RIVER BASINS

INTERNATIONAL CONFERENCE ON MONITORING, MODELLING AND MANAGEMENT OF RIVER BASINS

ABSTRACTS

Edited by Máté Krisztián Kardos, Orsolya Szomolányi, Adrienne Clement, Steffen Kittlaus, Karoline Morling and Stephan Fuchs

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Edited by Máté Krisztián Kardos, Orsolya Szomolányi, Adrienne Clement, Steffen Kittlaus, Karoline Morling and Stephan Fuchs

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Developing nitrogen boundaries for surface water bodies on national and regional scale for Germany
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Conference program

Welcome and opening – Miklós Patziger, Head of Department, Department of Sanitary and Environmental Engineering, Budapest University of Technology and Economics

Oral presentations

Monitoring (Tuesday, 4th June, 9:10 - 10:40)

Chair: Adrienne Clement, Budapest University of Technology and Economics, Hungary

Influence of sampling strategies on the assessment of concentrations and loads of trace contaminants in surface waters. Ottavia Zoboli – TU Wien, Austria

Particle-bound nutrients and trace substances in small streams: Implications for the aquatic environment and presentation of a novel sampling method. *Peter Flödl – BOKU Wien, Austria*

Trace substance monitoring at the intersection of urban drainage and an urban river in Karlsruhe, Germany. Lukas Kopp – Karlsruhe Institute of Technology, Germany

Monitoring and modelling I (Tuesday, 4th June, 11:10 - 12:40)

Chair: Ottavia Zoboli, TU Wien, Austria

Benchmarking the persistence of organic micropollutants in large European rivers. *Mark Honti* – *HUN-REN* – *BME Water Research Group, Hungary*

PFAS transport and retention during riverbank filtration and in saturated columns. *Thomas James Oudega – TU Wien, Austria*

Exploring human-vector dynamics using insect repellent concentrations in the river. *Enpei* Li – Federal Institute of Hydrology, Germany

Monitoring and modelling II. (Tuesday, 4th June 13:40 - 15:10)

Chair: Jos van Gils, Deltares

Assessment of diffuse heavy metal loadings by surface water and evaluation of their potential contamination. Yassine Mimouni – University of Liège, Belgium

Assessment of the share of sediments in the eutrophication of reservoirs: Case study from the Czech Republic. Josef Krása – Czech Technical University in Prague, Czech Republic

Transboundary contamination risk assessment and modelling in the Drava River floodplain. Jasminka Alijagić - Geological Survey of Slovenia

Modelling (Wednesday, 5th June 8:30 - 10:30)

Chair: Stephan Fuchs, Karlsruhe Institute of Technology, Germany

Calculating emissions to water – a simplified method implemented as a spatially and temporally distributed model. *Jos van Gils – Deltares, The Netherlands*

Modelling of nutrient emission in river systems (MONERIS): Presenting new perspectives and current developments of a widely used emission model. *Anna Oprei – Leibniz Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany*

Complex water quality simulations in Želivka River Basin and Švihov Water Reservoir (CZ). Pavel Tachecí – DHI a.s., Prague, Czech Republic

Developing nitrogen boundaries for surface water bodies on national and regional scale for Germany. *Karoline Morling – Karlsruhe Institute of Technology, Germany*

Modelling and Management (Wednesday, 5th June 11:00 – 12:30)

Chair: tbc.

The new Urban Wastewater Treatment Directive from the perspective of the receiving rivers. *Máté Krisztián Kardos – Budapest University of Technology and Economics, Hungary*

Nitrogen and phosphorous load reduction approach for catchments to reach the water quality targets set for the Water Framework Directive. *Peter Schipper – Wageningen University* & Research, The Netherlands

Efficiency of the buffer zones in nutrient load reduction under climate change conditions. *Damian Bojanowski – AGH University of Krakow, Poland*

Pitch presentation of posters

Session I. (Tuesday, 4th June 15:20 – 15:45)

Moderator: Martine Broer, Environment Agency Austria

A harmonized Danube Basin-wide multi-compartment concentration database to support inventories of micropollutant emissions to surface waters. *Steffen Kittlaus – TU Wien, Austria*

Mercury pollution in the Lom River Basin (East Cameroon): using PEGASE model to assess small scale gold mining pressures over surface water quality. *Marie Sorella Bella Atangana – University of Liège, Belgium/University of Yaoundé, Cameroon*

Seasonality in agricultural-associated river pollution: a global multi-pollutant modelling. *Mirjam Bak – Wageningen University, Netherlands*

Investment needs in water and wastewater infrastructure and inevitability of horizontal and vertical solidarity in fulfilling SDG 6. Károly Kovács – BDL Ltd., Hungary

Investigating eutrophication levels in the stream network of the Danube Basin. *Eszter D.* Nagy – Budapest University of Technology and Economics, Hungary

Event forecasting of rivers with soft computing methods. *Tamás Koncsos – Budapest* University of Technology and Economics, Hungary

Assessment of erosion phosphorus transport risk: Case study for the Elbe Basin. Barbora Jachymová – Czech Technical University in Prague, Czech Republic

Detecting pollutant sources and pathways: High-frequency automated online monitoring in a small rural French/German transborder catchment. *Angelika Meyer – Saarland University, Germany*

