

EDITORIAL

This year's heavy rainfalls and floods have led to intense debates: Can extreme floods be prevented after all? Will we face such events more frequently in the future? What kind of changes and improvements need to be made in the short term? Undoubtedly, settlement and construction activities have an impact on the water balance and the precipitation-runoff ratio, mostly in a way that the flow velocity of effluents is accelerated. Since the middle of last century, runoff reduction measures have had to be included in the German land-use planning. Since then, it has become almost self-evident to integrate swales for stormwater retention and infiltration, retention soil filters, eco-pavement, green roofs, etc. into the planning process. Through incentive systems such as fee-splitting but also through technical measures like qualified separate sewer and rain-water harvesting systems, a reduction of runoffs and sometimes even of pollution loads can be achieved. However, it is obvious that such measures are not suitable for the control of a once-in-a-century flooding but they may attenuate the impacts of "normal" local torrential rain.

In the near future, KWB will intensify its activities in the field of storm-water management in urban areas. We will study certain measure combinations, their boundary conditions and impacts to verify to what extent they are suitable to minimise water stress in selected urban quarters. Two new projects have been started on these issues: **KURAS*** and **OgRe****. You can read all about these acronyms in this newsletter.

Andreas Hartmann
Kompetenzzentrum Wasser Berlin, Managing Director



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LATEST NEWS

Foto: Veolia



KWB has won Sustainability Award from Veolia Wasser

KWB has been awarded the Sustainability Prize of Veolia Wasser for its commitment to adapting Life Cycle Assessment (LCA) methods to water management processes. Since 2009, Veolia Wasser has honoured with this award its collaborators whose ideas contribute to balance the economic, social and ecologic requirements of the day-to-day business. The selection is made by the in-house task force "Sustainability" according to the criteria innovation, transferability, social value and learning effect. Together with other awardees of the Veolia Group, Christian Remy (far right in the picture), KWB's LCA expert since 2010, has received the award from Michel Cunnac, head of Veolia Wasser Management.

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Foto: wikipedia public domain | Alex Buirds

Urban Stormwater and Sewage Management



Two interdisciplinary projects are to give new impetus: German Federal Ministry of Education and Research (BMBF) and Berlin Environmental Relief Programme support projects KURAS and OgRe***

Is it possible and reasonable to create stormwater retention measures in densely populated areas beyond the current state? How should the management of sewer systems be adapted to increasingly long lasting periods of underload on the one hand and intense overload periods during stormwater events on the other hand? The consortium of the three-year project KURAS* involving Technische Universität Berlin and Kompetenzzentrum Wasser Berlin together with 15 partners will commit itself to answering these questions. The overall project volume amounts to 4.4 million €, of which 3.4 million € are received from the German Federal Ministry of Education and Research (BMBF) in the scope of its INIS programme. One important goal of the project is to assess different combinations of centralised and decentralised storm water measures for urban quarters with regard to their impacts on the inhabitants, the environment and their cost-effectiveness. Exemplary

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NEWS FROM THE KWB NETWORK OFFICE

7,8 million Euro research funds have been attracted to Berlin

KWB kept developing research projects with local partners in Berlin. Since 2012, KWB has initiated several major publicly sponsored projects. The funds totaling to 7,8 million € are provided to all Berlin partners includ-

ing KWB in the scope of the programmes UEP-2, EU-FP7, BMBF und UFOPLAN. KWB's industrial shareholders Veolia and Berliner Wasserbetriebe contribute actively to these projects and support KWB with co-financ-

ing. This applies to the projects DEMAU, KURAS, P-REX, Saph-Pani, Decentralised Treatment of Roadway Runoffs, Demoware and UFO-WWW. ●



Ulrich Szewzyk, you are a trained microbiologist, but what is special about an "environmental microbiologist"?

Environmental microbiologists don't only study pure cultures of microorganisms in the laboratory – they have the goal of understanding the behaviour and function of microorganisms in their natural habitats. In my working group, the focus is on investigating groundwater systems, soil ecology systems, and floodplains. A central role is played by the interactions of microorganisms with one another and with other organisms, because the behaviour of microorganisms differs considerably depending on whether they are in a natural ecosystem or in a pure culture. The insights gained from natural systems can also help to improve our understanding of the behaviour of microorganisms in technical systems, because for microorganisms a water well or a water treatment plant is also an ecosystem. In addition, there is also the possibility that microorganisms from natural systems can be of interest for biotechnology.

