15th International Conference on Hydroinformatics (HIC 2024)

From Nature to Digital Water: Challenges and Opportunities

Beijing, China
27-30 May 2024

ISBN: 979-8-3313-3137-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

This work is licensed under a Creative Commons Attribution 4.0 International License.
License details: http://creativecommons.org/licenses/by/4.0/.

No changes have been made to the content of these proceedings. There may be changes to pagination, and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2026)

For permission requests, please contact International Association for Hydro-Environment Engineering & Research (IAHR) at the address below.

International Association for Hydro-Environment Engineering & Research (IAHR)
Paseo Bajo Virgen del Puerto, 3
28005 Madrid
Spain

Phone: +34 913357908
Fax: +34 913357935

iahr@iahr.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

AI, big-data, knowledge and water data management

[TPA-4] A comparative study of rape recognition model based on convolutional neural network 1

Zhuoyue Zhou, Zhiguo Pang

[TPA-2] Research on remote joint control technology of plant-network-river integration 7

Min Lele, Tian Leqi, Li Hongwei, ZhaoLiang, Sun Yutian, Lu Zongren

Big-data, knowledge, and water data management

[TPA-3] Unprecedented Compound Drought and Hot Extremes Events in Sichuan: An Angle from Copula Analysis 14

Lilingjun Liu, Xiaosheng Qin

[TPA-3] Assessment of Joint Probabilistic Behaviour of Fine-Resolution Rainfall and its Impact on Prediction of Urban Hydrological Peak Flows 22

Xiaosheng Qin, Lilingjun Liu

[TPA-3] The study on marine multi-element datasets integration based on element decomposition 29

Yingxiang Hong, Yazhen Wang, Xuan Wang

[TPA-3] Enhancing Forecasting Through Data-Driven Models: A Comparative Analysis 36

Daniele Dalla Torre, Andrea Menapace, Maurizio Righetti

[TPA-3] Research on the Prediction of Yellow River Runoff and Sediment Based on Deep Learning Framework 46

WU Dan, LIU Qixing

[TPA-3] Preliminary statistical analysis of a large hydraulic and hydrological dataset for mudflows and debris flows events in the South Tyrol region (Italy) 57

Anna Prati, Andrea Menapace, Michele Larcher

Emerging solutions in modelling methods (AI, high performance computing, cloud computing)

[TPA-3] Physics-informed neural networks as surrogate models of pipeline transient mixed flow simulator 63

Shixun Li, Wenchong Tian, Hexiang Yan

[TPA-1] On Runoff and Sediment Reduction Effect and Critical Threshold of Soil and Water Conservation in Sanchuan River Basin 72

Xiaoying Liu, Qunfang Zheng

[TPA-1] A Hybrid LSTM and RF Model for Rainfall Inversion Using Commercial Microwave Link 78

Luming Song, Bin Lian, Lili Huang, Tong Li, Jijun Zhao

[TPA-1] An Enhanced Deep Learning Model Based on CNN-GRU-Attention for Rainfall Retrieval Using Microwave Links 86

Zhongcheng Wei, Tong Li, Luming Song

[TPA-1] Consideration of XAI in inflow prediction model using convolutional neural network for multiple dams 96

Kenta Hakoishi, Masayuki Hitokoto, Shingo Zenkoji, Ryota Nishiguchi

[TPA-2] Embedded transient hydraulic simulations with machine learning processing for leak detection in water distribution networks 105

Andrea Menapace, Maurizio Tavelli, Daniele Dalla Torre and Maurizio Righetti

[TPA-1] Enhanced Method for Rainfall Estimation Using Surveillance and Smartphone Videos 114

Manuel Fiallos-Salguero, Soon-Thiam Khu, Jingyu Guan, Tianzhi Wang, Mingna Wang

[TPA-1] Integrating Social Media, News and Machine Learning for Enhanced Hydrological Event Detection and Management 123

Joao Pita Costa, Gerald A. Corzo Perez, Inna Novalija, Luis Rei, Matej Senožetnik and I. Casals del Busto

[TPA-1] New data augmentation method for rainfall-runoffcalculation using machine learning and examining it's applicability 133

Masayuki HITOKOTO, Takeru ARAKI

[TPA-1] Flow data and water level prediction using ANN 142

Shivaanand V, Priyanga S A, Dr. Manjula R

Complex water systems, remote sensing and control

[TPA-1] The Interchangeability of the Cross-Platform Data in the Deep Learning-based Land Cover Classification Methodology 151

