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THEME 1: Extremes and Variability

1.1 Floods

- 1  **Effects of Compaction and Slope Steepness on the Retreat of a Sand Bed Under Supercritical Flow**
(*M. Al-Riffai, I. Nistor*)
- 9  **Assessment of Streamflow Trend in Southeast Queensland**
(*M. Amghar, C. Thorstensen*)
- 17  **Artificial Neural Networks Based Regional Flood Estimation Methods for Eastern Australia: Identification of Optimum Regions**
(*K. Aziz, A. Rahman, G. Fang, S. Shrestha*)
- 25  **Investigation of Algorithms Enabling Floodwise System to Estimate Road Flooding for the Gold Coast**
(*M.J. Bagi, H. Zhang, H. Mirfenderesk*)
- 31  **Revisiting the Design Flood Problem**
(*J.E. Ball, M.K. Babister, M.E. Retallick*)
- 39  **Estimating Culvert & Bridge Blockages — A Simplified Procedure**
(*A.J. Barthelmess, E.H. Rigby*)
- 48  **Methodology for Flood Resilience Index Development**
(*Jelena Batica, Philippe Gourbesville*)
- 55  **A Review of Inundation Damage Assessment Processes and Applications for Infrastructure, Planning and Mitigation Projects**
(*H.W. Betts*)
- 64  **Predicting Baseflow Contributions to Design Flood Events in Australia**
(*R.E. Brown, Z.M. Graszekiewicz, P.I. Hill, B.P. Neal, R.J. Nathan*)



- 74  **Monte Carlo Simulation Technique to Design Flood Estimation — Regionalisation of Rainfall Duration for New South Wales**
(*W.L. Caballero, A. Rahman*)
- 82  **Flooding Over a Wide, Flat and Highly Developed Floodplain — RMA2 Modelling Issues and Solutions**
(*C. Callipari, N. Albert*)
- 90  **RORB — Monte Carlo Applications in Metropolitan Melbourne Catchments**
(*L.J. Cunningham, S.H. Muncaster*)
- 98  **Reproduction of Heavy Rainfall Due to Typhoon Morakot Using MM5**
(*Fei Ding, Takao Yamashita, Han Soo Lee*)
- 106  **Space-Time Image Analysis and Numerical Simulation of Flash Flood Caused by Torrential Rain in Urbanized Area**
(*I. Fujita, Y. Kunita*)
- 114  **Development and Validation of a Coastal Flood Model in an Urbanized Embayment: Accounting for Tides, Waves and Higher Ocean Levels in the Eastern Pacific**
(*T.W. Gallien, J.E. Schubert, Y.K. Poon, B.F. Sanders*)
- 122  **Culvert Design for Flood Routing Considering Sediment Transport**
(*W.H. Goodridge, W.J. Rahmeyer*)
- 130  **Flood Modelling at Brisbane Airport**
(*T.D. Graham, U. Baeumer*)
- 138  **Review of Techniques for Estimating the Contribution of Baseflow to Flood Hydrographs**
(*Z.M. Graszekiewicz, R.E. Murphy, P.I. Hill, R.J. Nathan*)
- 147  **Revision of the Short Duration Intensity-Frequency-Duration (IFD) Design Rainfall Estimates for Australia**
(*J.H. Green, F.M. Johnson, C. The*)