How can you apply what you learn about the environment to technical systems?

Let me explain by taking iron bacteria as an example. In natural ecosystems we find iron bacteria in moors and water springs, but also similar ones in groundwater wells and drinking water pipes. It is very important to tackle the problem of incrustation in pipes and other technical systems, and to do this we need to identify the various interacting iron bacteria involved, which are also found in natural systems. Some of the iron bacteria from our large collection have proved to be able to degrade persistent organic pollutants.

BIOFILMS IN NATURE AND TECHNOLOGY

INTERVIEW WITH PROF ULRICH SZEWZYK, HEAD OF THE CHAIR OF ENVIRONMENTAL MICROBIOLOGY AT THE TECHNISCHE UNIVERSITÄT BERLIN

You also work intensively on biofilms. What is it that is so fascinating about them?

For the past 30 years I have been studying microorganisms in biofilms. At the start this was a very exotic topic. But it became increasingly clear that in many natural systems biofilms are one of the most important and most frequent life forms of microorganisms. Natural biofilms not only consist of bacteria, fungi, and protozoa, but also multicellular animals, and algae, which are held together by a slimy extracellular matrix. Biofilms are therefore highly complex aggregates in which there are shifts in behaviour both at the metabolic level and at the genetic level.

Are biofilms also an important topic for water management plants?

Biofilms also have important roles to play in technical systems. On the one hand they are intentionally used, for example in waste water treatment in trickle filtering or for the purification of drinking water in sand filters. On the other hand, undesirable biofilms can form, for example in drinking water pipes, and these can also provide shelter for pathogenic bacteria such as Legionella or pseudomonads. Living in a biofilm offers a lot of advantages. Bacteria can survive when nutrients are scarce, and they are protected against various negative influences such as disinfectants or antibiotics.

One of the focal points of your work is the drinking water supply from the water well to the tap. What is there to discover?

As I mentioned, environmental microbiologists also consider technical systems as ecosystems, and these can be colonised by microorganisms, and in some cases also by higher organisms. Regarding drinking water extraction, preparation and distribution, we are interested in particular in the

Ulrich Szewzyk (56) has been a professor at the Technische Universität Berlin since 1994. He studied biology at the University of Tübingen and went on to gain a doctorate in Konstanz. He continued with post-doctoral studies at the University of Gothenburg in Sweden and qualified as a lecturer in 1993.

formation of ochre incrustation in drinking water wells and the role of iron bacteria. In addition we are working on ways of further optimising the degradation of trace substances in drinking water preparation, for example by using biofilms. We are also interested in the strategies of bacteria which are able to survive and multiply in nutrient-poor drinking water. We are studying domestic installations to establish how originally nutrient-poor drinking water systems can become a habitat for pathogens in biofilms.

In order to be able to answer questions like these, we have developed methods in my research group to quantify the biofilms in these systems and to investigate them in detail.

You have worked together with KWB on various projects, most recently on the Wellma project. What impression have you gained about KWB as a research partner?

In particular in the field of iron bacteria we have carried out a number of successful projects together. KWB has always proved to be a reliable and dedicated research partner.

Finally, a personal question. Your dialect suggests that you have your roots in Southern Germany. Would you say that you have meanwhile become a Berliner?

My roots in Swabia are not that deep. My parents originally came from Breslau. And I also lived for many years in Sweden. The thing I find fascinating about Berlin is firstly the varied research landscape with the good opportunities for the practical application of findings, and then also the creative cultural life in the city. ●

Thank you very much.

Bodo Weigert asked the questions

WATER RESEARCH IN BERLIN AND BRANDENBURG

Senatsverwaltung
für Stadtentwicklung
und Umwelt



Ozone Process Optimisation for Tertiary Treatment

Large-scale ozone systems for the removal of micropollutants from treated wastewater require new approaches to the adjustment of ozone dosing.

