TIM FLETCHER)

Cities as Catchments is the title of a \$16 million multi-disciplinary research project, involving researchers, government and industry from across Australia. Led by Tony Wong (AECOM EDAW and Monash University), Ana Deletic and Rebekah Brown (Monash University), its aim is to undertake the research and practical trials necessary to deliver “water sensitive cities”, where a diversity of water sources will be employed, at a range of scales, in order to provide cities which are more resilient, more sustainable and with higher levels of amenity (e.g. reduced urban heat island effect). Its primary focus is on the role of stormwater harvesting – at a diversity of scales – to supplement existing water supplies of cities, as well as to protect receiving waters from stormwater-related degradation. The project includes programmes on technology, stream health, society and institutions, health and risk management, economics, urban microclimate and the impacts of climate change. The project also has a major demonstration programme, in conjunction with developers and water agencies. As the project has just started, no website is yet established, but those interested can contact tony.wong@aecom.com or ana.deletic@eng.monash.edu.au.

Indeed, **stormwater harvesting** is starting to generate widespread public and government support, with the Australian federal government recently announcing a \$200 million fund to encourage stormwater harvesting projects across Australia. So far, \$86 million has been allocated, to 13 funds across Australia: <http://www.climatechange.gov.au/minister/wong/2009/media-releases/November/mr20091101.aspx>. Even prior to this, the town of Orange, in New South Wales, made the decision to harvest runoff from the entire town area, and divert it to the potable drinking water reservoirs, to overcome ongoing drought and water shortages.

The **Facility for Advancing Water Biofiltration (FAWB)** has completed its core research programme, and has now published at its website (see www.monash.edu.au/fawb) a wide range of guidelines, including guidelines for (i) specification of filtration media, (ii) field testing of hydraulic conductivity, (iii) design, construction and maintenance of stormwater biofiltration systems. For information on the guidelines, contact Belinda Hatt (Belinda.hatt@eng.monash.edu.au).

The **Model for Urban Stormwater Improvement Conceptualisation (MUSIC)** is used throughout Australia for the conceptual design of “water sensitive urban design” systems. It is a user-friendly tool which helps people to size and compare a range of stormwater management strategies, in terms of hydrologic, water quality and financial performance. The first upgrade of the software for three years was delivered in October 2009 (see www.toolkit.net.au/music). MUSIC v4 includes the latest research from FAWB (see above) to predict the hydrological and water quality performance of a wide range of biofiltration systems and also has much-improved capacity to help model integrated stormwater treatment and harvesting systems. Version 5 is planned for release in early 2011. In the meantime, the MUSIC team is about to commence working on a French version of the software, in conjunction with INSA and the developers of the French model, CANOE. The eWater CRC is also working on another tool for urban water managers, called “Urban Developer”, which covers stormwater, drinking water and wastewater, all in an integrated platform (see http://www.ewatercrc.com.au/reports/UrbanDeveloper_sep09-1.pdf).

The National Urban Water Governance Program (see www.urbanwatergovernance.com) wrapped up its core research programme in August 2009, having delivered a range of insights into institutional aspects of sustainable urban water management, including theories underpinning

social-technical change, the role of leadership, the roles and importance of demonstration projects, and characteristics of institutions which perform well in sustainable water management. The Program has been very “high profile” in delivering a range of important workshops across Australia, such as its “Creating Water Sensitive Cities” (see www.watersensitivefutures.org). For more information, contact the Program Leader, Rebekah Brown (rebekah.brown@arts.monash.edu.au).

The Little Stringybark Creek project is a collaboration between the University of Melbourne, Monash University, Melbourne Water, The Shire of Yarra Ranges and Yarra Valley Water, which aims to demonstrate the first catchment-scale implementation of water-sensitive urban design. An auction-based incentive scheme is being used to encourage members of the public to retrofit stormwater management works on their property, whilst larger-scale systems are being built at the streetscape-scale. Changes in flow, water quality and ecosystem health in the receiving water are being measured. See www.urbanstreams.unimelb.edu.au or contact Chris Walsh (cwalsh@unimelb.edu.au) or Tim Fletcher (tim.fletcher@eng.monash.edu.au).

In Australia there is considerable interest growing in **permeable pavement** technology, with much work being done on the lifespan of porous pavements at the University of South Australia (contact Simon.Beecham@unisa.edu.au) and Monash University (contact ana.deletic@eng.monash.edu.au).

South East Queensland Healthy Waterways Partnership is recognized for its collaborative and science based approach to understanding, monitoring and improving the health of the region’s waterways. An extensive ecosystem healthy monitoring program has now been running for 10 years, and distils a complex range of biological, physical and chemical indicators into A to F grades in an annual, well publicized Report Card ; building political and social capital for improved wastewater and stormwater management.

The South East Queensland Healthy Waterways Partnership has established an innovative capacity building program, *Water by Design*, which has been developing a range of products and services to assist the urban development and water sectors better implement sustainable urban water management. An important development has been the recent publishing of a suite of design guides for stormwater management measures which span from concept design and detailed design through to construction and establishment. The region now has a statutory set of design objectives for stormwater quality, waterway stability and frequent flow management. To further strengthen this policy framework, a *Business Case* for water. It’s a useful resource for those needing to make the case for SUDS/LIDS/WSUD (depending on your local acronym). The report can be downloaded for free from: www.waterbydesign.com.au/businesscase Further information on the SEQ Healthy Waterways Partnership is available at: www.healthywaterways.org or contact alan.hoban@healthywaterways.org.

Retrofit of SUDs technologies into existing built environments continues to be one of the more challenging areas of application. In a recent project in **Brisbane, Australia**, an industrial galvanising factory was retrofitted with a range of treatments to reduce high quantities of heavy metal runoff into stormwater drainage and as a secondary benefit, provide an alternative water supply for the factory. The combination of rainwater tanks, vegetated buffers, biofiltration swales and biofiltration basins have been applied, being combined with non-structural treatments such as better housekeeping to segregate chemicals and isolation of areas of more intense activity. The

treatments are being closely monitored both visually and through water quality sampling to gain greater understanding of the performance and survival of vegetated treatment systems in areas of high contamination. Contact Tony Weber at trweber@wbmpl.com.au for more information.

In New Zealand, the IAHR-APD conference (www.iahr-apd2010.com) will include an embedded conference on International Urban Watershed Management, which will deal with urban runoff management: quality and quantity, innovative developments in stormwater management, integrated urban water resources and green infrastructure and Low Impact Design/Development. Contact Elizabeth Fassman at e.fassman@auckland.ac.nz.

The University of Auckland's Department of Civil and Environmental Engineering has been actively engaged in field monitoring of a variety of stormwater management devices, aimed at advancing our understanding of design and performance of urban **low impact development/design (LID)** systems. The full technical report on two years' of hydrologic and water quality monitoring of a 200 m² area of **permeable pavement** in an active roadway is available from www.cee.auckland.ac.nz/EFassman/permeable_pavement.aspx. A manual on design and construction of **green roofs** designed specifically for stormwater management using locally available materials (as opposed to proprietary products) is under review, and should be released in early 2010. Hydrologic performance monitoring and modelling, including a detailed investigation of green roof evapotranspiration, should be available by mid 2010. Two years' hydrology and water quality monitoring of a **stormwater treatment train** including bioretention cells, grassed swales, a proprietary device, and a constructed wetland operating in series has recently been completed. Results should be ready for distribution by mid 2010. Enquiries on any of the above projects should be sent to e.fassman@auckland.ac.nz. All of the field studies have been funded by the Auckland Regional Council through the Stormwater Action Plan.

BRAZIL and SOUTH AMERICA (REPORTED BY PROF NILO NASCIMENTO)

The **First IWA Development Congress** was held in Mexico City, from 15 to 19 November 2009, on the main theme of "Water and Sanitation Services: what works in developing countries". This international conference, chaired by Prof. Blanca Jiménez-Cisneros from the Universidad Nacional Autónoma de México, focused on water and sanitation in developing countries as a specialised topic regarding specificities of the developing world in many different aspects, as population growth, rate of urbanisation, welfare distribution, and governance, legal and regulating issues. The conference gathered 423 experts, researchers and practitioners from developed and developing countries around the main conference themes which included service delivery, water and sanitation management, alternative and smart solutions on sanitation, water scarcity, rural water and sanitation, water sustainability issues, emergency management and other related topics. Participants were from Latin America (35%), Europe (21%, an important part from international agencies), Africa (17%), North America (15%), Asia (9%), and other regions (3%). Several workshops were also organised as parallel events dealing with topics such as operation and maintenance for sustainable management of water supply and sanitation services, water education, urban water conflicts, sustainable water management for mega cities in developing countries, water accountability and strategies to combat corruption, and city of the future workshop. After the conference an "Integrated Stormwater Management in Latin America" event was organised by the SWITCH International Research School for Urban Water Management, with the support of

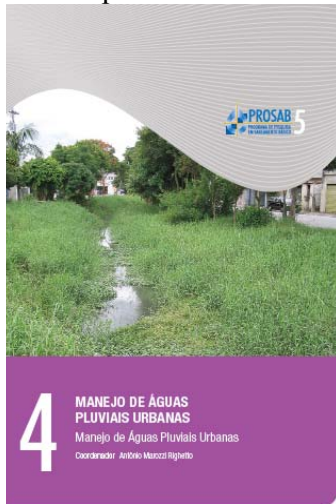
UNESCO and the SWITCH project. This first congress marks, with outstanding contributions on water management in the developing world, the start of a series of conferences in this domain. Through this event IWA is seeking to foster south-south cooperation.

Agua 2009 (Water 2009), the Conference on Integrated Water Resource Management and Climate Change was held in Cali, Colombia, from 9 to 13 November, 2009. Agua 2009 was organized by the Cinara Institute and the Faculty of Engineering of the Universidad del Valle at Cali, Colombia, with the main objective of promoting and disseminate knowledge and experiences, considering the relationship between integrated water resource management and climate change; generating a space for academic and scientific discussion to facilitate an understanding of the impacts and adaptation mechanisms and presenting the progress in conceptual development, policies, intervention methodologies, planning and monitoring. The Conference and parallel workshops addressed subjects such as policies to face climate change; impacts of climate change on water resources and their relationship to public health; planning, monitoring and management of risks, climate change and culture, among others. Four parallel workshops were organized around topics as (i) a new paradigm in integrated urban water management; (ii) wetlands as a sustainable technology for water management and climate change mitigation; (iii) efficient use of water and (iv) strategies for dealing with climate change. The first two seminars were held in the framework of the SWITCH “Sustainable Water Management Improves Tomorrow’s Cities’ Health” project which is financed by European Union. In Agua 2009 participated a total of 355 people from 20 countries, Colombia, Guatemala, Ecuador, Netherlands, Spain, Germany, Bolivia, Brazil, Canada, Costa Rica, Cuba, Denmark, United States, England, Honduras, Mexico, Peru, Venezuela, Belgium and Indonesia.

The 18th Brazilian Symposium on Water Resources was held in Campo Grande (MS), from 22nd to 26th November, 2009. The conference main theme was “Sustainability, the challenge of practical implementation in water resources management”. About one thousand participants attended the meeting, 320 papers were presented orally in 40 sessions, and other 420 papers were presented in 4 poster sessions. 101 papers presented at the Conference dealt with urban water issues. A clear change is becoming evident in paper subjects regarding urban drainage and urban waters presented at this Symposium. Subjects such as green roofs, rain gardens, rainfall harvesting, infiltration devices and other stormwater source control measures, wet weather diffuse pollution in the urban environment, wastewater reuse and related approaches to reducing pressures by drinking water demand over water resources are increasing in numbers and showing more detailed and sensible analysis, mainly by incorporating new approaches and concerns, particularly regarding integrated urban water management and sustainability assessments. Other urban drainage subjects such as urban erosion processes, impacts of land use on hydrologic processes in urban areas, and river restoration in urban areas were also presented and discussed. The ABRH Urban Waters Committee had its annual meeting during the conference. The agenda of this meeting included a detailed discussion on 12th ICUD organisation, which will be held in Porto Alegre, Brazil, in 2011. An update of the main conference topics and a discussion on the conference organisation schedule were then addressed. Other agenda items were the organisation of the next Brazilian meeting on urban waters, the preparation of new publication on urban drainage, the election of the new committee chair and related issues. Prof. Priscilla Moura of the Federal University of Minas Gerais was elected to chair the Committee from 2010 to 2011.

The PROSAB new publications on drinking water, sanitation and stormwater management

The Brazilian research programme on environmental sanitation, PROSAB, published in 2009 a new collection of books on the main subjects of drinking water, sanitation and stormwater management. PROSAB is a long-term multidisciplinary research and development programme covering the domains of drinking water, sanitation, urban drainage and solid waste management. It is funded by the Brazilian Science and Technology Fund on Water Resources and managed by FINEP (Research and Project Financing agency) and CNPq (National Council for Scientific and Technological Development). The new books address such issues as water and energy, emerging pollutants elimination by water treatment plants, sludge management for septic tanks and pit latrines, among other topics.



The volume 4 of this book series addresses stormwater management issues. In this book, one can find some chapters on the state of the art of urban drainage topics such as monitoring and modelling urban drainage systems, source control devices in stormwater management, wet weather diffuse pollution, interfaces between solid wastes, urban runoff and impacts on receiving bodies, as well as chapters on the main research issues which have been developed by a network of 6 Brazilian universities during the 2007-2009 5th edition of the PROSAB research programme, e.g.: experiments with extended detention ponds, infiltration trenches, detention devices, infiltration pavements in parking lots, and green roofs, as well as social issues regarding public perception and acceptance of stormwater BMPs. The book is edited by Antônio Righetto, from the Federal University of Rio Grande do Norte, in collaboration with Mônica Porto, from the University of São Paulo, Jaime Cabral, David Marques and Nilo

Nascimento, from the Federal Universities of Pernambuco, Rio Grande do Sul and Minas Gerais, respectively.