Keisuke Yoshida, Shijun Pan, Satoshi Nishiyama, Takashi Kojima

[TPA-1] Uncertainties Due to Diverse Attributes and Models in Rainfall Retrieval based on Commercial Microwave Links 160

Bin Lian, Zhongcheng Wei, Lili Huang and Jijun Zhao

[TPA-1] Evaluation of Segment Anything Model for Riparian Land Cover Classification from Aerial Imagery 168

Keisuke Yoshida, Shijun Pan, Takashi Kojima

[TPA-2] A rule-based method for open-channel irrigation system considering channel water storage capacity and stormwater utilization 176

Wentao Hou, Shaohui Zhang, Meijian Bai, Haorui Chen, Wei Dai, Yinong Li

[TPA-2] Optimal sequence of replacements in the renovation of water distribution networks 196

Vesipa Riccardo, Avarzamani Mohsen

[TPA-1] Research on the Application of High-Resolution Remote Sensing Satellites in River and Lake Health Assessment and Supervision 205

Yuxuan Chen, Guoqing Liu, Ziwu Fan, Chang Yang, Yang Liu

Table of Contents

Digital transformation of urban water systems

[TPA-1] Utilizing Smartphone-derived Photogrammetry 3D Model for AI-based Riparian Crack Segmentation and Measurement 214

Shijun Pan, Keisuke Yoshida, Satoshi Nishiyama

[TPA-1] The Application of Machine Learning in the Systemic Decision Process Development for Water Supply Pipe Replacement Performance in Thailand 222

Manatsawee Nawik, Suwatthana Chitthaladakorn, Sitang Pilailar

[TPA-1] Evaluating the impact of rainfall variability on urban flood saturation: A case study in Ha Noi 242

Ha Minh Do, Gerald Corzo Perez, Chris Zevenbergen

[TPA-2] Domain analysis to identify the main hydraulic pathways in WDNs to support asset management 249

Antonietta Simone, Luigi Berardi, Daniele B. Laucelli, Orazio Giustolisi

[TPA-2] Improving the Knowledge of real WDNs by Building Geometric Model

Francesco Gino Ciliberti, Luigi Berardi, Daniele Biagio Laucelli, Gabriele Freni, Antonietta Simone and Stefania Piazza 258

[TPA-2] Asset Management Support Indicator to Drive Technical Decisions in Real Water Distribution Systems 267

Orazio Giustolisi, Gabriele Freni, Giovanni Bruno, Franz Bruno, Luigi Berardi and Gianfredi Mazzolani

[TPA-2] Integrating Data-Driven and Hydraulic Modelling with Acoustic Sensor Information for Improved Leak Location in Water Distribution Networks 276

Ignasius Axel Hutomo, Ioana Popescu, Leonardo Alfonso Segura

Eco-environmental hydroinformatics of river and lakes

[TPA-2] Redetermination of environmental flow after hydropower decommission using hydraulic and habitation models: A case study in the Chishui River Basin, China 294

Zhenhua Cui, Shuai Niu, Ni Xiao, Liang Wang, Wenlin Zhai

Environmental and coastal hydroinformatics

[TPA-2] An Evaluation of Different Annotation Approaches for YOLOv8 Instance Segmentation in UAV Imagery: A Case Study on the UAV-BD Dataset 301

Shijun Pan, Yuki Yamada, Daichi Shimoe, Keisuke Yoshida

[TPA-2] Analysis of Periphytic Algae Community Structure and the Correlation with Environmental Factors in Xuhong River 309

YANG Yuming

[TPA-1] Assessing the combined risk of fire and flood on a national scale for Sweden 314

Fainaz Inamdeen, Magnus Larson

Table of Contents

Flash Flood Program: Advanced Hydroinformatic approaches for flash flood defence and prevention

[TPA-1] Application research of video flow measurement technology 321

Guomin Lyu, Linrui Shi, Changjun Liu, Nan Qiao, Xiao Liu

[TPA-1] Prospect and framework design of digital twins in water network: the case of Shandong, China 329

Linrui Shi , Guomin Lv , Yuan Zhang , Jun'e Fu , Ronghua Liu, Qing Li

Hydraulic and hydrological modeling

[TPA-1] Modeling Breaching of Biopolymer Treated Earthen Dams Due to Overtopping 337

