# 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

Budapest, Hungary
4-5 June 2024

# RIVER BASINS 2024

INTERNATIONAL CONFERENCE
ON MONITORING, MODELLING AND MANAGEMENT
OF RIVER BASINS

Jointly organized by:

Budapest University of Technology and Economics
Department of Sanitary and Environmental Engineering

Technical University Vienna
Institute of Water Quality and Resource Management

Karlsruhe Institute of Technology
Institute for Water and Environment

Environment Agency Austria

Environment Agency Germany

German Federal Institute of Hydrology

Deltares

International Committee for Protection of the Danube River

## Abstracts of the Conference

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Budapest, Hungary
04-05 June 2024

The conference was supported within the framework of the Széchenyi Plan Plus program with the support of the National Laboratory for Water Science and Water Security (RRF 2.3.1 21 2022 00008) project.

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Responsible publisher: Prof. Dr. Tibor Czigány rector
Budapest University of Technology and Economics,
Faculty of Civil Engineering,
Department of Sanitary and Environmental Engineering
Budapest, Hungary

ISBN 978-963-421-953-8 (pdf)
DOI: 10.3311/rb2024

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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*

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*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*

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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*

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### 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. *Tímea 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 poster presentations

# Assessment of pollutant emissions to support river basin management in Albania according to the EU, AMORE-AL.

Seit Shallari[1], Thomas Ertl[2], Matthias Zessner[3], Stephan Fuchs[4], Klajdi Sotiri[4], Ilir Kristo[1], Fatbardh Sallaku[1], Xhuljo Sema[1], Vjola Bakillari[1], Fatos Huqi[1]

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Albania is blessed with various water resources, including rivers, lakes, groundwater, and coastal areas. These water resources play a crucial role in supporting various sectors of the economy and sustaining ecosystems. Rivers are one of the biggest and most important water potentials of Albania. Albania has the status of a candidate country for the European Union (EU), and as such it has adapted the water legislation framework to that of the EU. In this context river basin management plans (RBMP) are used to achieve a holistic management of surface waters according to the EU Water Framework Directive. However, Albania has a significant need for data as a basis for RBMPs, especially the data regarding the pollutant emissions and pathways from the river basins. The Amore-AL project aims at filling these gaps for pollutant emissions by establishing an appropriate monitoring strategy coupled with modelling of pollutant pathways. Through this, the project aims at supporting Albanian institutions with their need for basic tools to improve river basins management plans. For the quantification of the nutrients and pollution emissions in the catchment, the river basin management system MoRE (Modelling of Regionalized Emissions) will be used. MoRE is a flexible open-source instrument which is able to model pathway-specific emissions and river loads on a catchment scale. Its flexibility in integrating new modelling approaches makes it a robust tool which can be used also in the case of Albanian water bodies. The whole modelling approach will be coupled with a holistic validation measuring station, which will be installed in the river stretch. The monitoring station consists in a large volume sampler that will collect water and sediment samples for analysis in the laboratory, focusing on various parameters of nutrients (N; P) and heavy metals. The investigation area will be Ishmi River catchment. The modelling results will be compared to the findings from the monitoring station to check the effectiveness of the model and to implement any further calibration. The most

important outcomes of the project will consist in: Quantification of pollutant emissions in the investigated area; Understanding of urban processes in terms of substances input and transformation and definition of the most important pathway; Setting up a decision support system for an improved and integrated water resources management. The final goal of this project is to widen and facilitate the applicability to other river basins in Albania and neighboring countries.