The **8th IWA Specialist Group Conference on Waste Stabilization Ponds** was held in Belo Horizonte, Brazil, from 26 to 30 April 2009. The conference followed the pathway of the very successful previous conferences (Portugal, USA, Brazil, Morocco, New Zealand, France and Thailand). There were 120 delegates from 22 different countries covering all continents, what guaranteed the international view and flavour of the conference. In the opening ceremony a tribute to Prof. Salomão Silva, who died last year, was made. In the sequence, Prof. Duncan Mara received homage, including a plaque in the name of the Specialist Group “*in recognition for his outstanding contribution to ponds research and application*”. The morning sessions were devoted to five round tables with the presence of internationally leading scientists, covering the following subjects: (a) *Pond biology*; (b) *Pond hydraulics and modelling*; (c) *Nutrient removal*; (d) *Pathogen removal and effluent reuse*; (e) *Integration of ponds with other systems*. The round tables had an excellent level and presented historical perspectives, consolidated views, new findings and new research focuses. In the afternoon there were 70 oral presentations for papers and 16 short-platform presentations for posters. Probably close to a record in terms of a conference, all papers originally scheduled were effectively presented. The technical visit was done to the Onça (UASB reactors) and Arrudas (activated sludge) treatment plants, with a special tour on the experimental site UFMG-COPASA, which includes several wastewater treatment units (ponds, wetlands, UASB reactors, trickling filters and others). In the Specialist Group meeting at the conference, new SG chair (Marcos von

Sperling, Brazil) and secretary (Kara Nelson, USA) were elected for a mandate of four years, and Adelaide (Australia) was selected as the host city for the next conference, in 2011.

The **9th WWW-YES (World Wide Workshop for Young Environmental Scientists)** edition was held at Belo Horizonte, Brazil, from 26 to 30 October 2009.

WWW-YES is an interdisciplinary workshop for PhD students in the field of urban waters, including both water resources and risk issues. It was created in 2001 by the French Laboratory for Water, Environment and Urban Systems (LEESU: www.leesu.fr), at the Paris-Est University, in order to contribute to capacity building in urban water environmental sciences, at PhD level. Since its first edition, about 200 postgraduates have been trained, a large number of them coming from developing countries. The aim of WWW-YES workshops is to offer an opportunity to young researchers not only to present, discuss and assess their research work but also to build up their knowledge network in a non-formal work environment, stimulating scientific creativity, exchange and discussion among the participants. Moreover, whatever their country of origin or study, all participants are trained for scientific interactions in English.

In 2009, after a French edition held at Arcueil (Paris suburb), a special edition was organized at Belo Horizonte (Minas Gerais, Brazil) in the framework of the year of France in Brazil. This 9th edition was preceded by an international conference which was opened by the secretary of the environment of Belo Horizonte municipality Ronaldo Vasconcellos and by the coordinator of the hosting institution, Federal University of Minas Gerais, Professor Nilo Nascimento. This conference reviewed four projects linked to urban water management:

- The Proliphyc project on real-time survey of lake water quality,
- The "festival de l'Oh!", an annual public awareness campaign in the outskirts of Paris,
- The Switch European project focused, at Belo Horizonte, on sustainable urban drainage systems (SUDS), and
- The DayWater European project on the development, both in English and French language, of an adaptive decision support system (ADSS) for of storm water source control.

The main program of the WWW-YES workshop, over 3 days and 15 oral presentations, discussions and individual peer reviews, covered topics like urban flooding and its control (ENGEES/Cemagref France, University of São Paulo and Federal University of Minas Gerais, Brazil), waste water treatment using macrophytes (Swiss Federal Institute of Aquatic Science and Technology and Colombian Institute Cinara of University of Valle). Other presentations were related to urban creek restoration (UNESCO-IHE, Delft), study on water user perception (German University of Technology at Cottbus) or sediments as archive of urban pollution (French Paris-Est University). Besides a technical visit to the Federal University of Minas Gerais facilities for urban water treatment plants, WWW-YES participants were trained during 2 days for collectively building-up international research proposals and their oral presentation and justification, under the guidance of senior experts. The proposed research projects varied from those addressing local water issues such as the Transfer of Rio Sao Francisco in Minas Gerais, to more general ones such as urban rainwater harvesting or creek revitalization.

Past WWW-YES proceedings are to be shared through a specific Open Source collection (<http://hal.archives-ouvertes.fr/WWW-YES/fr/>) under development. All information about the past and future editions (May 2010 at Paris) of the WWW-YES workshop is available at: <http://yes.h2o.net/>

CANADA (REPORTED BY JIRI MARSALEK)

The current stage of stormwater management, also referred to as techniques of low impact development (LID), focuses to a large extent on management of the existing knowledge and translation of research results into practice. Three such activities are further described below.

The Canadian Standards Association (CSA) became involved in stormwater management under its Municipal Infrastructure Solutions programs. Towards that end, it developed two training courses on specific topics and other may follow. The first one was entitled “Overview of Low Impact Development (LID) Techniques, the second one Design of road and parking lot infiltration. Both courses have been fully developed, tested and are offered by CSA to the interested parties.

Innovative Stormwater Management Project was supported by the Canadian Water Network (CWN) as a two-year knowledge translation project on innovative stormwater management with the following aims: 1. Share experiences and identify case studies where some of the LID innovations have been successful, 2. Compare how the function of these systems varies across the country and how some of these systems have to be modified depending on the prevailing climate conditions. 3. Identify knowledge gaps and research needs, and 4. Provide a forum for dissemination of these innovations to practitioners. Following three workshops, authors of the selected papers from these workshops have been invited to submit their presentations in the form of journal papers, which were reviewed and ten papers were selected for a special issue of the Water Quality Research Journal of Canada (Volume 44, No. 1, 2009), which was published in spring 2009. Further information appears in Section 10 of this newspaper.

Water Balance Model. The Water Balance Model promotes a watershed-based approach that manages the natural environment and the built environment as integrated components of the same watershed (<http://www.waterbalance.ca/waterbalance/home/wbnIndex.asp>). The model development and refinement is progressing well and the initial partnership responsible for the model has been growing, as more agencies join in. For the latest, please visit the above website.

The Sustainable Technologies Evaluation Program (STEP) is a multi-agency program based in Ontario (Canada) and led by the Toronto and Region Conservation Authority (TRCA) (<http://www.sustainabletechnologies.ca/>). The program was developed to provide the data and analytical tools necessary to support broader implementation of sustainable technologies and practices within a Canadian context. Its main objectives are to:

- Monitor and evaluate sustainable technologies in the areas of water and air
- Assess potential barriers to implementing sustainable technologies
- Provide recommendations for guideline and policy development, and
- Disseminate study results and recommendations and promote the use of effective technologies at a broader scale through education and advocacy.

STEP website is continually updated and certainly worthwhile to visit.

Two large governmental programs, dealing with water management in Lake Winnipeg and Lake Simcoe, spurred new interest in specific aspects of stormwater – control of nutrients. New research studies are conducted on the effectiveness of stormwater BMPs in controlling nutrient export from

urban catchments. Some of this work is being done under the NSERC Strategic grant awarded to Trent University, working with the National Water Research Institute as one of the research partners. A fair number of stormwater ponds are surveyed for nutrient cycling and looking at management options to control nutrient export. For further information, contact Jiri Marsalek (jiri.marsalek@ec.gc.ca).

CZECH REPUBLIC (REPORTED BY IVANA KABELKOVA AND DAVID STRANSKY)

Water management in the Czech Republic is undergoing turbulent changes. The current novelisation of the Water Act shifts the emphasis on water and its functions in rural and urban landscape significantly more towards sustainability principles.

In connection with the legislative process, Specialist Group on Urban Drainage (SG UD) of the Czech Water Association (CzWA, the Czech affiliate of IWA) elaborated *a feasibility study on the implementation of principles of sustainable urban drainage*. It includes suggestions in support of the Water Act and several additional law amendments, creation of methodical guidance and technical rules, launching of a grant system encouraging implementation of best management practices as well as introduction of the sustainability principles concerning water resources into the education at all levels.

The Czech SG UD finalized the *Code of Good Practice for rainfall-runoff modelling*, which was commissioned by the State Environmental Fund of the Czech Republic. It provides a background for the assessment of projects applying for EU grants and sets a standard for urban drainage masterplans, including the objectives to be addressed (tasks solved), key parameters and their target (default) values, input data, monitoring, modelling and documentation requirements.

CzWA initiated creation of a new working group on Urban Streams under the IAHR&IWA Joint Committee on Urban Drainage - *Working Group on Urban Streams*. Its main objectives are to bring together water management engineers, biologists and landscape planners, bridge the gap between various specialists' communications, co-ordinate research activities, encourage information exchange and identify research needs. As announced at the UDM conference in Tokyo, Dr. Ivana Kabelkova was nominated as the first chairperson of the group (until the first official meeting of the group is held). Specialists all around the world are welcome to join the new working group by contacting Ivana (kabelkova@fsv.cvut.cz).

Research activities of the Czech Technical University in Prague focus on uncertainties in, and optimization of, assessment methods of ecological deficits of urban streams. First results of a simplified macrozoobenthos sampling and processing procedure show a promising cost-saving potential of the method in urban drainage applications. The group also investigates the application of a camera-based system for flow and velocity monitoring in sewer systems and WWTPs, and another research project aims to further develop and modify the CARE-S technology for the Czech environment. A project carried on at the Brno University of Technology deals with risk analysis of extreme precipitation scenarios in the context of climate change.

Conferences: The 8th Biennial International Conference on Wastewaters took place in Pilsen, Czech Republic. The Conference hosted experts from five countries in the central Europe region and among other topics, it focused, most appropriately (being held in Pilsen), on water management of breweries. The 9th Conference on Optimization of design and control of sewer systems and WWTPs held in the Czech Republic in October 2009 had a honour to host a special guest – Jiri Marsalek, the Secretary of the Joint Committee on Urban Drainage, who presented an invited lecture “Global progress in urban stormwater management: 40 years of design with nature”, a topic which is currently widely discussed in the Czech Republic.

For further information on the above items, please contact Ivana Kabelkova (kabelkova@fsv.cvut.cz) or David Stransky (stransky@fsv.cvut.cz).

DENMARK (REPORTED BY JES VOLLERTSEN, MICHAEL RASMUSSEN, MARINA BERGEN JENSEN, HELLE KATRINE ANDERSEN, KARSTEN ARNBJERG-NIELSEN AND PETER STEEN MIKKELSEN)

The **TREASURE** project tested novel technologies for advanced stormwater treatment in full scale. It was recently completed and was co-financed by the EU LIFE Environment program. For this project, 3 facilities were constructed treating stormwater runoff from between 8.8 and 25.8 ha. All facilities contained a wet retention pond and sand filters. In one facility the water from the sand filters was fed through fixed media sorption filters. In another facility the pond bottom was enriched with iron salts. In the last facility alum was added to the incoming stormwater.

The treatment train consisting of a wet retention pond, a sand filter and a fixed media sorption filter was the most efficient technology for reducing a broad range of dissolved and colloidal pollutants in the stormwater runoff. Accidentally, the facility equipped with this treatment train received extremely high concentrations of copper and other heavy metals, which it consistently reduced to very low levels, proving an efficient safeguard against those pollutants. Examples of achieved average discharge concentrations are Orthophosphate: 6 µg/L (95% reduction); Copper: 4 µg/L (99% reduction); Lead: 0.6 µg/L (97% reduction). The treatment train consisting of wet retention pond with iron enriched bottom sediments followed by a sand filter and the treatment train consisting of alum addition to the stormwater entering the wet pond and followed by a sand filter, proved to be efficient in reducing the algae content of the wet retention pond. Compared to the fixed media filters, the treatment trains were, however, less efficient with respect to removing heavy metals. Plants contributed marginally to the cleaning processes, but were important for ensuring integration of the facilities as recreational elements of the urban environment.

Details on the project are available at www.life-treasure.com, where also the final monitoring results and recommendations will be made available in the near future.

The Danish research project **Black, Blue and Green – Integrated infrastructure planning as key to sustainable urban water systems** (www.2BG.dk), 2007-2011, is performing well. The three associated universities, which include University of Copenhagen, The Technical University of Denmark and University of Aarhus, now have 8 PhD-students associated with the project. In December 2009 these 8 students completed a joint case study. With an individual commitment of approximately 3 months they designed a solution for a massive (60 %) SUDS-based disconnection of roofs and roads in an area comprising 1/6 of the total area of Copenhagen Municipality, in order

to control CSO-problems. The design was assessed with respect to impact on hydrological balances, freshwater pollution risks, and social and economic urban values. The resulting report is in Danish, but is being translated to English. For further information please contact project coordinator M.B. Jensen, mbj@life.ku.dk.

Water in the city – practitioners’ course creating a common platform for urban water planning in municipalities. In the autumn/winter 2009/10 the Danish Water and Wastewater Association (DANVA) and the Danish Town Planning Institute (Dansk byplanlaboratorium) has introduced a Water in the City course on urban water planning aimed at practitioners in municipalities and water and wastewater utilities. The purpose of the course is to create a common platform between different professions to share a common understanding of how different infrastructure solutions affect the sustainability of urban water systems. The course is closely linked to the project Black, Blue & Green (2BG) on integrated infrastructure planning as key to sustainable urban water systems (see above), and was first introduced as a pilot project under the 2BG in 2007/2008. The Water in the City course running this autumn/winter has 39 participants with 7 ‘municipality teams’ each consisting of a group of different professions from different departments of the municipality (i.e. city planners, landscape architects, engineers, biologists etc.). Researchers and PhD students from the 2BG project are coupled to the course and participate as teachers and as competent sparring for the municipality teams when they are working with their local urban water planning cases. In this way the course also facilitates transfer and exchange of knowledge between researchers and practitioners. Read more about 2BG on www.2bg.dk, or the Water in the city course on www.byplanlab.dk or www.danva.dk.