Ezzat Elalfy, Matthew J. Czapiga, Enrica Viparelli, M. Hanif Chaudhry

[TPA-1] Physical and numerical modeling of flow behaviors of piano key weirs 342

Shicheng Li, James Yang

[TPA-1] River-Aquifer Interaction - Where Is The Problem In Calculating Volumetric Exchange? Hupsel Case Study 350

Maria Grodzka-Łukaszewska, Joachim Rozemeijer and Ype van der Velde

[TPA-1] Performance Assessment of Machine Learning and Statistical Models for Wet-Period Rainfall Forecasting 358

Rashid Farooq, Monzur Alam Imteaz

[TPA-1] Flood risk modelling of metro systems in coastal megacities: case study of the “9.7” black rainstorm in Hong Kong 366

Chen Liang, Kaihua Guo, Mingfu Guan

[TPA-1] Effects of land use and terrain characteristics on hydrological signatures: a comparative study of two adjacent subbasins 374

Haifan Liu, Mingfu Guan

[TPA-1] Dynamics and mechanisms of urban flash flooding induced by training rainstorms: case study in Hong Kong 383

Kaihua Guo, Haochen Yan, Mingfu Guan

[TPA-1] Black Carbon impact on snow albedo and snowmelt by coupling radiative transfer model and hydrological modeling 390

Diego Pacheco, Dayanne Perersen, Lina Castro

[TPA-1] Study on water quality improvement schemes and benefits in Benxi Section of the Taizi River 396

Mingwei Wang, Jianwei Liu, Bing Yang, Jun Wei, Fenfei Chen, Huabin Li

[TPA-1] Investigation of the effect of air injection on scour mitigation behind apron 405

Jeonghu Lee, Van Thinh Nguyen

[TPA-1] Numerical Simulation of Confluence Flow with Various Discharge Ratios and Junction Angles 414

Van Thinh Nguyen, Jihwan Kim

Table of Contents

[TPA-1] Modelling sediment transport in key reservoirs on Yellow River 421

Yang Fei, Wang Qiang, Wang Yuanjian

[TPA-1] A Flexible Mesh Hydrodynamic and Particle Model as a Supporting Tool for Handling Environmental Incidents – Hindcasting of Two Spillage Incidents in Coastal Waters of Hong Kong and the Greater Bay Area, China 430

Ken TM Wong, Qian Zhao, Yanbin Xi, Junting Fan, Chao Zhou, Qinghua Ye, Ken KT Tsui, Alex YW Chiu, Sunny WC Sun, Ron R Yang, Samuel HK Chui

[TPA-1] Interaction of Rainfall, Topography, Vegetation, and Soil Characteristics on Hydrological Behavior in Small and Medium-sized Catchments: A case study within the Yangtze River Basin, China 438

Shiyun Lin, Jiali Guo, Shan-e-hyder Soomro, Yinghai Li

[TPA-1] Flood Risk Analysis of Zhongxin River in Lianping County Based on IFMS 447

Haoran Zhu Chao Dai

[TPA-2] Efficient leakage detection in pressurized looped pipelines 454

PAN Bin, DUAN Huanfeng, CHE Tongchuan, KERAMAT Alireza, WANG Manli, WANG Zhaohui, ZHU Chunguang

[TPA-2] One-Dimensional Mathematical Modeling of Water Flow and Sediment Transport in the Haibowan Reservoir 460

Jingyi Guo, Xinjie Li, Xiaoying Li, Fei Yang, Qiang Wang

[TPA-1] Key technology of “four pre” system for fl ood control of digital twin Huaihe 466

WANG Kai, XU Shijin, LIU Changjun, HU Youbing, REN Minglei, CHEN Sheng

[TPA-1] Riverway Flow Simulation for the Yellow River Estuary 474

Bojun Liu, Yun Zhao, Shuntian Liang, Kefei Li

[TPA-1] The optimal algorithm for urban surface runoff based on cellular automata 481

Mengnan He, Cheng Chen, Donghao Wu

[TPA-1] Influence of the mouth bar on saltwater intrusion in microtidal estuary of Modaomen Estuary 490