154		Establishment of a Quality Controlled Rainfall Database for the Revision of the Intensity-Frequency-Duration (IFD) Estimates for Australia <i>(J.H. Green, K. Xuereb, L. Siriwardena)</i>
162		Regional Flood Frequency Analysis in New South Wales Using Bayesian GLS Regression: Comparison of Fixed Region and Region-of-Influence Approaches <i>(K. Haddad, A. Rahman, George Kuczera, T. Micevski)</i>
170		Towards a New Regional Flood Frequency Analysis Method for Tasmania <i>(K. Haddad, A. Rahman, F. Ling, P.E. Weinmann)</i>
178		Integrating Urban Drainage Within a Rainfall Based Flood Risk Assessment Model and the Impact on Flood Hazard <i>(H. Haynes, D. Bertram, M. Roberts)</i>
186		Monte Carlo Temporal Patterns for Melbourne <i>(A. Herron, D. Stephens, R.J. Nathan, L. Jayatilaka)</i>
194		Towards Improved Loss Parameters for Design Flood Estimation in Australia <i>(P.I. Hill)</i>
202		Reproduction of Flood Flow Using Only One Depth-Hydrograph in a River Course — Theoretical Background and Computational Method <i>(T. Hosoda, H. Shirai, S. Onda, Y. Shibayama)</i>
210		Debris-Flow Events and Their Mitigations in the Qianghuangkeng Stream, Tainan, Taiwan <i>(Chyan-Deng Jan, Kuo-Hsun Tseng, Ji-Shang Wang, Yu-Chao Hsu)</i>
218		Areal Reduction Factors for Estimation of Design Rainfall Intensities for New South Wales and the Australian Capital Territory <i>(P.W. Jordan, K. Sih, P.I. Hill, N. Nandakumar, P.E. Weinmann, R.J. Nathan)</i>
226		Modelling High Resolution Discharge Dynamics Nearby Road Structure, Using Data from Small Catchment and 3 Different Models <i>(Zahra Kalantari, Per-Erik Jansson, Mona Sassner, Jannes Stolte)</i>







233		Assessment of Baseflow Seasonality and Application to Design Flood Events in South-West Western Australia <i>(K. Kinkela, L.J. Pearce, R.E. Murphy, Z.M. Graszekiewicz, P.I. Hill)</i>
241		Iowa Flood Center: Resource for Critical Research and Applications <i>(W.F. Krajewski, L.J. Weber, Nathan C. Young)</i>
248		Seven Day Flow Forecasting Using Hydrological Models and Numerical Weather Prediction Rainfall Forecasts <i>(C.P. Leahy, T.C. Pagano, J.F. Elliott, S. Sooriyakumaran, J. Schellekens, J.S. Verkade)</i>
256		Optimal Parameter Estimation of a New Rapid Flood Spreading Model Using Multi-Objectives <i>(Yang Liu, Gareth Pender)</i>
264		Extreme Design Floods for Seqwater Storages <i>(T. Malone)</i>
270		A Rapid Approach to Modelling Overland Flood Risk <i>(D. McConnell, C. Druery)</i>
278		Reconciliation Between Flood Frequency Analysis and Rainfall-Runoff Model Results <i>(H. Mirfenderesk, A. Chong, M. Rahman, M. Kabir, R. Van Doorn)</i>
286		Community-Based Tools for Communicating Flood Risk and Improving Public Preparedness <i>(Matthew Moore, D.W. Gilles, Jesse A. Piotrowski, Nathan C. Young)</i>
292		Streamflow Rating Curves During Floods <i>(M. Muste, H.-C. Ho, H. Zhang)</i>
299		Uncertainty of Including Detailed Hydraulic Structures in a 2D Hydraulic Model <i>(D.N. Niven, C.L. Catalano)</i>
307		Experimental Study to Prevent River Stoppages Due to Driftwood <i>(H. Oshikawa, T. Komatsu)</i>

315		Adjustment Factors for Unsteady State-Discharge Measurements (<i>N. Ozbey</i>)
323		Regional Flood Estimation for Small Catchments in South-West Western Australia (<i>L.J. Pearce</i>)
331		Regional Runoff Coefficients for Summer and Winter Design Flood Events in South-West Western Australia (<i>L.J. Pearce</i>)
339		Genetic Algorithms for the Optimization of Control Structures (<i>F. Pereira, X. Valls, P. Deckers</i>)
348		Hydrological Modelling in Data-Scarce Catchments — The Example of Ruvubu River Basin in Burundi (<i>N. Pontien, B. Bhattacharya</i>)
356		Estimating Design Floods for Gauged Urban Catchments Under Climate Change Conditions — Case Study: Cooks River, Sydney (<i>P. Rahman, A. Sharma, G.P. Smith</i>)
364		Towards a New Regional Flood Estimation Method for the Northern Territory (<i>A. Rahman, M. Zaman, F. Melaisi, K. Haddad, L. Rajaratnam, W. Weeks</i>)
372		Rainfall-on-Grid Modelling — A Decade of Practice (<i>H. Rehman</i>)
380		Culvert Blockage Mechanisms and Their Impact on Flood Behaviour (<i>E.H. Rigby, A.J. Barthelmess</i>)
388		An Australia-Wide Assessment of Rainfall Predictors for Improved Seasonal Streamflow Forecasts (<i>A.D. Schepen, Q.J. Wang, D.E. Robertson</i>)
396		Optical Visualization of Spatial Dike Breach Profiles Due to Overtopping Erosion (<i>L. Schmocker, W.H. Hager</i>)