The **Source Control Options for Reducing Emissions of Priority Pollutants (ScorePP)** project is a 3.5 year European Community funded 6th Framework Programme project where the partners are five universities: University of Ljubljana (Slovenia), Ghent University (Belgium), Middlesex University (UK), Université Laval (Quebec City, Canada) and Technical University of Denmark; two consultancies: Envicat (Belgium) and Estudis (Spain); the private company Anjou Recherche (France) and the city of Stockholm (Sweden). This project will be finalized in the end of March 2010 and reporting and dissemination of its results is one of the main tasks now.

The project objectives are to identify the sources of priority pollutants in urban areas and to identify and assess strategies for limiting the release of priority pollutants from urban sources and for treating priority pollutants on a variety of spatial scales. Furthermore, to develop GIS-based spatial decision support tools for identification of appropriate emission control measures, to develop integrated dynamic urban scale source-and-flux models that can be used to assess the effect of source control options of priority pollutant emissions and to optimise monitoring programmes, and to assess the direct and indirect costs, the cost-effectiveness and the societal implications of source control strategies. The developed approaches, data, models and assessments are used to formulate a set of appropriate priority pollutant emission control strategies, and a multicriteria approach will be used to compare and evaluate these strategies in relation to their economic, societal and environmental impacts.

A final dissemination workshop was held at the Technical University of Denmark 2-3 February 2010, and the main project deliverables will be made available on the project website (www.scorepp.eu) during spring. Contact Hans-Christian Holten Lütshøft (hhl@env.dtu.dk) or Peter Steen Mikkelsen (psm@env.dtu.dk) if you are interested to know more about this project.

Storm- and Wastewater Informatics (SWI) is a strategic Danish Research Project with an overall aim to close the knowledge gaps within prediction and control of current and future conditions in integrated urban wastewater systems. Major outputs will be components of an intelligent real-time decision support system, following a drop of water from the cloud, throughout the sewer-wastewater treatment system and into the receiving waters. The project partners include the Technical University of Denmark, Aalborg University, the Danish Meteorological Institute, three internationally oriented software and technology providers (DHI, Krüger and PH-Consult) and 4 of the largest Danish utility companies (Avedøre Wastewater Services, Copenhagen Energy, Lynette-fællesskabet and Århus municipality).

The project formally started in 2008. Three postdocs (Søren Thorndahl at Aalborg University, Thomas Bøvith at the Danish Meteorological Institute and Anitha Sharma at DTU Environment) and four Ph.D. students (Morten Borup and Signe T. Andersen at DTU and Jesper Ellerbæk Nielsen and Jakob Badsberg Larsen at Aalborg University) have now started and two more Ph.D. positions and a Postdoc position will be filled in 2010. Information about the project may be found on the project website: <http://swi.env.dtu.dk>.

The **Urban Water Technology (UWT)** graduate school was founded in January 2007 as a collaboration between the Technical University of Denmark (DTU) and Aalborg University (AAU). It serves as a forum for PhD students working with technologies within the urban water cycle. UWT offers a professional framework for PhD students, universities, utility companies, consultants, technology providers, public research institutions and authorities, where the participants can develop shared professional outlooks and discuss future research initiatives.

Five PhD students affiliated with UWT graduated in 2009, among which three are within the urban drainage field, Henriette Stokbro Jensen (abiotic and biotic concrete corrosion in sewer systems) from Aalborg University, department of Biotechnology, Biochemistry and Environmental Engineering, Erik Lindblom (Dynamic modelling of xenobiotic organic compounds in the integrated urban wastewater system) from DTU Environment and Lisbeth Pedersen (Automatic calibration and attenuation correction in networks of small weather radars) from DTU Informatics in collaboration with DHI.

More than 20 PhD students are currently enrolled under UWT, among which many are within the urban drainage field. The website (www.urbanwatertech.dk) lists the topics and students and contains links to more detailed information including contact details.

Organization of PhD courses within the urban water technology area are among the important objectives of UWT, and these are open to PhD students from across the world. The following PhD courses are planned for 2009:

- **Precipitation measurement and analysis in urban drainage and hydrology**, May 2009, organized by Aalborg University, Department of Civil Engineering within the framework of the SWI project.
- **Xenobiotics in the urban water cycle**, June 2009, organized by DTU Environment. This course was already held once in 2008 and is organized partly within the framework of the ScorePP project.
- **Stochastic dynamic modeling of fast hydrologic systems** (tentative title), August 2009, organized by DTU Informatics and with DTU Environment within the framework of the SWI project.

- **Downscaling of precipitation and other climate model variables**, autumn 2009, organized by DTU Environment in collaboration with several other institutions participating in CRES (see below).

The PhD courses typically give 5 ECTS credits and require 1-2 weeks of attendance in combination with some reading in advance. Further information about these course and other UWT activities will be announced on the website (www.urbanwatertech.dk).

Two new Danish large-scale research and innovation initiatives relevant for urban drainage will be launched in 2010, the **Centre for Regional Change in the Earth System (CRES)**, which is a “research centre” lead by The Danish Meteorological Institute and funded by the Danish Council for Strategic research, and **Water in Urban Areas - partnership for climate change adaptation and innovation**, which is a “strategic partnership” lead by DTU Environment and funded by the Danish Council for Technology and Innovation. Information on these initiatives may be obtained from Karsten Arbjerg-Nielsen (kan@env.dtu.dk).

FRANCE (REPORTED BY JEAN-LUC BERTRAND-KRAJEWSKI)

News from SAP (Interdisciplinary Experimental Observatory), Nantes, France

From 1st January 2010, SAP will be a part of OSUNA (Observatoire des Sciences de l'Univers Nantes Atlantique), which will strengthen its role as a long term observatory.

A 4-year project supported by the French National Research Agency (ANR) and coordinated by LCPC-IRSTV will start in January 2010. This is the first national project associating the 3 French observatories on urban hydrology (OPUR in Paris, OTHU in Lyon, and SAP in Nantes). The group of the 3 French observatories is named HURRBIS (www.hurrbis.org). This project aims at helping local authorities to define efficient strategies for the management of pollutant fluxes, and analysing the knowledge transfer between research results and their operational application. The system considered in this study is an urban catchment with a separate sewer system, where 3 compartments are studied: the atmosphere, urban surfaces (roofs, roads...) and the catchment outlet.

Two PhD theses have been finished in December 2009:

Katerine Lamprea : “Characterization and origin of trace metals, polycyclic aromatic hydrocarbons and pesticides transported by atmospheric deposition and storm water runoff in suburban separate sewer catchments”. The objective of this thesis was to characterize and determine the sources of heavy metals, polycyclic aromatic hydrocarbons (PAHs) and pesticides transported by runoff from two suburban catchments served by separate sewer systems and located in the East of Nantes City (Pin Sec and Gohards catchments). Total atmospheric deposition was the principal source of cadmium and chromium, roofs and their accessories are a large source of zinc and lead, and street runoff provides nickel, copper and zinc. With regard to organic pollution, vehicular traffic has been identified as the main source of PAHs, while the treatment of surfaces with herbicides for the control of growing plants is the main source of pesticides in these catchments.

Amélie-Laure Le Delliou: “Role of interactions between sewer networks and groundwater in the hydrologic functioning of an urban catchment: Experimental approach and modelling”. The aim of

this work was to improve the description of water flows in sub-soils of urban catchments, in which hydrologic behaviour is influenced by interactions between soil water and sewer networks. The MOD FLOW hydrologic code was tested before being validated on the Pin Sec catchment (31 ha). Simulated and observed water levels were comparable. The coupling between the URBS-MO hydrologic model specific for urban environments and MOD FLOW specific for the saturation zone was made. This coupling improved the spatial coherence of saturation levels.

Contact : Veronique RUBAN at veronique.ruban@lcpc.fr

OTHU (Field Observatory for Urban Water Management): A long term and multidisciplinary approach linked to end-user needs

Ten years ago, the OTHU (Field Observatory on Urban Drainage - www.othu.org) was created in Lyon (France) in order to improve knowledge and know-how in the field of Urban Water Management by encouraging both cooperation between researchers from different scientific domains and collaboration between researchers and end-users.

In 2009, this Research Federation includes thirteen research laboratories from nine universities, engineering schools and other research institutions working in close collaboration with the Water Department of Greater Lyon, the local Water Agency, private companies, and gathers a wide range of complementary scientific fields (climatology, hydrology, hydraulic, soil science, chemistry, biology, social sciences).

OTHU conducts long-term, continuous and intensive monitoring of urban catchments drained by different types of sewer systems, together with their aquatic environments (mainly small peri-urban watercourses and groundwater aquifers). Five sites are intensively monitored and eleven were added more recently and are studied with a lesser intensity.

Monitoring systems collecting numerous data (e.g. more than 20 millions of data were collected during 2006 / 2008) are specifically devoted to:

- improve the knowledge of rainfall and climatology at the urban area scale, and the associated factors that increase the risks of flooding and pollution;
- improve the knowledge of water and pollutants generation and transport during dry and wet weather;
- assess the physical, chemical and biological transformations and processes associated with these pollutants during their transfer in urban water systems (sewer and drainage systems including retention and infiltration structures and CSOs);
- assess the physical, chemical and biological transformations and processes associated with these pollutants after being discharged into the aquatic environment, with special attention paid to small peri-urban watercourses, unsaturated zones and aquifers;
- assess the modifications and the behaviour, at various time scales (from hours to ten years), of the biocenosis in receiving surface waters, especially in relation to the progressing urbanisation;
- develop and validate models of pollutant transfers through urban water systems ;
- improve monitoring technologies (e.g. micro-sensors) and processes (e.g. standard data validation procedures and software tools); and,
- develop decision support systems to build more sustainable strategies for the management of the urban water system.

The tenth anniversary of OTHU was celebrated on October 20th, 2009 and this gave us the opportunity to present recent studies as well as the ten years of research outputs usable by or transferable to professionals. All presentations and videos of discussions (in French only....) can be seen on the page "Actualités" of the OTHU Website: <http://www.othu.org>

As the OTHU observatory is an open project which has been specifically designed to encourage collaboration among scientists and promote data sharing, please do not hesitate to contact us and visit our Website.

Note also that OTHU is one of the 3 French observatories on urban hydrology, which are cooperating at the national level in the frame of the HURRBIS network (www.hurrbis.org); OTHU contact: Sylvie Barraud at Sylvie.barraud@insa-lyon.fr

New Concepts in Sustainable Urban Water Management: DISCUSSION FORUM

The USEPA (United States Environmental Agency Protection) requested that the specialized group on urban water management of the ASCE (American Society of Civil Engineering) develops a perspective on the stakes and probable evolutions in the management of urban stormwater. A first meeting of the group took place in Edinburgh, UK, in early September, 2008, during the 11th ICUD conference. The next stage was a discussion forum in Lyon, France, gathering approximately 30 people with different backgrounds. The third stage will probably be a report developed in the framework of the 2010 Novatech Conference. The purpose of these workshops is to encourage discussion on the new paradigms to be promoted and on the obstacles to overcome in the field of sustainable urban water management. A summary of the 2008 discussions is available on the Graie website:

http://www.graie.org/graie/graiedoc/doc_telech/actesynteses/08EPprospectivesynth.pdf

Guidelines for recognition of stormwater in urban planning

In 2009, GRAIE published on its website a compilation of guidelines for a better accounting for stormwater in urban planning (in French). This publication, written in collaboration with water management professionals, is a real success: more than 100 000 downloads in less than one year. Such a success does not only reflect the quality of the document, but it mainly highlights the needs and expectations of French professionals who are looking for administrative and regulation tools, in order to better include and integrate stormwater management in urban planning. This topic will probably be widely discussed at a worldwide scale during the 2010 Novatech conference.

Infiltration in question!

ECOPLUIES is a French multidisciplinary project gathering 8 research teams and 3 end-users (a municipality and two consulting companies) whose competencies are hydrology, chemistry, soil science, hydro-geology, treatment and process engineering, biology and socio-economy. The project aims at studying the performance of urban stormwater infiltration systems according to physical aspects (clogging, ageing, possibility of water transfer through preferential paths of the soil, groundwater temperature modifications ...), environmental features (pollution transport and role of different phases (particles, colloids and dissolved matters) flowing through the topsoil, the unsaturated and the saturated zone, role of micro-organisms in the pollution transfer, possible treatment methods of solid waste trapped by infiltration systems, ...) and socio-economic aspects.

The research mainly uses *on site* observations and measurements from the OTHU sites (Field Observatory for Urban Hydrology – www.othu.org). This research has begun in January 2006 and finished in December 2008. The final deliverable is a compilation of guidelines to design and monitor stormwater infiltration systems. This publication (in French) is available on the website of the programme <http://www.ecopluies.org/>

Many French research studies will be presented at the 7th NOVATECH conference to be held from June 28th to July 1st, 2010 in the prestigious Lyon Congress Centre, in the heart of Lyon, between the Rhône River and the wonderful "Parc de la Tête d'Or". The main focus of the Novatech conferences is sustainable solutions for management of wet-weather discharges in constructed areas (i.e. urban and suburban areas). The conference covers both stormwater management and CSOs. Further details appear in Section 9 of this newsletter.