Wang Pu Gu Zhitong Ye Shengbo Liu Feng

[TPA-1] Streamflow Simulation in Baihe River Basin Based on SWAT Model 497

Mengyan Shen, Miaomiao Ma, Zhicheng Su, Xuejun Zhang

[TPA-1] Enhancing the Storage Capacity of Coastal Plain River Networks Based on Flood Simulation 506

Yao Liu, Shunli Chen, Yongzhi Liu, Rui Tian, Yanyun Ruan, Xiang Wang, Xiaoyang Liu, Jianhua Zhao, Wenting Zhang,

Marine and Coastal Hydroinformatics

[TPA-1] Effects of Offshore Artificial Islands on Beach Evolution Processes, Hongtang Bay, Sanya as an Example 515

Wang Yanhong, Gao Lu

[TPA-1] Numerical Simulation of Sudden Siltation in Yangtze Estuary under Extreme Weather 523
Lu Chuanteng, Han Yufang, Luo Xiaofeng, Zhu Xianbo

Climate change impacts

[TPA-1] Impact of extreme climate and land-use change on inducing floods and droughts in the upper Luanhe River Basin 533
Ge Gao , Jia Liu , Jianzhu Li , Ping Feng , Yicheng Wang

[TPA-1] Research on Evaluation of "Rain-Carbon-Economy" of Sponge Campus During Full Life Cycle 540
You Jin, Chai Beibei, Wang Shuqian

[TPA-1] Analysis on flood control situation of Huaihe River under extreme rainstorm event 551
Lu Zhijie, Wang Kai, Hu youbing, Feng Zhigang

[TPA-1] Ensemble Methods for Climate Forecast Based on Rainfall Data in Serayu-Bogowonto River Basin, Study case: Serayu-Bogowonto River Basin in Special Region of Yogyakarta 558
Khoirunnisaa' Ronaa' Fairuuz , Shakti Rahadiansyah , Nabilla Aranda Shinta S , Muhamad Anif Ainul Murtaqi

[TPA-1] Assessment of terrestrial water storage variations and spatial heterogeneity across the Pearl River Basin：The influences of Climate change 566
Weijin Pan , YuLei Xie

Technologies for water management and monitoring

[TPA-2] Utilizing AQUARIUS as Water Resource Management Software: A Decision Support Tool in the Operational Area of Jasa Tirta I State-Owned Enterprise, Indonesia 573
Rasyid Muhammad Amirul Muttaqin, Astria Nugrahany, Heddy Bramantya

[TPA-2] Development of an a-priori numerical indicator for the evaluation of the impact of diffusion and dispersion in water distribution systems 582
Stefania Piazza, Mariacrocetta Sambito and Gabriele Freni

[TPA-2] Enhancing Safety and Stability in Real-time Optimization Control for Bioreactors in Wastewater Treatment: A TransLSTM-Net-Based Model Predictive Control with Rationality Verification 589
Weihao Chen, Wenchong Tian, Yuting Liu and Kunlun Xin

[TPA-2] The application of smart water management system in improving urban water supply efficiency 598
Li Ziming, Song Xiaoying, Jing Ming, Chen Xiuhong, Chang Buhui

[TPA-2] Analysis of the Temporal and Spatial Evolution of NDVI and Its Correlation with Soil Moisture Content in Extreme Arid Areas: A Case Study of the Kekeya Irrigation District in Turpan 606
Pengbo Zhao, Weiwei Xu, Mei Ma, Xin Li

[TPA-2] Research and design of maintenance information platform for sewage treatment in highway service area 615
Dong Ni, Jian Wang, Shegang Shao

Table of Contents

[TPA-1] Flood Emergency Remote Sensing Monitoring by Drone Swarm based on Deep Reinforcement Learning 621

Yu Zhe, Lu Wenjing

[TPA-1] Dynamic Change Analysis of Human-induced Soil Erosion in the Fenhe River Basin from 2020 to 2023 627

Kai Guo, Xiangbing Kong, Yuzhong Wen, Huashi Guo, Yinan Wang, Chunjing Zhao, Jintao Zhao

[TPA-2] Nodes Dominating The Spread Of Contaminants In Sewer Networks: A Different Approach To Monitoring 636

Antonietta Simone, Gabriele Freni, Mariacrocetta Sambito

[TPA-2] Analysis of influencing factors and water conservation potential of household water consumption in China 644