404		Development of Appropriate Criteria for the Safety and Stability of Persons and Vehicles in Floods (<i>T.D. Shand, G.P. Smith, R.J. Cox, M. Blacka</i>)
413		Has There Been a Change in Rainfall Maxima? — Implications for Design Rainfalls (<i>K. Sih, K. Fowler, P.W. Jordan, P.I. Hill, N. Nandakumar, P.E. Weinmann, R.J. Nathan</i>)
421		Predicting Inundation Extents for Different Frequency Rainfalls in Upper Gin River Basin, Sri Lanka (<i>G.H.A.C. Silva, H. Ishidaira</i>)
428		Re-Design of Rain Gauge Network Using Genetic Programming Based Ordinary Kriging (<i>C. Sivapragasam, V.M. Arun, Nitin Muttli</i>)
434		The Ineptitude of Traditional Loss Paradigms in a 2D Direct Rainfall Model (<i>F. Taaffe, S. Gray, A. Sharma, M.K. Babister</i>)
442		Penrith Lakes Development — Verification of a 2D Model with a Physical Model (<i>R.S.D. Thomson, M.W. Zollinger, L.R. Evans, B.C. Phillips</i>)
450		Validation of a 2-D Hydraulic Model — ANUGA, to Undertake Hydrologic Analysis (<i>R. Van Drie, P. Milevski, M. Simon</i>)
458		Continuous Simulation of Rainfall at Ungauged Locations — A Non-Parametric Disaggregation Approach (<i>S. Westra, R. Mehrotra, A. Sharma, S. Srikanthan</i>)
466		2D vs 1D Hydraulic Modelling for Suttor Creek and Middle Creek Railway Bridge Design (<i>Silver Yance, Nilantha Karunarathna, G. Hadzilacos</i>)
475		Experimental Study on Flash Flood Waves Down a Stepped Channel (<i>Yang Yang</i>)
483		Three-Dimensional Numerical Analysis for Predicting the Fluid Force Acting on the Human Body from Water Flow (<i>Nozomu Yoneyama, Masaki Miwa, Keiichi Toda</i>)

- 491  **Computations of Real Scale Experiment on Levee Breach with a 2D Shallow Flow Model**
(*Hiroki Zenno, Toshiki Iwasaki, Yasuyuki Shimizu, Ichiro Kimura*)
- 499  **Experimental Study on Unsteady Flow of Blocked Dam-Break**
(*Jing Zhang*)

1.2 Storm Surge

- 504  **Joint Probability of Sea Levels and Rainfall at Tauranga Harbour**
(*S. Aijaz, P. Hartley, P. Miselis, M.J. Collett, K.G. Dayananda*)
- 512  **Propagation of Storm Surge in a Coupled Bay System**
(*S. Aoki, S. Kato*)
- 519  **Data Analysis and Numerical Modeling of Sea Level Anomalies in the South China Sea**
(*Haoliang Chen, Pavel Tkulich, Paola Malanotte-Rizzoli*)
- 527  **Modeling of Sea Level and Current Anomalies in the Singapore Region**
(*S.K. Ooi, P. Sisomphon, A. Kurniawan, H. Gerritsen*)
- 535  **Stochastic Storm Surge Simulation and the Multivariate Statistical Assessment of the Results via Copula Functions**
(*T. Wahl, J. Jensen, C. Mudersbach*)
- 543  **Investigation into the Joint Dependence Between Extreme Rainfall and Storm Surge in the Coastal Zone**
(*S. Westra*)









1.3 Drought

- 551  **Laboratory Assessment of the Performance of Porous Coverings in Evaporation Mitigation**
(*David Busuttil, William Peirson, Gregory Lee, Pou Onesemo, Chris Waite*)
- 559  **Numerical Study of the Seasonal Wave Action Developed at an Agricultural Water Reserve**
(*Y. Huang, H. Zhang, C.J. Lemckert, P.W. Schouten*)
- 567  **Drought Planning and Management on an European Transboundary Context: The Case of the Iberian Peninsula**
(*R. Maia*)
- 575  **Long-Term Reservoir Operation Considering Large-Scale Meteorological Conditions Well-Correlated with Basin Precipitation**
(*D. Nohara, H. Miki, T. Hori*)