REGIONAL NEWS FROM CENTRAL AND EASTERN EUROPE (REPORTED BY MANFRED SCHUETZE, ifak Magdeburg, GERMANY)

This section briefly summarises current research topics on urban drainage in a number of European countries and was prepared by Manfred Schuetze, who invited brief contributions from professors in Germany, Austria, Switzerland, Belgium, Netherlands, Poland, Czech Republic, Slovakia, Hungary, Serbia, Romania, Bulgaria, Slovenia, Latvia and Belarus. If interested in obtaining more information, please contact the research groups directly, or Manfred Schuetze (Manfred.Schuetze@ifak.eu).

Biochemical processes within sewer systems form a topic of current research at various institutions: In-sewer processes, including odour and corrosion aspects, including modelling are investigated at *Technical University of Berlin*. The *Harz University of Applied Sciences in Wernigerode* is researching treatment of wastewater in sewers by aeration in pressure pipes and tanks with biological contactors. Microbiological in-sewer processes, in particular those concerning sulphide formation, are included in the research at this university. Similarly, H₂S production in sewer networks as well as related counter measures is investigated at *Technical University of Vienna*, where also a mathematical model estimating the H₂S-production potential has been developed and validated on full-scale pressurised main sewers.

The treatment **efficiency of sedimentation tanks** in sewer systems is being researched at *Technical University of Graz* and at *University of Applied Sciences in Münster*. In Münster, a diagnostic method to quantify and evaluate the treatment efficiency of sedimentation tanks in combined and separated sewer system is developed, combining field studies and CFD simulation of flow and sedimentation processes. Settling and resuspension of solids in CSO tanks and in primary clarifiers is focus of settling studies, also supported by CFD simulation, is topic of two projects at TU Graz.

A topic of increasing relevance are **priority pollutants**. The *University of Stuttgart* is researching pollutant fluxes related to wet-weather flow. Monitoring and modelling are combined to assess emissions of priority pollutants and pathogens from CSOs. Stormwater runoff from an industrial area is analyzed for organic trace pollutants. Particle load is related to other physical and chemical particle properties. The aim consists in detailed simulation of pollutant transport. Release of organic

pollutants and nanoparticles and the leaching of pesticides on pavements forms part of research at *EAWAG* in Switzerland. In another process project, *EAWAG* investigates the performance of absorber materials for the elimination of organic and inorganic pollutants from stormwater runoff. Models for retention of trace parameters are under development also at *University of Duisburg-Essen*.

Research on **innovative technologies** for advances decentralised treatment of CSO and urban storm water runoff is topic of a project at *TU Berlin*. Monitoring sewers and storm water treatment facilities in order to determine efficiencies towards standard and trace parameters and to develop models for the retention of those pollutants is topic of research at the *University of Duisburg-Essen*. The establishment of industrial standards for small-scale treatment devices for polluted stormwater runoff forms part of a cooperation of the *University of Kaiserslautern*, the *University of Applied Sciences Münster* and *Karlsruhe University*.

Measurements within sewer systems forms topic of research at various places: Since 2002, an on-line sewer monitoring station is operating in *Graz*. Runoff and pollutants are continuously monitored. A camera-based tool for flow and velocity monitoring has been developed at *EPFL Lausanne*. It could be shown by in-situ tests in various sewer configurations that the system allows accurate monitoring of hydraulic structures. Furthermore, at EPFL, a new scientific approach has been developed for the assessment of the reliability of sampling campaigns and in order to enhance hydraulic knowledge in sewer systems. It allows for the comprehensive assessment of the uncertainties linked to monitoring and sampling. The accuracy of flow measurements is tackled, at practical [lab-scale and field work] and theoretical level [CFD modelling] at *University of Applied Sciences of Münster*, aiming at the estimation of uncertainties. For the most relevant measurement methods, uncertainty algorithms were developed, being able to propagate uncertainties in individual values and in time series. At *Technical University of Vienna*, a monitoring network software has been developed, assisting in, among others, the management of the entire measurement process and in manufacturer-independent integration of sensor signals into a consistent data base.

Driven by the European Water Framework Directive, **impacts of urban runoff on receiving waters** are receiving increasing attention. For the analysis of hydraulic impacts of storm water runoff on biological and morphological river water quality, the *University of Applied Sciences in Münster* is developing a GIS-based tool for the German federal state of Northrhine-Westphalia. In order to assess impacts of CSOs and of wastewater treatment discharges on rivers, the *Technical University of Darmstadt*¹ and the research institute *ifak Magdeburg* are developing a simulation tool suitable for consenting procedures, based on a simple river water quality model (“SWQM”). An application of this model to a river in Slovakia is under preparation at *Slovak Technical University* in Bratislava. Results of a related research project at *EAWAG* have been implemented in best drainage practice codes in Switzerland. The suggested procedure involves setting up a risk profile for receiving waters, explicitly taking into account uncertainty in input data as well as inherent uncertainty in the processes. Finally, the increasing topic of “Urban Streams” has led, by initiative from Czech Republic, to the setup of a new Working Group “Urban Streams”² under the umbrella of the Joint Committee (see note elsewhere in this Newsletter)

A large number of projects related to **system design of sewer systems** and parts thereof can be found at various places around Central and Eastern Europe:

New CSO design guidelines (ÖWAV guideline documents 11 and 19), based on an efficiency factor, allows flexible solutions in the design and management of combined sewer systems, are now applicable in Austria. Seminars held at *Technical Universities of Graz* and *Innsbruck* presented the new Austrian guidelines. Also in Belgium, guidelines for the design of urban drainage systems are currently under revision, taking into account climate change trends. At *K.U. Leuven*, new techniques have been developed to statistically downscale climate model results with focus on short-duration (convective) summer rainfall extremes.

The **expansion of sewer systems and their modernisation** forms part of research at many places, including *Rzeszow University of Technology* (also researching storm water accumulation processes in innovative multi-chamber reservoirs), *Technical University of Lodz* (also promoting the idea of integrated modelling of sewer systems and wastewater treatment plants in Poland; furthermore working on renaturalisation of urban rivers receiving stormwater runoff). Rainwater outflow modelling from green roofs as well as installations for surface and underground detention of rainwater are topics being investigated at *Wroclaw University of Environment and Life Sciences*. Here, also meteorological data processing and work on synthetic hyetograph generators takes place. *Warsaw University of Technology* works on reliability field tests and risk assessment of gravitational and pressured sewer networks. Based on data obtained from a water company, statistical evaluation, Markov models with finite number of states and Markov chains and processes and First and Second Order Reliability Methods are used for reliability assessment.

The *Czech Specialist group on urban drainage* finalised a feasibility study on the implementation of principles of **sustainable urban drainage** in a feasibility study. This work resulted in suggestions to the Czech Water Act as well as the setup of technical rules and of a grant system encouraging best management practices as well as the introduction of the sustainability principles concerning water resources into education at all levels. Stormwater treatment using BMP techniques forms also part of the work at *Gdansk University of Technology*. Decentralised sanitation and reuse (aiming at the reduction of impacts of urbanisation and the reduction of nutrients in wastewater) are dealt with in various projects in Slovakia. “Sustainable Water Management” is also the title of a research programme of the *Swiss National Science Foundation*. It aims at the development of scientific foundations and methods for sustainable management of water resources, also determining the effects of climate and social changes. Two (“Sustainable Water Infrastructure Planning”, “Integrated River water quality management”) of the sixteen projects of this research programme explicitly deal with urban drainage issues. An assessment of willingness to pay for wastewater treatment and closing of water circuits has been carried out at *Bialystok Technical University*.

Urban flooding is receiving increased attention, also as a potential consequence of climate change. For examples, *RWTH Aachen University* and at *Gdansk University of Technology* are working on these issues.

Modelling of urban drainage systems takes place at many places. New developments are at *Technical University of Darmstadt*, linking hydrologic sewer models (also several of them) and a new river model (see above) via the European OpenMI framework. Linking models with measurement data, as required for example in calibration, forms part of current research at this university and at *Technical University of Graz*; linking models with continuous monitoring data is

done at *Poznan University of Technology*, whilst data mining technologies are applied to monitoring results at *Wroclaw University of Environment and Life Sciences*. In *Czech Republic*, a Code of good practice on rainfall-runoff modelling has been finalised.

The development and application of a general (applicable to many sewer networks) and easily configurable algorithm for **real time control (RTC)** forms one of the research topics at *ifak Magdeburg*; it is now being implemented in practice in cooperation with *University of Hannover* and with an automation company. The use of optimisation techniques for RTC is currently being investigated at *CRTE Luxemburg* and at *Technical University of Darmstadt*.

As a means to address the challenges of climate change in a megacity context, *ifak Magdeburg* is setting up a **macro-modelling** tool, including the entire water supply and wastewater system of a megacity in a conceptual manner, as only the overall consideration of the water (and energy) system can ensure sustainable solutions being found and implemented.

Finally, many research institutions are involved in the **organisation of conferences** related to the topic of urban drainage, e.g. the conference on urban drainage modelling (UDM 2012) in Serbia (under the auspices of IRTCUD Belgrade and *University of Belgrade*³). Past conferences include the 9th Czech Conference on Optimisation of design and control of sewer systems and WWTPs in October 2009 and the Conference on Measurement and control technologies in wastewater systems in November 2009 in Wuppertal/Germany. A core activity in Central Europe is given by the bi-annual meetings of the Central European Researchers' Simulation Group (German acronym: HSG) with participants from Germany, Austria, Switzerland, Slovakia, Poland and Switzerland. Currently topics such as data management in urban drainage, impacts of urban discharges on receiving rivers and wastewater treatment plant modelling are discussed in this lively group.

Overall, there is a large spectrum of research activities in Central and Eastern Europe, which is characterised by a large decentralised research structure. Only a very brief and concise summary could be given here. However, it is hoped that it enables the outside world to connect with the activities currently going on in this part of the world.

ITALY (REPORTED BY ALBERTO CAMPISANO, GABRIELE FRENI, MARCO MAGLIONICO AND UMBERTO SANFILIPPO)

The Centro Studi Idraulica Urbana (CSDU) is continuing its efforts in a number of recent research projects, including (a) performance indicators for water distribution systems, (b) water pollution impacts on receiving water bodies, and (c) standardisation of urban drainage structures. The main outcomes of the biennial research projects, financed in 2007 by the Italian Ministry of Research, are now published in English (details are available on www.csdu.it). CSDU applied for additional funds on the following topics:

- Influence of climate change on the mitigation of water quality impacts due to stormwater runoff (project partners: Politecnico di Milano, Università degli Studi di Pavia, Università degli Studi di Bologna, Università della Calabria, Università degli Studi di Palermo);
- Impact of water leakage reduction on water systems management in drought conditions (project partners: Università degli Studi di Pavia, Politecnico di Milano, Università degli Studi di Bologna, Università degli Studi di Catania);

- Standard design of hydraulic structures in urban drainage systems (project partners: Università degli Studi di Napoli “Federico II”, Università degli Studi di Catania, Università degli Studi di Roma Tre, Università della Calabria)

Single research units continue their collaboration with Local Authorities in applied research projects:

- Politecnico di Milano with the CaRiPLo Foundation is running a project about protection and use of water resources in the Livescia catchment
- Università degli Studi di Bologna is supporting the Emilia Romagna Region on the topic of the water loss: leakage-energy relationship and definition of operative strategies to save water and energy resources. Application of simulation models to large actual cases: analysis of the environmental impact of the Rimini CSOs to the Adriatic sea; energy and water quality optimization of water distribution networks in the Modena district.
- Università degli Studi di Catania is running research projects on the evaluation of real time control techniques for leakage control in water supply networks.
- Università degli Studi di Palermo is running two projects in cooperation with Palermo water managers regarding the evaluation and mitigation of apparent water losses in water distribution systems; moreover Università di Palermo is continuing water quality monitoring and modelling of the integrated urban drainage systems in collaboration with local authorities.

A continuing attention is being paid to the topic of the first flush pollution control in urban environments. This topic will be discussed in a new first flush management manual that is under preparation by CSDU in 2010 and it will transfer CSDU experience in the field to practitioners and administrators.

A short course on Advanced Systems and Technologies for Modern Urban Drainage, organised by CSDU, will take place at the Politecnico di Milano in spring 2010 (http://www.csdu.it/STADIUM'09/Corso_STADIUM'09.htm). Such a course is developed for professionals and technicians of water agencies, municipalities, and system managers and will cover new developments in the fields of urban drainage management and receiving water bodies quality amendments. For additional information please visit www.csdu.it.

The Italian Group of Hydraulics (GII) selected Palermo as the venue for the XXXII Italian Conference on Hydraulics and Hydraulic Constructions. The Conference will open on the 14th September 2010 and will close on 17th September 2010. This event, repeated every two years since 1947, represents an important and consolidated meeting point for all the researchers and professionals interested in hydraulic disciplines. On that occasion, a special session will be held on “Uncertainty assessment and validation of hydrological, hydraulic and environmental modelling”. The official language of the session will be English and a selected papers will be published in Physics and Chemistry of the Earth. Details can be found on the conference website www.idra2010.it

JAPAN (REPORTED BY TAKASHI SAKAKIBARA, ATSUSHI TAJIMA, MAYUMI KOSEKI, AND HIROAKI FURUMAI)

Japan Global Center for Urban Sanitation (GCUS) was established on April 28, 2009. The main objectives of the Center are to support sustainable development of sanitation to achieve the UN Millennium Development Goals (MDGs), recommend appropriate sanitation technologies

depending on needs of each country, and use Japan's experience in planning, construction and management of sewerage to provide advice to developing countries. The details of the center are available at <http://gcus.jp/english/index.html> and <http://www.jswa.jp/en/jswa-en/>

The **Consortium of the Common Modelling Platform (CommonMP)** was established for new comprehensive water management. The "CommonMP" can operate two or more element models at the same time for water-material runoff analysis in a watershed and should be operational in March, 2010. The consortium started to work on the platform development and future operation in July, 2009, under the management of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), National Institute for Land and Infrastructure Management (NILIM), Japan Society of Civil Engineers (JSCE), The Japan Civil engineering Consultants Association (JCCA) and Association of Water and Sewage Works Consultants of Japan (AWSC). The consortium will provide active exchange of information and opinions concerning the use of existing software and analytical engines, and proposals of new models or frameworks.