Liwei Zhan, Yongnan Zhu, Mengyuan You, Yong Zhao, Haihong Li

[TPA-2] Increasing the performance of the water meter test for reducing apparent loss and gaining high productivity with less time 654

Teepagorn Chaladtanyakij, Chayanon Choongpon, Peerapong Choopum, Phongphanu Srisomsong, Jittawat Kunanusont, A-phiwat Kaeophaithun, Pisit Kitnarumit

[TPA-2] Transient wave-based method for leak detection in long water conveyance pipes 662

Asiedu R. Sarpong, Ling Zhou, Tongchuan Che

[TPA-2] Development and Application of a Real-Time Marine Hydrological Monitoring System for Cross-Sea Bridges 671

Wang Xing-gang, Xiao Rui, Yang Pu-hang, Cheng Xiao-fei

[TPA-2] Channel Flow Field Recognition Method and Application Based on Eagle-eye Bionic Vision 679

Hairong Gao, Zihan Liu, Yu Han

[TPA-2] Development about Engineering Solution of Integrated Real-time Observation Systems for Coastal Erosion Management 688

PengfeiLiu, Changyi Yang , Yusheng Zhuo , Baojiang Zhou , Runjie Miao

[TPA-2] Research on integrated emergency management mechanism and risk management guarantee system for the whole process of exceeding-design flood of river basin 693

Yang Liting, Li Changwen, Huang Yan, Zhou Rui, Lin Sujing, Huang Jiale

[TPA-2] What Future Holds for China: The Water Resources Availability in the Future Periods Under RCP 2.6 and RCP 6.0 Emission Scenarios 710

Muhammad Bilal Idrees, Haixing Liu, Zhou Xian

[TPA-2] Ecological Service Value Evaluation Method and Application of Water System 718

Yang Zheng, Xuefeng Sang, Dongmei Wang, Ziheng Li, Siqi Zhang, Jiaxuan Chang

Water - Energy - Food nexus

[TPA-2] Experimental study on the properties of debris bait incipient motion in riparian zone 726

Wang Zhengyang, Chen Zhuo, Feng Jingjie, Li Ran

[TPA-2] Potential energy recovery evaluation in mountain irrigation distribution networks 734
Francesca Peretti, Andrea Menapace, Massimiliano Renzi and Maurizio Righetti

SS001: From models to Decision Support Systems

[TPA-1] Optical Flow-Based River Surface Velocity Measurement Algorithm Under Complex Illumination Conditions 744
Guocheng An, Tiantian Du, Yanwei Zhang

SS002: Digital twins for watersheds: challenges and advanced Hydroinformatic solutions

[TPA-2] Research and practice on integration technology of digital twin Huaihe River forecast and rehearsal 753
Youbing Hu, Shijin Xu, Kai Wang, Banghui Chen, Zhigang Feng, Jian Xu, Mengkai Qiang

[TPA-2] Digital Twin Water Network Empowering Multi-Service Scenarios Applications and Practices 761
Yang Guang, Fan Ziwu, Liu Guoqing, Li Dongzhou, Chao Yutian

SS004: Flash Flood Program: Advanced Hydroinformatic approaches for flash flood defence and prevention

[TPA-1] A Transformer-Based Convolution Neural Network Framework For Building Change Detection From High-Resolution Remote-Sensing Images 769
Han Wang, Shunyu Yao, Qing Li, Tao Sun, Changjun Liu

[TPA-1] Dynamic analysis of flash flood risk warning considering soil moisture variability and risk factors 778
Xiaoyan Zhai, Ronghua Liu, Chaoxing Sun, Xiaolei Zhang, Qi Liu

SS005: Urban flooding/waterlogging

[TPA-1] Three-dimensional simulation and analysis of urban waterlogging based on numerical modeling: Maling River urban watershed case study 786
Mei Chao, Zhang Kehan, Liu Jiahong, Wang Jia, Song Tianxu, Li Yulong

SS012: Data-driven risk management of water-related disasters

[TPA-1] Groundwater response to future droughts under climate change in a coastal region 795
Jun Zhang, Laura E. Condon

SS015: River and Lake Protection and Intelligent Management

[TPA-2] Evaluation of River Health in Chongming Island, Shanghai 804
Yifan Ding, Dacheng Chen, Xin Zhang, Yulin Chen, Ning Yang, Yaqi Dai