1.4 Natural Disaster & Mitigation











- 583  **Assessment of Flood Risk Management Strategies in Mixed-Use Urban and Rural River Basins, Case Study: Gorgan River Basin, North-Eastern Iran**
(*Babak Bozorgy, Farhad Yazdandoost*)
- 591  **Dam Breaks of Viscoplastic Material on an Inclined Plane**
(*S. Cochard, C. Ancey*)
- 599  **Depth-Averaged Flowslides Model: Validation and Application to Tailings Dams and Waste Dumps Failures**
(*B. Dewals, P. Archambeau, S. Detrembleur, S. Erpicum, M. Pirotton*)
- 607  **Evaluation of Dredging and Operational Changes at a Major Flood Control Reservoir to Accommodate Extreme Flood Events**
(*D.W. Gilles, Nathan C. Young, L.J. Weber*)
- 615  **Severe Flooding from Extreme Meteorological Events in Monterrey, Mexico**
(*C.A. Gonzalez*)
- 623  **Experimental Investigations of Dam Break Flows Down an Inclined Channel**
(*D. Marra, T. Earl, C. Ancey*)
- 631  **Flood Forecast Verification to Support Emergency Management**
(*D. Molinari, F. Ballio, S. Menoni*)
- 639  **Post Earthquake Water Infrastructure Assessment in Leogane Haiti: A First Step Towards a Sustainable Solution**
(*M. Piasecki, P. Gurian, F. Montalto, M. Sheller, T. Ayalew, H. Galada, S. O'Connor*)
- 646  **Analysis of Railway Embankment Breach Due to Typhoon-Induced Flooding**
(*R. Tsubaki, Yoshihisa Kawahara, I. Fujita, T. Sayama*)



1.5 Stochastic Hydrology

- 654  **Influences on Flood Frequency Distribution in Irish Catchments**
(*S. Ahilan, J.J. O'Sullivan, M. Bruen*)
- 662  **Quantifying Uncertainty in Level-of-Service Statistics Using the Parametric Bootstrap Method**
(*K.J. Althaus, J.P. Vítkovský*)
- 670  **Generation of Monthly Inflow into the Bigge Reservoir**
(*S. Elabd, Andreas Schlenkhoff*)
- 678  **Application of the Monte Carlo Technique to Riverine Sand and Gravel Extraction — Analysing Risk in Complex Environmental Systems**
(*S. Jha, A.J. Markham*)
- 686  **Meteorological Drought Forecasting Using Stochastic Models**
(*Mosaad Khadr, Andreas Schlenkhoff*)
- 694  **On the Coincidence of Extreme Rainfall Bursts with Duration**
(*M. Leonard, J.E. Ball, M.F. Lambert*)
- 702  **Ensemble Empirical Mode Decomposition: Testing and Objective Automation**
(*M.C. Peel, T.A. McMahon, R. Srikanthan, K.S. Tan*)
- 710  **Analysis of Extreme Hydrological Events in Major River Basins in Japan Under Climate Change**
(*Y. Sato, Toshiharu Kojiri, Y. Michihiro, Y. Suzuki, E. Nakakita*)

1.6 Adaptation to Climate Changes & Variability

- 718  **Adaptation to Climate Change on Water Resources in Bangladesh**
(*Faisal Ahammed, G.A. Hewa*)
- 726  **Using High-Resolution Regional Climate Projections to Investigate the Impact of Climate Change on Flood Inundation: A Case-Study from Tasmania**
(*K.A.S. Brown, C. White, J. Peterson, N. West, F. Ling*)
- 734  **Stormwater Drainage Design Under Climate Change and Variability Conditions**
(*Rezaul Chowdhury, Simon Beecham*)
- 742  **Observed Runoff Variability and Projected Change in the La Plata Basin**
(*S. Guerini, S. Barontini, A.M. Peviani, R. Ranzi*)
- 750  **Observed Relationships Between Extreme Sub-Daily Rainfall, Surface Temperature and Relative Humidity**
(*R. Hardwick Jones, S. Westra, A. Sharma*)
- 758  **Links Between the Southern Annular Mode (SAM) and Australian Rainfall: An Investigation into SAM Indices**
(*M. Ho, A.S. Kiem, D.C. Verdon-Kidd*)
- 766  **Trends in Peak Streamflow Data in Australia: Impacts of Serial and Cross-Correlation**
(*E.H. Ishak, A. Rahman, S. Westra, A. Sharma, George Kuczera*)
- 774  **Exploring Links Between Effects of Climate Variations on Average Rainfall and Rainfall Extremes**
(*Dörte Jakob*)
- 782  **Streamflow and Water Availability Forecasts — Exploring the Needs of Water Managers and the Community**
(*D. Jayasuriya, T. Peatey, N. Plummer, J.F. Elliott, J. Perkins, S. Sooriyakumaran, Q.J. Wang, S. Zhou*)