X-band Multi Para (MP) radars are being installed for rainstorm observation and flood forecasting. According to the report of the Japan Meteorological Agency, the frequency of heavy storms with rainfall intensities larger than 50 mm/hr has increased almost 240 times per year during the last decade. The frequency is now 1.5 times higher than it was three decades ago. During the last two years, several peoples died because of heavy storms with rainfall intensities exceeding 100 mm/hr. To detect the generation of rainstorms quickly and more accurately, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is promoting the installation of X-band MP radars. X-band MP radar uses two kinds of electromagnetic radiations (horizontal and vertical), and by inferring the amount of rainfall from the strength of signal reflection and the phase difference, it does not need calibration by observed rainfall data. By April 2010, rainfall data in a 250 m grid, which covers Tokyo, Osaka, Nagoya, and Kanazawa, will be provided and updated on the website in one-minute intervals. Moreover, MLIT plans to provide flood forecasts and the predicted rain cell movement with a one-hour time lag by using the X-band MP radar's high accuracy and frequent updates of monitored rainfall data.

CSO control and management has been implemented by many cities in Japan. In 2003, the sewerage law was revised and the implementation of urgent CSO remediation measures has become mandatory. The target year is 2013 for medium and small cities (170 cities) and 2023 for large cities (21 cities). To develop appropriate technologies for sewage works, MLIT initiated a project called Sewage Project, Integrated and Revolutionary Technology for the 21st Century, or SPIRIT 21 (reported in the earlier newsletters).

The project promoted research and development work during 2002-05 in the following areas of CSO treatment and instrumentation: (a) gross pollutants removal (mostly by screening), (b) high rate filtration, (c) coagulation and solids separation, (d) disinfection, and (e) measurement and control instrumentation. By August 31, 2009, the project results were implemented with the following frequency: (a) gross pollutant removal at 237 CSO points, (b) high rate filtration at 6 points, (c) coagulation and solids separation at 3 points, (d) disinfection at 35 points, and item (e) has not been yet adopted.

MALAYSIA (REPORTED BY MOHD NOR BIN MOHD DESA and LARIYAH MOHD SIDEK)

The Centre for Stormwater and Geohazard Management of UNITEN currently undertakes research projects, which are summarised below and address various aspects of urban water management in the country.

Modeling of Stormwater Quality in an Urban Area (Case Study: Klang Town)

The Klang Town is one of the urban areas that have problems in drainage system due to frequent flash flooding, particularly during heavy downpours, and also deterioration of water quality. This in turn, has led to major socio-economic and socio-political impacts as a whole. The water quality in the Klang basin has declined due to high sediment loads, large quantities of litter and rubbish, untreated sewage and industrial and commercial effluents. A modelling has been carried out by using XPSWMM to simulate and predict the behaviour of stormwater quality led to a conclusions that it is important to prevent and control such a river pollution. The main objectives of this research are to characterize river quality and identify changes or trends in water quality over time, to identify the types and possible sources of pollutants discharged into the river, and to analyze and simulate the behaviour of stormwater and river water quality at selected catchments in the Klang Town. A recommendation for the Best Management Practices (BMPs) is to be achieved to improve water quality and to sustain the improvement. This research will also identify stormwater characteristics associated with different types of land use.



Figure 1:

Typical view of

drainage and river System in Klang Town

Dielectric Measuring Technique to Characterize Contaminations Underneath Infiltration Facilities

Multi Dielectric Sensors based on the measured dielectric mixture modelling are used to detect and identify the type and level of contamination commonly found in stormwater infiltration facilities. The purpose of this research is to assemble information related to the contamination problems from

the infiltration facilities in conjunction with the development of an instrument for determination the characterization and level of contamination based on the measured dielectric properties of water and soil. This potential of contamination to the groundwater is evaluated based on pollutant abundance in stormwater, pollutant mobility in the vadose zone, the treatability of the pollutants, and the infiltration procedure used. This method requires special sample preparation and sample size. As a result, there is a need to develop a sensor to assess the contamination in the laboratory and field.

It is expected that the results of this work will form a basis for further advancement of electromagnetic techniques and the development of effective systems for environmental applications.

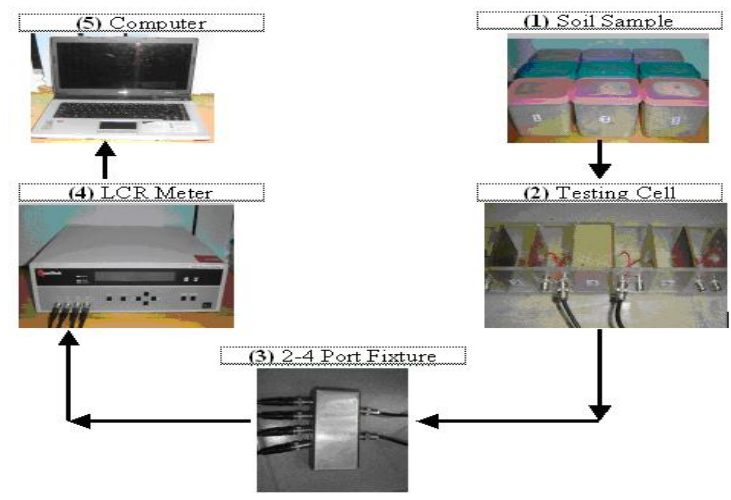


Figure 2: Lab scale experiment using Multi-dielectric Sensor for Infiltration Contamination Detection

Gross Pollutant Trap (GPTs) to Improve Stormwater Quality

There are now a number of devices including the proprietary and non-proprietary GPT's for trapping of gross pollutants that are based on initially diverting stormwater to a separation and retention chamber in which these pollutants are subjected to the mechanisms of interception and sedimentation (Wong, 2002). However, the hydraulic performance of these GPT's is not well understood in tropical climates where high rainfall intensities of a short duration are common. In this connection, it is important to study the size, design flows, operation under above design conditions and optimal dimensions for the trap in order to characterize and estimate the urban litter produced from different type of developments.

The method used in this research focuses on collecting and gathering hydrological and hydraulic information and data of the study area from all the available sources. The information gathered will be analyzed to serve as inputs to a Decision Support System for GPT's. The research will initially focus on the characteristics and behaviour of litter transport in the existing drainage system before proceeding to the development of DSS GPT's. It will help estimate total load produced and transport from different type of land use, total load capture in different type of gross pollutant

traps, and effective cost of using GPTs. Ultimately, it will assist the engineers and local authorities to select the most appropriate strategies for trapping gross pollutants in an urban area, expand the sources for managing gross pollutants in order to rehabilitate the river system and preparing budget allocation of using GPTs in terms of installation cost and annual maintenance costs, including the Life Cycle Cost analysis. The software is very user-friendly and interactive to enable the engineers/user to select, design and evaluate the proprietary & non-proprietary GPTs based on a MSMA design standard.

Centre for Stormwater & Geohazard Management (CSGM), Universiti Tenaga Nasional in Kuala Lumpur (<http://www.uniten.edu.my/>), completed a number of projects including: (1) Evaluation of stormwater oil & grease trap in Putrajaya, (2) Development of gross pollutant trap decision support system for tropical climates DeGPTs, (3) Characterization and modelling of stormwater pollutants in Klang Town, (4) Stormwater and Drainage Master Plan for Klang Town, and (5) Flood Mitigation Master Plan for Melaka State (6) Dam Break Analysis and Scio-Economic Impacts for Kenyir Power Station (7) Multi-dielectric sensors for contaminated soils underneath Infiltration facilities. Other projects deal with WSUD Application for Integrated Stormwater Management at Lot Scale in Kuala Lumpur. The stormwater management measures will be monitored to gain a better understanding of WSUD and develop an improved design methodology that will ensure that WSUD is cost effective as well as unobtrusive in its function. Monitoring will include the condition and performance of WSUD components such as permeable paving surfaces, bioretention, green roof and constructed wetland. Prior to that, it will also include the operation of stormwater reuse systems and specifically the quantity of rainwater used in the building. CSGM is very active and key achievements in 2009 include: (i) Gold Medal during MTE09, Malaysia – “Stormwater Gross Pollutant Traps Decision Support System (DeGPT’s) for River Rehabilitation”, (ii) Gold Medal during INNOVA, Brussel – “DeGPTs – Innovative Stormwater Gross Pollutant Trap DSS”, and (iii) Bronze Medal for Best Thesis Award 2009 by DID, Malaysia.

2nd edition of Urban Stormwater Management Manual for Malaysia (MSMA)

Malaysian Government via Drainage and Irrigation Department (DID) has taken initiative to review and publish the 2nd Edition of the MSMA manual. To effectively manage the impacts of stormwater and prevent adverse impacts to stormwater quality, habitat and flood storage capacity as well as meet the requirements, DID are updating the 1st Manual to reflect the current engineering practice based on local data and experience concerning stormwater management and to incorporate MSMA methods throughout. This revised manual provides appropriate guidance for stormwater management in new development and redevelopment projects and most importantly incorporates MSMA as the “industry standard” for all sites, representing a fundamental shift in how development projects are planned and designed.

This stormwater standard manual is aimed at providing (a) The **stormwater standard** and (b) **stormwater design workbook** for current best practice in the management of urban stormwater quantity and quality in Malaysia drawing on the latest findings and recommendations from Malaysian and international research to the following:

- Provide a tool for developing design responses that incorporate better stormwater management practices and which meet defined performance standards
- Help in preparing conceptual and detailed designs for MSMA systems as part of a development proposal.
- Maintain post-development peak discharge rates to not exceed pre-development rates

- Use MSMA techniques as the primary method of stormwater control to the maximum extent practicable.

PORTUGAL (REPORTED BY MARIA DO CÉU ALMEIDA)

The on-going AWARE-P project (<http://www.aware-p.org/np4/home>) aims to promote the application of integrated and risk-based approaches to the rehabilitation of urban water systems, by providing adequate and effective decision support tools to water utilities. It further aims to create awareness, contribute to change current practice and improve the technical know-how of the utilities' human resources. The main objective of AWARE-P is to develop a structured procedure for supporting strategic urban water infrastructural asset management, and to implement it in water utilities. Thus, the project aims at providing water utilities with the know-how and the tools needed for efficient decision-making. Based both on previous and new R&D results, an open-source, professional-grade computer application is being developed, along with manuals of best practice and learning materials. LNEC and SINTEF, as R&D institutions, are responsible for the technical and scientific components of the project. Other partners include the Water and Waste Regulator Institute (IRAR), a software house (YDREAMS) and a number of Portuguese end-users. For more information on this project contact Sérgio Teixeira Coelho (sergio.coelho@aware-p.org).

REPUBLIC OF SOUTH AFRICA (REPORTED BY NEIL ARMITAGE)

Regrettably, urban stormwater management in South Africa is still largely dominated by the old-fashioned approach of channelling runoff from non-pervious areas via road kerbs, catch-pits, pipes and canals to the nearest watercourse. Whilst the larger cities are liberally provided with stormwater detention ponds to reduce the flood peaks, little is done to improve water quality other than the occasional, often dysfunctional, gross pollutant trap. Sewage systems are notionally separate from the stormwater systems, but even where sewerage is provided, inadequate capacity, poor maintenance, vandalism and power cuts frequently result in sewage ending up in the streams and wetlands. Furthermore, millions of people live in informal settlements / shanty-towns where there is no formal stormwater drainage and minimal sanitation resulting in highly polluted runoff. In the northern part of the country, acid drainage from South Africa's numerous mines make matters worse. Everywhere, gross pollutants (i.e. urban litter such as plastic packets) are a huge problem as solid waste management is often wanting.

On the bright side, water research in South Africa is relatively well-funded by the Water Research Commission of South Africa (WRC). Current research in the area of urban drainage includes:

Stormwater ingress in South African sewer systems: understanding the problem and dealing with it (Duzi-uMngeni Conservation Trust). This study is almost complete. It focuses on the problem of illegal stormwater to sewer connections and ingress through breaks in aging sewer networks. The work was carried out in Msunduzi Municipality (incorporating the city of Pietermaritzburg, the capital of the province of KwaZulu-Natal in the east of South Africa). Particular attention was paid to the role of municipal inspectors in reducing the size of this problem.

Waterborne sanitation operating and maintenance guide (University of Pretoria). This work, which is now effectively complete, involved the compilation of a user-friendly guide with particular relevance for the smaller, poorly resourced municipalities (approximately one-third of South African municipalities have no technical staff at all, another third have only one or two junior people. Many of these municipalities provide services to substantial populations).

Influence of catchment development on peak urban runoff (University of Pretoria). The current trend amongst the relatively small middle class in South Africa is towards “gated communities” and/or homes surrounded by high impermeable walls as perceived protection against “crime and grime”. These walls have the unintended – but positive – consequence of reducing peak runoffs by temporarily storing stormwater on site and possibly increasing local infiltration. In this project, the researchers attempted to measure the flows emanating from three typical urban sub-catchments in an attempt to quantify the impact of the changes in development patterns.