In the scope of the IST4R project, KWB carries out ozonation trials with the aim to reliably remove anthropogenic micropollutants from treated wastewater maintaining a steady partial disinfection. The frequently occurring high fluctuations in the quantities to be treated and the composition of wastewater are technically challenging. The ongoing pilot trials have shown significant advantages of a load proportional dosing against a volume proportional dosage of ozone. Nevertheless, the usual control performed via the measurement of dissolved organic carbon before ozonation is not sufficient to cope with all loading cases. For this reason, a cutting-edge control approach will soon be tested at a recently installed pilot plant allowing for the determination of the optimal ozone dose by measuring the absorption of UV light before and after the ozonation process.

The project, coordinated by Technische Universität Berlin, is sponsored by the Berliner Wasserbetriebe and the European Union (European Regional Development Fund) and co-financed by the Berlin Senate.

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Delivery of the new ozonation plant end of June 2013



Ochre formation at motor pump from a drinking water well

Microbial Clogging in Water-Bearing Technical Systems

Within the joint research project ANTI-OCKER financed by the German Federal Ministry of Education and Research (BMBF), 15 research partners from academia and industry focus on the investigation of iron bacteria, which may cause the formation of clogging materials in wells and pipe systems leading to an increased flow resistance and consequently to a decreased well performance.



Iron bacteria derive their energy by oxidizing dissolved ferrous iron. The resulting ferric oxide is insoluble. In wells and pumps, these ochre formations are responsible for the clogging of the water intakes and consequently for reduced water inflow. In the scope of the interdisciplinary project ANTI-OCKER, which was started in 2011, KWB, together with Technische Universität Berlin, Chair of Environmental Microbiology (coordinator) and Chair of Water Quality Control, and Berliner Wasserbetriebe has taken numerous ochre samples from wells and submersible water pumps and investigated them with regard to the iron deposit composition. The results achieved so far suggest that the influence of well operation parameters is stronger than the hydrochemical or constructional characteristics

of the well. On the basis of the statistical evaluation of all results, prevention measures and optimized maintenance methods will be recommended by 2014 to improve the energy efficiency and overall economic viability of the operation and maintenance of drinking water abstraction wells.

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Blue Green Dream

Floods, droughts and heat island effects are only some of the adverse effects of increasing climate extremes which are still intensified through growing population. New approaches and adaptation strategies need to be developed for the efficient planning and management of the urban environment.

The EU-funded project BlueGreenDream is a new Climate KIC project which explores the potential of “blue” (water related) and “green” (urban vegetation related) infrastructure as a means to support urban adaptation to climate change. In 2015, at the end of the project, a modelling software will facilitate the selection of existing technologies for planners, architects and building contractors in order to mitigate the negative impacts of climate changes. A good example for a synergy targeted solution is the combination of swimming ponds ranking among the “blue” assets with “green” elements like roof and facade greening. For this purpose, a water basin will be built on the airfield of former airport Berlin-Tempelhof in autumn 2013. Due to the different background in the individual partner countries Netherlands, France, Great Britain and Germany, the policy implementation of the project results will however, be a great challenge.

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Illustration: Planning of rainwater storage on airfield of former Airport Berlin-Tempelhof (Background: Google3D)

>> continuation of page 1 (KURAS and OgRe)

demonstrations will be performed for two Berlin quarters. In addition, guidelines are to be prepared for the operators of sewer networks featuring low downhill gradients in order to facilitate the long-term adaptation of their infrastructure to future demographics and climate changes.

In the scope of the OgRe** project, Kompetenzzentrum Wasser Berlin will systematically analyse water quality impairments resulting from the discharge of untreated stormwater. Due to its contact with road surfaces, house façades and roofs, stormwater may accumulate trace organic substances which may be relevant for aquatic organisms and human use. The project will deliver an overview on substances, entry paths and substance quantities which are relevant in this context. Both projects are co-funded by Veolia and Berliner Wasserbetriebe. ●

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FOCUS

The drugs we wash away:
Pharmaceuticals, Drinking Water and the Environment

Video (3:36 min) of EU FP7 project PHARMAS

Authors:
*Rodrigo Vidaurre,
Melanie Kemper,
Nicolas de Leval Jezierski*
June 2013



www.ecologic.eu/de/8575

This animation has been conceived for the general public with no prior knowledge of the issue. It analyses the frequently discussed questions whether and to what extent drug residues affect human health and the wildlife in rivers and lakes, and gives an insight into the relevant issues related to the occurrence of trace organic compounds in freshwaters. The authors succeeded in telling the story in both a differentiated and concise way, and in layman's terms. The video was financed by the EU within the research project PHARMAS. ●