- 790  **Inclusion of Long-Term Climate Change Impact in Sydney Catchment Authority's Water Supply Planning Process**
(*G. Kibria, J. Martin, S. Maheswaran*)
- 802  **Adapting to Climate Variability and Change: Limitations of Relying on Climate Model Outputs**
(*A.S. Kiem, D.C. Verdon-Kidd*)
- 810  **Estimation of Changes in Extreme Precipitation from Climate Model Projections**
(*H. Madsen, M.A. Sunyer*)
- 817  **An Airborne Acoustic Method to Monitor the Hydraulic Characteristics of Shallow Water Flows**
(*A. Nichols, S. Tait, K. Horoshenkov, S. Shepherd, G. Maximov*)
- 825  **Cyclonic Circulation in the Western Irish Sea in Future Climate**
(*A.I. Olbert, M. Hartnett, T. Dabrowski*)
- 832  **Variability in Soil Carbon Fluxes in Intensively Managed Agricultural Landscapes**
(*A.N. Thanos Papanicolaou, C.G. Wilson, K.M. Wacha, T.B. Moorman*)
- 839  **Extreme Rainfall Events in the Sources of the Yangtzi and the Yellow Rivers**
(*Yanshu Rong, Lusi Wei, Luyao Bai*)
- 847  **Investigation into the Suitability of Using Gridded Data as a Proxy for Gauged Data in Hydrological Applications**
(*C.R. Tozer, D.C. Verdon-Kidd, A.S. Kiem*)
- 855  **Is the Mid-1990's Step Change in South-Eastern Australian Climate Part of a Longer Term Climate Shift That Began in the 1970's?**
(*D.C. Verdon-Kidd, A.S. Kiem*)
- 863  **Regional Patterns of Sea Level Change in the German North Sea Related to Global Scale Patterns — Are IPCC Projections Reliable for Regional Planning Purposes?**
(*T. Wahl, T. Frank, J. Jensen*)










- 871  **Precipitation Variation in the Upper and Middle Yellow River Basin, China**
(*Yuanjian Wang, Xudong Fu, Tiejian Li*)
- 879  **Vulnerability of Groundwater Resources in Tongatapu**
(*I. White, A. Falkland, T. Fatai*)

THEME 2: Coastal Hydraulics: Form and Function

2.1 Advances in Wave Processes



- 888  **Experimental Investigation on Mean Velocity and Turbulence in Irregular Waves Over a Sloping Bottom**
(*F. De Serio, M. Mossa*)
- 896  **Waves Produced by Ship Displacement on Adjacent Shoals and Lateral Basins of Navigation Canals**
(*G. Di Silvio, C. Dall'Angelo, L. Zaggia, J. Rapaglia*)
- 904  **Experimental Investigation of Impulse Wave Run-Up and Overland Flow**
(*H. Fuchs, W.H. Hager*)
- 912  **Solitary Wave Run-Up Around a Conical Island with the Internal Wave Maker**
(*T. Ha, P. Lin, S. Jin, K.-H. Seo, Y.-S. Cho*)
- 919  **Stormy Wave Analysis Based on Field Observation on South-East Coasts of Queensland**
(*Alireza Jafari, Nick Cartwright, Peter Nielsen, David Callaghan*)
- 927  **Rough Turbulent Bottom Boundary Layers Beneath Waves Following and Opposing a Current**
(*Jona Johari, Lars Erik Holmedal, D. Myrhaug*)
- 935  **Spectral Wave Attenuation Over *Posidonia Oceanica***
(*Th. K. Koftis, P. Prinos*)
- 943  **Wave Breaking and Bottom Friction Over Mildly Sloping Bed and Bar in a New Boussinesq Wave Model**
(*I.G. Koutsourelakis, C.D. Memos*)
- 951  **Numerical Simulations of Water Wave Propagation by Volume of Fluid Approach**
(*D. Malcangio, M. Torresi, G. Pascazio, A.F. Petrillo*)
- 959  **Applicability of New Generation System for Solitary Wave Boundary Layer**
(*Bambang Winarta, Hitoshi Tanaka, Hiroto Yamaji*)