Sewer master planning tools and guidelines (University of Stellenbosch in collaboration with GLS Consulting). This project aims to develop tools to aid municipal staff and consultants in sewer master planning. This includes the identification and quantification of the most economical infrastructure interventions to ensure that uninterrupted development can proceed without sacrificing the agreed level of service or risking damage to the environment. The research takes into account the general low level of technical skills in almost all of the smaller towns and cities of South Africa.

Sustainable options for community-level management of greywater in settlements without on-site waterborne sanitation (University of Cape Town). Millions of people in South Africa live in very high density urban settlements which are either not provided with waterborne sewerage, or else the sanitation is in the form of communal toilet blocks shared by numerous people and often dysfunctional. Water is commonly provided at communal tap-stands. Greywater (domestic wastewater) is then disposed on the ground by the side of the homes (usually home-built “shacks” made of recycled material) where it mixes with faecal matter and solid waste to create pools of highly polluted stagnant water thus adding to the health burden of the inhabitants (who are frequently HIV+). The problem is exacerbated in the wet season as stormwater runoff spreads the toxic mix around the settlement – frequently into the homes of the residents. This project sought to provide community-centred local solutions to greywater management as a stop-gap measure until such time the government is able to provide adequate housing for all. It largely failed owing to the large measure of distrust and lack of cooperation between the local authorities and the residents, and amongst the residents themselves. Nevertheless, some important social lessons were learnt. The project is now finished.

Alternative technology for stormwater management (University of Cape Town in collaboration with the Municipalities of Cape Town, eThekweni, Johannesburg and Tshwane, SRK Consulting and IDS). This project seeks to identify and develop new, appropriate, practical and affordable alternative stormwater management technologies for South Africa in line with Sustainable Urban Drainage System (SUDS) and Water Sensitive Urban Design (WSUD) principles. Ultimately the intention is to develop appropriate, practical, user-friendly guidelines for South Africa. It is due for completion in 2012.

Improving sewerage for South Africa (University of Cape Town in collaboration with the Municipalities of Cape Town and eThekweni). Almost all sewerage in South Africa has been installed according to very conservative, relatively expensive, guidelines largely “inherited” from the UK many years ago. Given the great need to provide sewerage services for millions of poor people in the very high density urban settlements, this project aims to investigate the possibility of alternative sewerage systems such as shallow sewerage, settled sewerage, vacuum sewerage and pressure sewerage. It is due for completion in 2012.

UNITED KINGDOM (REPORTED BY DAVID BUTLER)

As in the last few years, the issues surrounding urban flooding still provide a strong focus for urban drainage research in the UK. A key vehicle for this work is the EPSRC/EA/Defra funded Flood Risk Management Research Consortium (FRMRC). See www.floodrisk.org.uk for details. There are seven individual urban WP's that are currently ongoing and these include health impacts, the application of dual polarisation weather radar, real-time forecasting of pluvial flooding, artificial intelligence techniques and studies to better inform the development of above and below ground interactive models. The latter involves experimental and CFD modelling study of flow in two laboratory setups, one consisting of a full scale gully structure with the grating and a flat surface area and another made up of a 10-pipe network below an area with urban surface features. These experiments and computational modelling are unique in that they are the first such detailed study of outflows surcharging from pressurized pipes and the interactions between sub-surface and surface flows, results of which will be tested and implemented in FRMRC tools but are also relevant to all dual drainage models. FRMRC urban WPs are being co-ordinated by Prof Adrian Saul at the University of Sheffield - a.j.saul@sheffield.ac.uk - from whom further information may be obtained.

The Urban Water Research Group at Imperial College London (as part of FRMRC) has recently completed the development of a 1D Urban Pluvial Flood Analysis module. The GIS-based Automatic Overland Flow Delineation module (AOFD) has been tested by independent modeller Richard Allitt on behalf of UKWIR (UK Water Industry Research) and the results published in a paper presented at the Blackpool WaPUG Conference in November 2009 and in the IAHR Journal of Hydraulic Research. The WaPUG paper also presents results of the testing of the 1D-2D model SIPSON/UIM (developed by the Centre for Water Systems, University of Exeter, coordinated by Prof Slobodan Djordjevic) and the Wallingford Software InfoWorks 2D. Copies of these papers are available from Prof Cedo Maksimovic (c.maksimovic@imperial.ac.uk). Also at Imperial, Joao Leitão recently defended his PhD thesis at Imperial College London with the title: Enhancement of digital elevation models and overland flow path delineation methods for advanced urban flood modelling. Copies of the full text are available from the author (j.leitao@imperial.ac.uk).

Also in the flooding field, researchers at the University of Edinburgh have developed an innovative method of assessing whether water bodies such as reservoirs can contribute to flood control, based on the new sustainable flood retention basin (SFRB) concept. This allows the contribution of water bodies to flood control to be assessed by screening and is quicker and cheaper than current methods. For further information, please contact: Dr Miklas Scholz; School of Engineering M.Scholz@ed.ac.uk.

A pilot plant designed to evaluate the variables affecting ammonia removal from final effluent using granular media biofiltration has been commissioned at a United Utilities wastewater treatment works (see photo). Over the next year or so it is hoped to feed knowledge from the trial back into the industry in order to raise awareness of the technology, generate performance verification information and find ways to optimise the process, which will be useful for all of the parties involved. Although at ‘the wrong end’ of the works for urban drainage it is also hoped that work carried out on site will be able to be incorporated into the selection of a treatment process and regimes in combined sewer overflow systems and also in designs at the forefront of CSO research. The research is being carried out with funding provided by EPSRC and led by the Liverpool Centre for Environmental Technology, Liverpool John Moores University, and Hydro International Plc. For more information please contact Professor Rafid Alkhattar at r.m.alkhattar@ljmu.ac.uk for more information.



Hydro International is also co-sponsoring (with EPSRC) another innovative project known as a Knowledge Transfer Partnership. These are government-backed research projects where the researcher is based exclusively with the industrial partner but is also registered for a PhD – in this case at the Centre for Water Systems, University of Exeter. The aim of the project has industrial and academic aspects: to enhance the product development process AND to understand and model the fundamentals of product performance. In this case the product being developed forms part of the company’s vortex flow regulator range. Computational fluid dynamics has been used to model regulator hydraulic performance in detail with impressive results, backed up by laboratory verification data (see photo of rig and instrumentation). Further details from Professor David Butler at Exeter (d.butler@exeter.ac.uk).



UNITED STATES (REPORTED BY SCOTT STRUCK)

The Urban Water Resources Research Council (UWRRC) of the Environmental and Water Resources Institute (EWRI) under the American Society of Civil Engineers has been active this year. The Council participated in the planning of several quality conferences including the Urban Watershed Management Track of the World Environmental and Water Resources Congress for the

7th year which will be held in Providence, Rhode Island May 16th -20th, 2010. This followed a very successful Track at the conference in Kansas City, Missouri in May of 2009. The 2010 International Low Impact Development Conference is also a product of this Council to be held in San Francisco, California April 11th-14th 2010. Many of the Low Impact Development Task Committees including the Computational Methods, Water harvesting and Reuse, Green Streets/Green Highways, and Bioretention task committees will be meeting at this conference. 2009 saw another success with the 6th International Urban Watershed Management Conference in China. The follow on 7th annual conference in Auckland, New Zealand February 21st – 24th held jointly with the 17th Congress of the Asia and Pacific Division of the International Association of Hydraulic Engineering and Research (IAHR) is expected to be just as popular, informative, and successful. The Council also provided speakers and organizational support for the 33rd IAHR Biennial Congress, August 9-14, 2009 in beautiful Vancouver, BC, Canada.

The Council was also pleased to produce a technical report from the Gross Solids Task Committee titled “Proposed Guidelines for Monitoring Stormwater Gross Solids”. This long awaited report provides guidance for standardized data collection procedures used in evaluating the removal of Gross Solids by Best Management Practices (BMPs). One of the primary goals of the committee was to develop a guidance document that will allow for direct comparison of field data from separate studies by using the same collection methodologies.

The Council is in the midst of developing a statement of input for the US EPA’s Development of Nationwide Post-Construction Stormwater Rule. The Council will forward the statement through EWRI and ASCE channels to provide comment on the national rulemaking process.

The success of this Council is dependent on its volunteer members. The breadth, knowledge, and leadership of these volunteers have continued to conquer new ground and maintain a level of participation and output unmatched in EWRI. If interested in joining the Council or participating in task committees, please contact Scott Struck at scott.struck@tetrattech.com.

8. REPORTS ON CONFERENCES AND WORKSHOPS

1st International Conference on Urban Drainage and Road Salt Management in Cold Climates: Advances in Best Practices

May 25-27, 2009, University of Waterloo, Waterloo, Ontario, Canada.

The conference was sponsored by IAHR, Canadian Association for Water Quality (member of IWA), and the JC Cold Climate Urban Drainage Working Group.

The conference provided the following outcomes:

- (1) an overview of urban drainage issues and state-of-the-art practices in cold climates, with a special emphasis on prevention and treatment of best management practices for mitigating chloride transfer from snowmelt/stormwater via overland drainage and storm sewers to the environment;
 - (2) the current state-of-the-art knowledge on interactions between road salting and the environment, with respect to their understanding, measurement, modelling and particularly management techniques;
- and

(3) a forum for improving the scientific basis for policy decisions related to the impacts of winter maintenance and road salt on infrastructure, terrestrial and aquatic ecosystems and water resources.

It brought together specialists, practitioners and researchers who have an interest in improving urban drainage design and operation in cold climates, and an understanding of mitigating the impact of road salts on infrastructure, water supply and the environment. The conference addressed eight topics, including Urban drainage and road runoff in cold climate, Design and operation of best management practices in cold climate, Impacts of road salt on the environment, Impacts of road salt on infrastructure, Modelling road salt transfer in the environment, Evaluating the utility of best management practices (BMPs), Management, legal and regulatory issues, and Assessing the effectiveness of BMPs. The conference attracted about 100 participants, who supported the organizing committee's suggestion to hold this event every two years.

The 8th Urban Drainage Modelling (UDM) and The 2nd Rainwater Harvesting and Management (RWHM) Conferences to be held in Tokyo, Japan, Sept. 7-11, 2009.

The 8th International Conference on Urban Drainage Modelling (8UDM) was held from September 7 to 11, 2009, in Tokyo, Japan, bringing this conference for the first time to Asia, in conjunction with The 2nd International Conference on Rainwater Harvesting and Management (2RWHM). The conference was well attended and the organizers received more than 200 abstracts from 28 countries. The 2RWHM was chaired by Prof. Mooyoung Han and received around 50 abstracts. In total, 133 oral presentations and 106 poster presentations were delivered during the joint conference, and the number of participants was almost 300, with 70% of participants from abroad. In order to promote young professionals' contributions in this field, the UDM Young Researcher Paper Awards were given to three young authors, who submitted excellent papers with good presentations, and there were also Poster Awards.

A special workshop was organized on "Rainwater Management for Climate Change Adaptation and Case Studies in Japan and Korea." Furthermore, four morning invited lectures were given by Dr. Jiri Marsalek, Dr. Slobodan Djordjevic, Prof. Tsuyosi Miyazaki, and Prof. Tadashi Yamada. After receiving permissions from the workshop speakers and invited morning lecturers, their presentations were uploaded on the conference website in PDF files, and are protected by the Password: 8udm2rwhm2009 (visit URL: <http://www.envrisk.t.u-tokyo.ac.jp/udm/program/slides.html>).

The conference has provided an excellent opportunity for exchanging the knowledge and technology between the developed and developing countries, and thereby served future improvements of the urban water environment. Selected papers were offered for publication in international journals such as Water Science and Technology, Water Practice & Technology, and others. The next UDM conference will be held in 2012, hosted by the University of Belgrade. We hope to see you in Serbia!

9. FUTURE MEETINGS AND CONFERENCES

A table listing the proposed JC and WG conferences and workshops (as of January 2010) appears below; additional information on some events is also presented. All information about conferences,

seminars, workshops, summer schools, etc. dealing with urban drainage is welcome and will be added to this table. Please send such information to Jiri Marsalek or Peter Steen Mikkelsen. You should also use this table when proposing new events - to avoid overlaps in time and topics.

Year	Month	JCUD	Data and Models WG	Sewer Systems & Processes WG	IWGUR (urban rainfall)	Drainage in Cold Climate
		P.S. Mikkelsen J.-L. Bertrand-Krajewski	A. Deletic B. Tait	G. Chebbo Z. Yuan	P. Willems T. Einfalt	M. Viklander
2010	June 15	5 th Int. Short Course: Advances in Knowledge of Urban Drainage: Technical solutions in stormwater management				
2010	June/July	7th Int. Conf. on Sustainable Techniques and Strategies for Urban water management, (NOVATECH), Lyon, France, June 28 – July 1, 2010				
2010	Sept.	IWA World Water Congress and Exhibition, Montreal, Canada, Sept. 19–24, 2010				
2010	Oct./Nov.			6th Int. Conf. on Sewer Processes and Networks (6th SPN), Brisbane, Australia, Oct./Nov. (http://www.spn6.net/)		
2011	Aug./Sep.	12 Int. Conf. On Urban Drainage, Porto Alegre, RS, Brazil				2 nd conference on Urban Drainage and Road Salt Management in Cold Climate, Waterloo, ON, Canada
2012			9th UDM, Belgrade, Serbia		The 9th Int. Workshop on Precipitation in Urban Areas, St. Moritz (December)	

For updated information, please regularly visit our website at:

http://www.iwahq.org/templates/ld_templates/layout_633184.aspx?ObjectId=633912,
or www.jcud.org

1st IAHR European Congress, Edinburgh, UK, May 4 to 6, 2010. You can now register on-line. Keynote Speakers: Professor Roger Falconer, Cardiff University; Professor Janos Jozsa, TU Budapest; Professor Suzanne Hulscher, University of Twente; and, Professor Paul Jowitt, President Institution of Civil Engineers, Professor of Civil Engineering Systems and Director of the Scottish Institute of Sustainable Technology Heriot-Watt University. Please visit the IAHR website for further details of this congress and some other specialised events offered by IAHR (www.iahr.org).