Modelling of PFAS emissions into the Upper Danube. Meiqi Liu - TU Wien, Austria

Quality management in river basins starts at the micro level: Filtration systems for storm water treatment – Appropriate filter substrates. *Claus Huwe – Hauraton Ltd., Germany*

Can machine learning tools support biological quality status assessment? Orsolya Szomolányi – Budapest University of Technology and Economics, Hungary

Session II. (Tuesday, 4th June 16:30 – 17:00)

Moderator: Steffen Kittlaus, TU Wien, Austria

Application of different types of catchment models to support understanding the hydrological and transport processes, emission patterns and model limitations related to these in a meso-scale catchment. *Zsolt Jolánkai – Budapest University of Technology and Economics, Hungary*

Updating input data and expanding the range of substances by a harmonized approach for modelling emissions from Urban Systems and Municipal Wastewater Treatment Plants in MoRE. *Julia Nowak – Karlsruhe Institute of Technology, Germany*

Heated rivers: learning from climate change and energy scenarios along a 700 km stretch of the Rhine. *Tanja Bergfeld-Wiedemann – Federal Institute of Hydrology, Germany*

Studying the effects of water temperature, phytoplankton and discharge variations on dissolved oxygen in the German reach of free-flowing Rhine. *Manoj Sanyasee Thapa* – *Federal Institute of Hydrology, Germany*

Exploring carbon dioxide dynamics and anthropogenic influences in the Ganga River: Implications for riverine management. *Pooja Upadhyay – Indian Institute of Technology Roorkee, India*

Identification of drained areas for enhanced precision in regionalized emission modelling. *Michelle Wild – Karlsruhe Institute of Technology, Germany*

Estimation of hazardous substance loads in a small catchment based on composite sampling. *Timea Lajkó – Budapest University of Technology and Economics, Hungary*

Lesson learned from the application of a catchment-specific continuous surface water quality monitoring system. Zsófia Kovács – University of Pannonia, Hungary

Horizontal and vertical mass fluxes between aquifer and river during river floods. Gadadhara Ferraz de Figueiredo – Budapest University of Technology and Economics, Hungary

Assessment of pollutant emissions to support river basin management in Albania according to the EU, AMORE-AL. Xhuljo Sema – Agricultural University of Tirana, Albania

Spatial variability of meander characteristics within a distributive fluvial system experiencing an avulsion. *Neve Norris – University of Glasgow, United Kingdom*

Comparative isotope hydrological characterization of the elements of the water cycle in two continental catchments: Koppány (Hungary) and Ledava (Slovenia) streams. *István Gábor Hatvani – HUN-REN Research Centre for Astronomy and Earth Sciences, Hungary*

A model-based case study for wetland restoration effects on the hydrological conditions at a Hungarian lowland catchment. Zsolt Kozma – Budapest University of Technology and Economics, Hungary

Abstracts of oral presentations

Influence of sampling strategies on the assessment of concentrations and loads of trace contaminants in surface waters

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The increasing number of trace contaminants found in surface waters, which are considered to pose a risk to human and environmental health, along with the evolving regulatory framework for water quality management in Europe, make it necessary to critically evaluate the adequacy of current monitoring strategies.

In particular, this research addresses two specific objectives of river monitoring, namely the robust assessment of the compliance with environmental quality standards and the reliable and accurate estimation of annual riverine loads, which in turn are required for the validation of emission models.

The aim of this study is to determine if there are significant variations in the average and maximum concentrations and calculated loads based on monthly grab samples versus composite samples obtained through continuous auto-sampling. To this purpose, two monitoring stations are being operated for one year, from July 2023 to June 2024, in the eastern region of Austria. The selection of the locations was based on their distinct catchment characteristics. The Wulka River is the main river in the region and receives up to 30% of the wastewater treatment plant effluent during low flow rates. The Nodbach River has a significantly smaller catchment area with mainly agricultural activities and no wastewater treatment plant discharges. In-situ sensors are used to continuously measure water level, turbidity and conductivity. Additionally, automatic samplers collect time- and flow-proportional composite samples over two weeks. A manual grab sample is also collected at the end of each two-week interval.

The samples are analysed for selected trace contaminants that represent different dominant sources, pathways, and transport behaviour. These include poly- and perfluoroalkyl substances (PFAS), pharmaceuticals, pesticides, and potential toxic elements (PTE).

Preliminary results (after one third of the planned samples have been analysed) indicate noteworthy differences not only between groups of contaminants, but also within each specific group. For instance, the sampling strategy appears to have a stronger influence on PFOS than on PFOA, on the pesticide Mecoprop than on AMPA and on copper more than nickel, respectively. It is not surprising that the reliability of the assessment for contaminants closely associated with sediment transport increasing through the use of volume-proportional sampling compared to grab samples. However, the reasons for the differences identified for other contaminants are more complex and provide insight into the temporal variability and complexity of processes determining their release into surface waters. The main dynamics occurring in the river catchments can be investigated in this study using the accompanying online monitoring.

The final results of this comparative monitoring survey are expected to provide a better understanding of the temporal variability of a broad spectrum of representative trace contaminants and a solid basis for planning future monitoring and sampling strategies.