EDITORIAL ANNOUNCEMENT

KWB is pleased to announce the successful completion of the ISO re-certification audit of our quality management system. The certification by GUTzert GmbH covers our entire management processes according to DIN EN ISO 2001:2008 standard and is valid until April 2016. ●

EVENTS

Meet us at the following upcoming events:

5 September 2013

33rd Berlin Water Workshop: Water pollution control begins in the quarters

Research towards the advancement of combined sewers and stormwater management

Organiser: Kompetenzzentrum Wasser Berlin

www.kompetenz-wasser.de

9-13 September 2013

DGL 2013 – Annual Conference of the German Limnological Association (DGL)

Organiser: University Potsdam, Leibniz Institute of Freshwater Ecology and Inland Fisheries Binnenfischerei

Venue: University Potsdam, Campus Griebnitzsee

www.dgl2013.de

10-12 September 2013

LESAM 2013 Leading-Edge Strategic Asset Management

Organiser: IWA Strategic Asset Management Network and Australian Water Association

Venue: Sydney, Australia

www.lesam2013.org

17 September 2013

P-REX – Stakeholder Workshop on Recycled Phosphorus Fertilizer – Market Chances and Requirements

Organisers: FHNW, ASIO, KWB

Venue: Poděbrady, Czech Republic

www.p-rex.eu

www.asio.cz/en/p-rex-workshop

24-25 September 2013

Risk Management of Emerging Compounds and Pathogens in the Water Cycle (RiSKWa) – 2nd Status Seminar

Organisers: BMBF and DECHEMA

Venue: Karlsruhe, Germany

www.bmbf.riskwa.de

30 September-1 October 2013

Aqua Urbanica – Water Pollution Control during Rain – Joint Mission for Urban Planners, Engineers and Ecologists

Organisers: Eawag-ETH Zürich, TU Graz, TU Kaiserslautern, University Innsbruck and University Stuttgart in cooperation with DWA, ÖWAV and VSA

Venue: Eawag, CH-8600 Dübendorf

www.aqua-urbanica.org

15-16 October 2013

Measurement and Control Technology for Wastewater Systems - Designs, Lessons Learned and Future Trends

Organiser: Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V.

Venue: Brunswick, Germany

www.dwa.de

4-5 November 2013

DWA Seminar Water-ReUse

Organiser: Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V.

Venue: Brunswick, Germany

www.dwa.de

6-7 November 2013

4th International Symposium Re-Water Brunswick

Organiser: SE|BS Stadtentwässerung Braunschweig GmbH, together with Wastewater Association Brunswick, the Institute for Urban Water Management of TU Braunschweig, Kompetenzzentrum Wasser Berlin

Venue: Municipal Hall Brunswick, Germany

www.re-water-braunschweig.de

6 November 2013

KWB Workshop "Impacts of Combined Sewer overflows on Urban Waters: Challenges and Solutions for European Cities", International Water Week in Amsterdam

Organiser: Kompetenzzentrum Wasser Berlin

Venue: Amsterdam, The Netherlands

www.internationalwaterweek.com

21 November 2013

EIP Water Conference – 1st Action Group Call Finalized

Organiser: European Commission

Venue: Brussels, Belgium

<http://ec.europa.eu/environment/water/innovationpartnership>

22-23 November 2013

European Water Policy: Challenges for Hydrogeologists

Organiser: EFG Panel of Experts on Hydrogeology, in cooperation with IAH, WssTP, EuroGeoSurvey

Venue: Royal Belgian Institute of Natural Sciences, Brussels, Belgium

about us

The Berlin Centre of Competence for Water (Kompetenzzentrum Wasser Berlin, KWB) is a public-private partnership company. Its associates are the TSB Technologiestiftung Berlin, the Berliner Wasserbetriebe, the Berlinwasser Holding and VeoliaWasser. The KWB stands as a network node to strengthen the position of Berlin as an international centre in the field of water economy and technology. Partners and actors are scientific facilities, public institutions, companies as well as multipliers from public and private sectors.

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