Seminar Flood Forecasting & Warning System for Tropical Region, 24-25th May 2010. For information contact Prof. Mohamed Nor bin Desa (mohamednor@uniten.edu.my)
The tropical region of South East Asia is blessed with abundant supply of rainfall and if not properly managed it can easily turn into a disaster. Flood forecasting and management is a very

daunting task involving complex phenomena. Today's society becomes ever more rapidly vulnerable to flood due to the concentration of populations in big cities. It is a grave concern that this vulnerability could increase the risk of catastrophic flood. A catastrophic flood disaster strikes and spreads not only by an abnormal natural force but also by very human factors. Thus, a reduction system, both mitigation and standardized emergency management, must be promoted by establishing strategic partnership to work on flood disaster reduction technology and management between a multi-disciplinary research team consisted with natural scientists, engineers, and social scientists.

The course objectives are as follows:

- To expose the participant the awareness and importance of the Flood Forecasting and Warning System (FFWS).
- To apply scientific findings for society adaptable towards extreme weather to become flood disaster resilient society.
- To address holistically and comprehensively the various concerns and gaps in the different phases of the flood disaster management cycle by considering the underlying causes of floods (e.g. the conditions of flood risks) and the broader set of issues and contexts associated with flood risk and its management.
- To prevent, mitigate, prepare for, and respond effectively to the occurrence of floods through the enhancement of local capacity and capability, especially in flood risk management (e.g. recognizing, managing and reducing flood risks, and ensuring good decision-making in flood reduction and response based on reliable flood risk information).
- To promote multilevel, multidimensional and multidisciplinary coordination and collaboration among stakeholders in flood reduction and response as they ensure the participation of the community, the integration of stakeholders' action, and the best use of limited resources.

The 5th International Short Course on Advances in Knowledge of Urban Drainage, organized by Prof. P. Piro, University of Calabria, in Rende (Cosenza), Italy, June 15, 2010

The course is organised by Centro Studi Acquedotti e Fognature, Dipartimento di Difesa del Suolo (University of Calabria), Laboratorio di Idraulica Urbana (LIU) and Associazione Idrotecnica Italiana, Calabria division. It aims to provide both basic theoretical knowledge as well as practical know-how, in comparing international experiences in technical solutions for rainwater / stormwater management. Typical audiences at these courses comprise practicing civil, hydraulic and environmental engineers, as well as graduate students and junior researchers; young professionals from other countries are particularly welcome to come and share their ideas and research topics with Italian colleagues.

This year's course program will feature presentations by international experts as well as by young Ph.D. students from several countries and will feature such topics as Global progress in stormwater management: 40 years of design with nature, Analysis of the Transport and Fate of Sediments and Solutes in Urban Environmental Engineering Systems, Natural disaster (flash flood), life and public health threat, transportation and infrastructure collapse, Multi-functional and integrated urban stormwater systems for better adaptation to extreme meteorological events, and Water quality indicators and pollutant transport in highly urbanized catchments.

The course will be held on the university campus in Rende (Cosenza), located a short distance from Paola, which can be reached by train from Naples (2.5 h) or Rome (4.5 h), or by car from Lamezia.

Further information: Prof. Patrizia Piro, Dipartimento di Difesa del Suolo "V. Marone", Università della Calabria, Ponte Pietro Bucci, Cubo 42/b, 87036 Arcavacata di Rende (CS), Tel. +039.0984.496546/47 Fax. +039.0984.494050, e-mail: patpiro@dds.unical.it , or visit the website www.liu-cs.it .

Novatech 2010

Every three years since 1992, Graie organizes the Novatech conferences, in Lyon, France, with the support of the JCUD. These conferences are among the key international scientific and technical symposia dealing with urban water management with reference to wet-weather pollution. The 7th edition of Novatech will be held from June 28th to July 1st, 2010, in the prestigious Lyon Congress Centre, in the heart of Lyon, between the Rhône River and the wonderful "Parc de la Tête d'Or". The main focus of the Novatech conferences is sustainable solutions for management of wet-weather discharges in built up areas (i.e. urban and suburban areas). The conference covers both stormwater management and CSOs. It will deal with three complementary dimensions of urban and suburban water management under wet-weather conditions:

- Integrated approaches for urban planning and operation
- Innovative technologies, and
- Integrated approaches for the protection and enhancement of receiving water bodies

NOVATECH'2010 in a few words:

- Near 700 participants expected: 1/3 scientists, 1/3 local authorities and 1/3 private firms
- Specialized workshops on Sunday, June 27th, organized by the JCUD working groups; those which have been already planned address Source Controls, Real Time Control, and Drainage in Cold Climate.
- A prestigious plenary opening conference, an event by itself
- A 3-day conference, with 3 parallel break-out sessions
- 200 communications, distributed between oral and posters presentations, results of research and experience feedbacks, representative of the state of the art in the world (30 countries represented)
- Exhibition of scientific and technical posters and a display forum for innovative products presentations
- 2 technical tours on Thursday, July 1st;
- Simultaneous translation French / English during all sessions and technical tours.;

Key Dates: February 2010: preliminary program
 March 2010: registration opening
 Early registration before April 15th

Novatech secretariat:

Ophélie CHASSARD : novatech@graie.org

GRAIE - BP 52132 - 69603 Villeurbanne cedex – France.

Tel +33(0)4 72 43 83 68 – Fax +33(0)4 72 43 92 77.

Novatech website: <http://www.graie.org/novatech/>

Novatech Workshop: Design, modelling and implementation of stormwater source control technologies, Lyon, France, June 27, 2010.

Workshop description. The aim of the workshop is to examine aspects relating to the design and implementation of stormwater source control technologies. This workshop, which builds on the previous SOCOMA workshop held in Lyon in 2007 (see <http://graie.org/SOCOMA>), will be specifically focussed on the modelling and performance evaluation of source control techniques. It will also evaluate experiences with implementation, using a number of important case studies. Each of these themes will include a general presentation of the current state of the art in terms of understanding and research, before exploring particular aspects in detail, through interactive presentations and discussions. The workshop will result in publication of a review article summarising the current state of the art in the modelling, performance evaluation and implementation of source control strategies.

Summary of the Workshop Program

Introduction	G. Rivard (Canada)
Modelling	
General literature review on modelling	S. Barraud (France)
Modelling urban stormwater impact mitigation by using BMPs at the catchment scale - Implementation of Source Control systems in Italy	G. Freni (Italy)
Opportunities and drawbacks of simulating infiltration processes	S. Fach (Austria)
Source control performance	
General literature overview	T. Fletcher (Australia)
"Green" technologies and infrastructures for the control and treatment of impervious surface runoff	J.B. Ellis (UK)
Elements in favour of source control: The experience of the French on-site observatory OTHU	S. Barraud and A. Foulquier (France)
Implementation and adoption: success, failure and lessons learnt	
Lessons from a catchment-scale public & private-land retrofit project	T. Fletcher & M. Burns (Australia)
Lessons from the Shepherd Creek experiment.	B. Shuster (USA)
Some lessons learnt about Source Control strategies in France	C. Carré (France)
Lessons learnt and experiences about Source Control strategies in Brasil	M. Baptista & N. Nascimento (Brazil)
Discussion	

Introduction to WSUD, a short course at UNITEN, Malaysia, June 30 to July 1, 2010. The course will feature Prof Simon Beecham as key speaker from University of South Australia (UniSA). For more information on research activities at UNITEN please contact Mohamed Nor Mohd Desa (mohamednor@uniten.edu.my) and Lariyah Mohd Sidek (lariyah@uniten.edu.my).

14th International Conference on Diffuse Pollution and Eutrophication, Sept. 12-17, 2010, Quebec City (St. Anne du Beaupre), Canada. The conference aims to share and transfer the knowledge and technology among established and young specialists from developed and developing countries interested in diffuse pollution. It will seek to identify new approaches and solutions to protect water, air and soil resources from such diffuse source contaminants as sediment, nutrients, metals, trace elements, pesticides, pathogens, pharmaceuticals and other anthropogenic chemicals, occurring in both natural and urban developments. Besides regular sessions, the conference will feature special workshops, including the one on Managing Urban Stormwater

Quality in a Changing Climate: Science, Engineering and Policy, co-chaired by Jiri Marsalek (Canada) and Jean-Luc Bertrand-Krajewski (France). For further information, visit www.dipcon2010.org

The 32nd International Conference on Hydraulics and Hydraulic Construction, University of Palermo, Palermo, Italy, Sep. 14 - 17, 2010. The aim of the conference is to bring together researchers working on hydrologic, hydraulic and environmental modelling. A special session on *Uncertainty assessment and validation of hydrological, hydraulic and environmental modelling* has been planned in order to provide a comprehensive overview and a discussion platform for recent advances and trends currently under development in this cross-cutting field. Papers dealing with development and concepts of generic and pervasive frameworks, techniques and issues including system identification theory and practice, model conception, model integration, model and/or software evaluation, sensitivity and uncertainty assessment, visualization, scale and regionalization issues are welcome. Suitable topics for presentations include:

- key criteria in selecting methods of uncertainty assessment for different model structures and modelling problems;
- practical strategies for uncertainty analysis given environmental models with very large parameter sets, including spatial dimensions or high computing loads;
- development of new methods for explicitly conveying uncertainties in environmental modelling including the use of Bayesian probability theory and new hybrid approaches;
- quantifying environmental model responses to uncertainties in parameter values and input data;
- space-time scale effects on uncertainty assessment of integrated environmental models.
- Model and parameter identification and propagation of uncertainty through modelling

A selection of papers will be considered for publication by Physics and Chemistry of the Earth. A Special Issue is planned to be published in Summer 2011.

For more information, please visit the conference website at

<http://www.idra2010.it/?q=en/node/28>

Please extend this invitation to researchers that might be interested.

IWA World Water Congress, Sept. 19-24, 2010, Montreal, Canada

Workshop on: Stormwater source control for cold climates: technologies, incentives and regulations, proposed by SOCOMA (Source Control Management) and Cold Climate Working Groups of JCUD, Chaired by Gilles Rivard and Maria Viklander

Preliminary program

Theme: Source control technologies for areas subject to cold climate conditions, Policies, regulations and incentives for the implementation of source control

Sub-themes: Technologies suited to cold climate, Adaptation to cold climate conditions, Maintenance requirements, Case studies of successful technologies

Presentations

- Cold climate stormwater management, Jiri Marsalek
- Applying source control in cold climate - Specific problems and solutions, Gilles Rivard (Canada)
- Case studies :applying source control in Sweden, Maria Viklander (Sweden)
- Case studies: LID Implementation for Lake Simcoe, James Li (Canada)

The 6th International Conference on Sewer Processes and Networks (SPN6), Surfers Paradise, Queensland, Australia, Nov. 7-10, 2010 (<http://www.spn6.net/>). The 6th edition of this conference series will bring together the followers of the SPN series of conferences and the regular participants in the Sewer Operation & Maintenance (SOM) conferences. The conference program is described in Section 4.3 and all details can be found at www.spn6.net. Conference preparation indicates that this will be a highly informative and significant event in the field of sewer processes and networks, and their operation and maintenance.

International Conference on Sustainable Water Management in Developing and Transition Countries. The University of Exeter, Centre for Water Systems in association with three universities in Pakistan and UNESCO is organising an international conference on Sustainable Water Management in Developing and Transition countries to be held in Pakistan in 2010. For further details visit: <http://centres.exeter.ac.uk/cws/swm2010/> or contact Dr Fayyaz Memon: swm2010@exeter.ac.uk.

The 12th International Conference on Urban Drainage, Porto Alegre, Brazil, Sept. 10-15, 2011. Our triennial conference will be held as indicated above in Brazil

10. RECENT PUBLICATIONS OF INTEREST

For a comprehensive listing of IWA publications, see Section 7 (News from IWA Publishing). Some additional publications of interest are listed here.

Magnus Hallberg: TREATMENT CONDITIONS FOR THE REMOVAL OF CONTAMINANTS FROM ROAD RUNOFF. Ph.D. Thesis, Dept. of Land and Water Resources Engineering, Royal Institute of Technology, Stockholm, June 2007.