2.2 Coastal Processes & Morphology

- 967  **Temporal Variations of Bottom Profile and Sediment Along an Observation Pier**
(*Yasuyuki Baba, Kiyoshi Uchiyama*)
- 973  **Influence of Surf-Beat on Beach Morphology and Sediment Transport**
(*T.E. Baldock, J.A. Alsina, I. Caceres, P. Manoonvoravong, Kim Son Pham*)
- 981  **Physical Modelling of Waves Induced Sheet Flows**
(*C. Berni, H. Michallet, E. Barthélemy*)
- 989  **Analytical Solution of Collisional Sheet Flows**
(*D. Berzi, E. Larcen*)
- 994  **A Relative Simple Model for Predicting Tidal Flows**
(*Lars Erik Holmedal, D. Myrhaug*)
- 1001  **Suspended Sediments Due to Random Waves**
(*D. Myrhaug, M.C. Ong, Lars Erik Holmedal*)
- 1009  **Wave Energy Reflection off Dredged Channels**
(*A.F. Nielsen, R.I. Bonner, A. Berthot*)
- 1017  **Measurement and Modelling of Hydrodynamics at the Surf-Swash Boundary**
(*H.E. Power, T.E. Baldock*)
- 1024  **Numerical Model of Wave-Driven Coastal Current Considering Depth-Dependent Radiation Stresses**
(*Jinhai Zheng*)



2.3 Estuarine Processes

- 1031  **Attractors for the Entrance State of a Tidal Estuary in the Presence of a Multi-Harmonic Tide**
(*S. Baldwin, J.B. Hinwood, E.J. McLean*)
- 1039  **Unsteady Turbulence Measurements in Breaking Tidal Bores Including the Effect of Bed Roughness**
(*N.J. Docherty, H. Chanson*)
- 1047  **Heavy Metal Distribution in Estuarine Sediments: A Comparison of a Seagrass Bed and Adjacent Bare Sediment**
(*N.S. Dowsett, S.C. Rayburg*)
- 1054  **Estimation of Freshwater-Discharge Distribution for Multi-Estuary Branches in the Red River System in Vietnam**
(*N.H. Duc, T. Shintani, Motohiko Umeyama*)
- 1062  **Hydrodynamics and Turbulence in Positive Surges: A Comparative Study**
(*C. Gualtieri, H. Chanson*)
- 1070  **Attractor States for Estuary Morphology from Time-Scaled Equations**
(*Y.Y. Jia, J.B. Hinwood*)
- 1077  **Inception of Gravel Bed Motion Beneath Tidal Bores: An Experimental Study**
(*N. Khezri, H. Chanson*)
- 1085  **Mechanism of Water Exchange at the Sediment-Water Interface in a Tidal Estuary**
(*K. Komai, S. Nakashita, T. Hibino, Peter Nielsen*)
- 1093  **Sediment Dynamics of the Snowy River Estuary Entrance**
(*C.S. Lauchlan Arrowsmith, J.B. Hinwood*)
- 1101  **Lagrangian Simulation of Sewage Effluent Dispersion in a Density-Stratified Tidal Channel**
(*S. Liu, S.S. Li*)









- 1109  **Spring Tidal Pumping**
(*E.J. McLean, J.B. Hinwood*)
- 1117  **The Impact of Entrance Breakwaters on Large Estuaries**
(*A.F. Nielsen, A.D. Gordon*)
- 1125  **A Field Study for Calibration of a Water Quality Model for Darwin Harbour**
(*R.G. Patterson, E.M. Valentine*)
- 1133  **Three-Dimensional Numerical Simulation of the Hydrodynamics Generated by a Weak Breaking Tidal Bore**
(*B. Simon, P. Lubin, S. Glockner, H. Chanson*)
- 1141  **Turbulence Measurements in the Garonne River Tidal Bore: First Observations**
(*B. Simon, P. Lubin, D. Reungoat, H. Chanson*)
- 1149  **Effect of Bed Roughness Prediction on Morphodynamic Modelling: Application to the Dee Estuary (UK) and to the Gironde Estuary (France)**
(*C. Villaret, N. Huybrechts, A.G. Davies, O. Way*)
- 1157  **Estimating Lake Level Response to Wind in the Gippsland Lakes**
(*L. Walpole, A.R. Ladson, A. Herron*)
- 1165  **Estuarine Circulation and Associated Material Transport in Shallow Waters Around a River Mouth**
(*J.-H. Yuk, S. Aoki*)
- 1172  **Experimental Research on the Influences of Clay Minerals Upon the Fine Sediment Flocculation**
(*Jingjing Zhou, Changkuan Zhang, Ying Jin*)

2.4 Coastal & Offshore Structures

- 1179  **Hydrodynamic Characteristics of Vertical Slotted Wall Breakwaters**
(*H. Ahmed, Andreas Schlenkhoff, D.B. Bung*)
- 1187  **Input-Output Modelling of Tidal Renewable Energy**
(*Eva Fenrich, Reza Ahmadian, Bettina Bockelmann-Evans, Walter Marx, Roger A. Falconer*)
- 1194  **2D Physical Model Test of a Large Port Breakwater: The Case of the New Outer Port of “La Coruña” (Spain)**
(*R. Gutierrez-Serret, J. Lozano, J.I. Grau, F. Noya*)
- 1202  **Restraint Technique Over the Movement of Floating Aquaculture Facilities**
(*Y. Matsuuchi, M. Aminaka, M. Tochino, M. Miyagawa, Y. Suenaga*)
- 1210  **Research on the Seaweed Rootage by Current Control Structure**
(*M. Miyagawa, M. Fujiwara, Y. Suenaga*)
- 1218  **Evaluation of Coastal Protection Strategies for Lowlands in Respect of Climate Change**
(*Hanz D. Niemeyer, Ralf Kaiser, Heiko Knaack, Pushpa Dissanayake, Marco Miani, Johanna Elsebach, Cordula Berkenbrink, Gerald Herrling, Anne Ritzmann*)
- 1226  **A Numerical Simulator for Wave Overtopping**
(*D. Souliotis, P. Prinos*)
- 1232  **Analysis of 2D Wave Energy Transmission Over Offshore Breakwaters**
(*Francisco Taveira Pinto*)
- 1240  **Experimental Study on the Performance of Pile Breakwater with Special-Shaped Cross Section**
(*G.Y. Wang, Y.X. Wang, D.B. Gao, Y.Z. Wang*)
- 1247  **Theoretical Estimation and Numerical Modelling of Annual Energy Output from a Tidal Barrage**
(*J.Q. Xia, Roger A. Falconer, B.L. Lin, G.M. Tan*)










- 1255  **Experimental Study of Liquid Sloshing in a Tank Under Irregular Wave Excitation**
(*Mi-an Xue*)
- 1263  **Experimental Study on Interaction Between Vortices and Floating Breakwater**
(*J. Yoon, D. Namgung, Y.-S. Cho*)








2.5 Tsunamis








- 1271  **Investigation of Tsunami Wave Runup Over Vegetated Slopes**
(*Haoliang Chen, Eng Soon Chan, Pengzhi Lin*)
- 1278  **Design for Tsunami Resistance: Flume Experiments on Arrays of Buildings**
(*J.B. Hinwood, N. Mackenzie*)
- 1286  **Experimental Investigation for the Effects of Tree Arrangement in a Forest on Mitigating Tsunami**
(*Kosuke Iimura, N. Tanaka, Kenji Harada, Katsutoshi Tanimoto*)
- 1294  **Boulder Transport by the 2004 Indian Ocean Tsunami: Numerical Assessment of Field Observations at Lhok Nga Bay, Sumatra, Indonesia**
(*N.A.K. Nandasena, N. Tanaka, Raphaël Paris*)
- 1302  **Field Investigations and Experimental Modelling of the Tsunami-Induced Extreme Hydrodynamic Forces on Structures**
(*I. Nistor, D. Palermo, T. Al-Faesly, A. Cornett*)
- 1310  **Tsunami Impact on Coastal Structures**
(*S.R. Shafiei Amraei, B.W. Melville, A.Y. Shamseldin, B. Burridge, A. Hogan*)
- 1317  **Field Measurement and Numerical Studies on the Tsunami Propagation into Upstream of Rivers**
(*Hitoshi Tanaka, Xuan Tinh Nguyen, Xuan Dao Nguyen*)
- 1325  **Three-Dimensional Numerical Analysis of Salt-Water Behavior in the Yodo River in case of a Tsunami**
(*Nozomu Yoneyama, H. Matsumiya, R. Samejima*)