Summary: The pollutant load in road runoff is related to traffic densities and road maintenance activities. In urbanised areas treatment of road runoff is common and often considered necessary. The pollutants are partitioned between the particulate and dissolved matter. However, the contaminants tend to have an affinity to the particulate material. Sedimentation, the predominant treatment method for road runoff uses various types of ponds. Design tools used for stormwater treatment systems are based on extensive data from existing treatment systems. The variations in the empirical data make it difficult when attempting to evaluate precise conditions for pollutant removal

and thereby minimising the land use for a treatment facility. This is a concern in highly urbanised areas where land use often is restricted. In this work, field studies were conducted in three separate watersheds along the same motorway with an annual average daily traffic exceeding 120,000 vehicles. The aim was to assess treatment conditions for the removal of contaminants from road runoff. The study of mass transport of total suspended solids used the EU Directive (1991/271/EEC) discharge requirement for urban wastewater treatment: 60 mg/l during winter and summer. The results showed that a capture of the total runoff volume was necessary during both seasons. Ten metals (Al, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, and Zn), as dissolved and particulate bound, were studied in the road runoff during a winter season and the following summer period. The dissolved part of Al, Cd, Co, Cr, Mn, and Ni was significantly higher in winter. The mass

concentration (mg/kg) for all metals was significantly higher over the summer except for Al and Co, which showed a higher mass concentration during the winter. The total metal concentration showed a good correlation to total suspended solids (TSS) during winter with exception for Cd. Good correlation to TSS was also found for the summer period for Al, Cu, Fe, Mn, Ni, and Zn. A simple model could describe sedimentation by the initial concentration of TSS, albeit road salt (NaCl) had a significant impact on the sedimentation process during winter. Removal of dissolved metals was studied by column experiments using water granulated blast furnace slag. The result showed good removal for Cd, Cu, Ni, and Zn independent of NaCl concentrations. Sediment accumulation (mg sediment/mm precipitation) was relatively consistent for the studied summer seasons as opposed to winter. The sediment differed in metal mass concentrations (mg/kg) between the seasons. Concentrations of Cu and Zn were high in regard to the guidelines for sensitivity of sediment dwelling organisms and Swedish guidelines for contaminated soils. The findings suggest that the entire runoff volume must be captured for treatment. The reduction of TSS concentration could be estimated for a specific surface load (m/h). This would also apply for majority of the studied metals that correlated well to the particulate material. Reactive filter technology using water granulated blast furnace slag could be applied for treatment of runoff for the reduction of dissolved metals. However, long-term studies are necessary for its practical implementation. Furthermore; the work shows that on-line turbidity measurements could be used for expedient process control for treatment facilities in similar watersheds dominated by roads. The work could be used together with existing design methods and models to evaluate and optimise road runoff treatment.

Hvitved-Jacobsen, T., Vollertsen, J. and Nielsen, A.H. (2010): Urban and Highway Stormwater Pollution – Concepts and Engineering. CRC Press/Taylor & Francis Group. ISBN: 978-1-4398-2685-0.

Focusing on pollutant reduction, abatement, and control, this book provides the necessary tools and methodologies to solve urban stormwater problems. The authors present theories and fundamental concepts of wet weather pollution as a basis for solving engineering problems in practice. The book contains mathematical formulations for modeling the prediction of pollutant transport into both surface waters and soil systems. The entire urban wastewater system—including the drainage catchment and networks, treatment systems and local receiving waters—are examined in this context. The authors also address key points in the analysis, design, and management of urban drainage systems. The book is expected in March 2010, and the following key features can be mentioned:

- Explains sources, pathways, fate, impacts, and effects of pollutants associated with the wet weather/stormwater hydrologic cycle
- Covers the entire urban wastewater system, including drainage catchments and networks, treatment systems, and local receiving waters
- Examines US and European stormwater regulations
- Provides analysis for the design and management of urban drainage systems

Lindblom, E. (2009): Dynamic modelling of micropollutants in the integrated urban wastewater system. Ph.D. Thesis. Department of Environmental Engineering, Technical University of Denmark, Kgs. Lyngby. pp. 1-61 + appendix.
<http://www.er.dtu.dk/publications/fulltext/2009/ENV2009-075.pdf>

The focus of this thesis is dynamic modelling of micropollutants in the integrated urban wastewater system consisting of sewer catchments, wastewater treatment plants and receiving waters. Micropollutants are present in urban water due to manufacturing, disposal and use of man-made chemicals in all parts of the society as well as formation in e.g. combustion processes in connection with heating and traffic. From here, micropollutants leach into the natural environment to a large extent via pipe systems collecting both wastewater from household and industry and stormwater runoff from paved surfaces. The general hypothesis of the thesis is that models that realistically describe the fate of micropollutants in the system can be developed based on their inherent properties (e.g. biodegradability, liquid-solid partition coefficient) together with well-established mathematical descriptions of the physical, chemical and biological processes that occur in integrated urban wastewater systems.

The hypothesis is examined by means of modelling three defined focus areas (FAs) following the sequence of a generic model development procedure, which allowed to pursue a number of more specific objectives, i.e. (FA1) to develop a conceptual model structure that can describe the fate of both wastewater and stormwater micropollutants from their sources (households, industry, urban surfaces) to destination (CSOs, sludge and WWTP effluent), (FA2) discuss, develop and illustrate suitable methods to analyse the uncertainty of a stormwater accumulation-washout model, and (FA3) develop and calibrate a model that can be used to better understand and optimize the removal of micropollutants in WWTP's in combination with removal of traditional pollutants.

The thesis outlines the motivation for conducting the study and its objectives (Ch. 1), defines the methodological approach used for model development (Ch. 2), describes the three FA's under detailed study (Ch. 3), summarises the model formulation and performance analyses conducted in the three FA's (Ch. 4), then details the parameter estimation method developed in relation to FA2 (Ch. 5) and the uncertainty-based calibration method developed in FA3 (Ch. 6) and finally concludes across the three FAs (Ch. 7) and discusses the possible future work briefly (Ch. 8). In the thesis it is shown that not too complex lumped, conceptual and deterministic models can be used to elucidate several complex phenomena of importance to the fate of micropollutants in the integrated urban wastewater system. To be practical also for predictive purposes several sources of uncertainty should be considered, which can however be modelled as model parameter uncertainty using the developed uncertainty based calibration method.

Special Journal Issue on Innovative Approaches to Stormwater Management in Canada

This is a collection of 10 peer-reviewed papers addressing the following topics: mitigation methods to manage contaminant transfer in urban watersheds, a new approach to measuring rainfall interception by urban trees, treatment performance of an extensive green roof, street sweeping as a method of source control for stormwater pollution, sediment removal by two types of permeable pavement, compost biofilters for removal of sediments from a construction site runoff, assessment of stormwater ponds sediments, developing capacity for large-scale rainwater harvesting in Canada, and Culex mosquito issues associated with stormwater ponds in Canada.

Reference: Hans Schreier and Jiri Marsalek (Eds.), *Innovative Approaches to Stormwater Management in Canada*, Water Qual. Res. J. Canada, 44(1), 2009. For ordering an electronic version of the issue, contact Janet Jardine, Environment Canada (janet.jardine@ec.gc.ca).

New forthcoming UNESCO Publications on stormwater management in tropical climate (for information, contact Prof. Mohd Nor bin Mohd Desa (Mohamednor@uniten.edu.my)). CSGM and

HTC have produce guidelines for WSUD design and application for all decision makers as a recommended solution for suitable land development. It is expected that these publication will be released in summer 2010:

POROUS AND PERMEABLE PAVEMENT SYSTEMS FOR TROPICAL CLIMATES, Chief Editor: Mohamed Nor Mohd Desa, Editors: Lariyah Mohd Sidek, Mohamed Roseli Zainal Abidin, Simon Beecham, Rohani Ahmad, David Pezzaniti and Norimi Razbira Zulkipli. UNESCO IHP Technical Publication.

GREYWATER REUSE SYSTEMS FORTROPICAL CLIMATES, Chief Editor: Mohamed Nor Mohd Desa, Editors: Lariyah Mohd Sidek, Mohamed Roseli Zainal Abidin, Simon Beecham and Norazizah Abdul Kadir. UNESCO IHP Technical Publication.

BIORETENTION SYSTEMS FOR TROPICAL CLIMATES, Chief Editor: Lariyah Mohd Sidek, Editors: Mohamed Roseli Zainal Abidin, Mohamed Nor Mohamed Desa, Simon Beecham, Zulkefli Mustaffa and Amirah Hanim Mohd Puad. UNESCO IHP Technical Publication.

GREEN ROOF SYSTEMS FOR TROPICAL CLIMATES. Chief Editor: Lariyah Mohd Sidek, Editors: Mohamed Nor Mohamed Desa, Mohamed Roseli Zainal Abidin, Simon Beecham and Ahmad Zafuan Ibrahim Ahmad Zaki. UNESCO IHP Technical Publication.

CONSTRUCTED WETLAND SYSTEMS FOR TROPICAL CLIMATES. Chief Editor: Mohamed Roseli Zainal Abidin, Editors: Lariyah Mohd Sidek, Mohamed Nor Mohamed Desa, Simon Beecham and Hezrin Haslinda Hashim. UNESCO IHP Technical Publication.

RAINWATER HARVESTING SYSTEMS FOR TROPICAL CLIMATES. Chief Editor: Mohamed Roseli Zainal Abidin, Editors: Lariyah Mohd Sidek, Mohamed Nor Mohamed Desa, Simon Beecham and Devi Peechmani.

12. WORKING GROUP CONTACTS

Int. Working Group on Data & Models (IWGDM) Web site: http://iswr.eng.monash.edu.au/iwgdm	
<i>Chairman:</i> Dr Ana Deletic Institute for Sustainable Water Resources Dept. of Civil Engineering, Building 60 Monash University Clayton, Vic 3800 AUSTRALIA Ph: 61 3 9905 2940, Fax: 61 3 9905 4944 E-mail: ana.deletic@eng.monash.edu.au	<i>Secretary:</i> Prof. Simon Tait Pennine Water Group School of Engineering Design and Technology, University of Bradford Bradford, BD7 1DP UK Ph: 44 1274 233 878 E-mail: s.tait@bradford.ac.uk
Real-Time Control of Urban Drainage Systems (RTCUDS) Web site: http://web.tiscali.it/RTCUSD/	
<i>Chairman:</i> Dr A.. Campisano Dept. Civil and Environmental Engineering University of Catania, Viale Andrea Doria 6 95125 Catania ITALY Ph: 39(0)95 738 2730, Fax: 39(0)95 738 2748 E-mail: acampisa@dica.unict.it	<i>Secretary:</i> Dr M. Pleau BPR-CSO 5100, Sherbrooke St. E., Suite 400 Montreal, Quebec H1V 3R9 CANADA Ph.: +001 514 257 2439, Fax: +001 514 257 2414 E-mail: martin.pleau@bpr-cso.com
Sewer Systems and Processes Working Group (SS&PWG) Web Site: http://www.sspwg.org	
<i>Chairman:</i> Dr. Ghassan Chebbo CEREVE 6-8 Avenue Blaise Pascal, Cité Descartes, Champs-sur-Marne 77455 Marne la Vallee, Cedex 2 FRANCE Ph.: + 33 164 153 641 E-mail: gksc@terra.net.lb	<i>Vice-Chairman and Secretary:</i> Dr. Zhiguo Yuan, The University of Queensland, Sta. Lucia, QLD 4072 AUSTRALIA Ph.: + 61 733 654 374, Fax: +61 733 654 726 E-mail: zhiguo@awmc.uq.edu.au .
Working Group on Source Control for Stormwater Management (SOCOMA)	
<i>Chairman:</i> Gilles Rivard Aquapraaxis Inc. 948 Donat-Belisle LAVAL, QC CANADA H7X3W5 Ph: 001-450-689-2967, Fax: 001-450-689-2969 E-mail: GRivard@aquapraaxis.com	<i>Secretary:</i> Sylvie Barraud INSA Lyon – LGCIE, Bâtiment Coulomb 34 Avenue des Arts F-69621 Villeurbanne Cedex France Phone: 04 72 43 83 88 - Fax: 04 72 43 85 21 E-mail: sylvie.barraud@insa-lyon.fr
International Working Group on Urban Rainfall (IGUR) Web Site: http://www.kuleuven.ac.be/hydr/gur	
<i>Chairman:</i> Dr. Patrick Willems Katholieke Universiteit Leuven Hydraulics Division Kasteelpark Arenberg 40 B-3001 Leuven, Belgium Ph. : +32-16-321658, Fax: +32-16-321989 E-mail: Patrick.Willems@bwk.kuleuven.be	<i>Secretary:</i> Dr Thomas Einfalt hydro & meteo GmbH & Co. KG Breite Strasse 6-8 D-23552 Lübeck GERMANY Ph.: 49-451-7027333, Fax: 49-451-7027339 E-mail: einfalt@hydrometeo.de

Technology Exchange, Transfer and Training (TETTWG)	
<p>Chair: Dr Mohd Nor bin Mohd Desa Hydrology and Water Resources Universiti Tenaga Nasional KM7, Jalan Kajang-Puchong 43009 KAJANG MALAYSIA Phone: 603 8928 7254, Fax: 603 8921 2116 Email: mohamednor@uniten.edu.my</p>	
Urban Drainage in Cold Climate Working Group	
<p><i>Chair:</i> Prof Maria Viklander Dept. of Civil, Mining and Environmental Engineering Lulea University of Technology S-971 87 Lulea SWEDEN Ph.: 46 920 491 634, Fax: 46 920 491 493 E-mail: Maria.Viklander@sb.luth.se</p>	<p><i>Secretary:</i> Vacant</p>
Water Sensitive Urban Design	
<p><i>Chair:</i> Dr Rebekah Brown Faculty of Arts, Menzies Building Monash University Victoria 3800 AUSTRALIA Ph.: +61 3 9905 9992; Fax +61 3 9905 2948 E-mail: Rebekah.Brown@arts.monash.edu.au</p>	<p><i>Secretary:</i> Prof Richard M. Ashley Dept. of Civil and Structural Engineering University of Sheffield Sir Frederick Mappin Building, Mappin Street Sheffield S1 3JD UK Phone: 44 114 222 5766, Fax: 44 114 222 5700 E-mail: r.ashley@sheffield.ac.uk</p>
Urban Streams	
<p><i>Chair:</i> Dr Ivana Kabelkova Dept. of Sanitary and Ecological Engineering Faculty of Civil Engineering Czech Technical University Thakurova 7 166 29 Prague 6 CZECH REPUBLIC Ph.: +42 (0)2 24321292 e-mail: kabelkova@fsv.cvut.cz</p>	



**International
Water Association**

Den Haag Office
Global Operations Office
Koningin Julianaplein 2 (7th floor)
2595 AA The Hague
The Netherlands
Email: water@iwahq.org · Web: www.iwahq.org
Company registered in England No. 3597005
Registered Charity (England) No. 1076690