THEME 3: Water and Carbon: Climate Change Impact

3.1 Surface Water Hydrology









- 1333  **The Impacts of Climate Change and Reforestation on Future Water Availability of the Collie River Catchment, Western Australia**
(*M.A. Bari, R.P. Silberstein, S.K. Aryal*)
- 1341  **Investigation of the Use of PEST to Optimise a Source Catchments Model of Streamflow in the Ovens River, Australia**
(*K.M. Barlow, A.L. Weeks, F. Githui*)
- 1348  **Design Flows — Over or Under Predicted?**
(*Carmen E. Bernedo*)
- 1355  **Use of Split-Sample Validation to Assess the Uncertainty in Modelled Streamflow**
(*M. Braccia*)
- 1363  **Applications of Vandewiele's Monthly Water Balance Model for Predicting Climate Change Effects in Australian Catchments**
(*R. Fallahzadeh, E.A. Johnson, E.J. Woolford, G.A. Hewa*)
- 1371  **An Artificial Neural Network Model for Simulating Streamflow Using Remote Sensing Data**
(*N. Gamage, R. Agrawal, V. Smakhtin, B.J.C. Perera*)
- 1379  **Evaluating Parameter Sensitivity for Surface Water Modelling of Ungauged Catchments**
(*M.S. Gibbs, G.C. Dandy, H.R. Maier*)
- 1387  **Calibration of SWAT Model Using Remotely-Sensed Evapotranspiration for an Irrigated Catchment in Southeastern Australia**
(*F. Githui, T. Thayalakumaran*)
- 1395  **Numerical Demonstration of Distributed Hydrological Modelling Performance Based on Super High Resolution GCM Outputs Using Geostatistical Approaches**
(*T. Hamaguchi, M. Sapkota, Toshiharu Kojiri*)





- 1403  **Evaluation of Sediment Transport Capacity Equations Using Basin-Scale Process-Based Modelling Approach**
(*M.A. Kabir, Dushmanta Dutta, S. Hironaka*)
- 1411  **Battling Hydrological Monsters: Insights into Numerical Approximations, Data Uncertainty and Structural Errors**
(*Dmitri Kavetski, Guillaume Evin, Martyn P. Clark, M. Thyer, George Kuczera, Benjamin Renard, Fabrizio Fenicia, Narendra Tuteja*)
- 1419  **Modelling Equatorial Baseflow**
(*W.J.C. Meynink*)
- 1427  **Predictability and Chaotic Nature of Daily Streamflow**
(*D. Nagesh Kumar, C.T. Dhanya*)
- 1435  **Modelling Hydrological Change: A Case Study Exploring the Challenge of Modelling the Impact of Strip Mining Over Specific Time Increments on an Ungauged, Pristine Catchment**
(*May-Le Ng, G. Hadzilacos, A. Vitale, B. Loney*)
- 1443  **An Assessment of the Anthropogenic Impacts on Streamflows in the Himayat Sagar Catchment, India Using SWAT**
(*Rajesh Nune, B.A. George, Andrew W. Western*)
- 1451  **Predictability of Short-Term Streamflow Forecasts in Australia**
(*T.C. Pagano, Q.J. Wang, H.A.P. Hapuarachchi*)
- 1459  **On the Assessment of a Modified Diffusion-Wave Approximation Model in the Framework of Overland Flow**
(*R. Paulus, P. Archambeau, S. Erpicum, B. Dewals, M. Pirotton*)
- 1466  **Modelling Runoff Under Current and Future Climates Across the Tropical Savannas of Northern Australia**
(*C. Petheram, P. Rustomji, J. Vleeshouwer, R. Cresswell, F.H.S. Chiew*)

- 1474  **Annual Runoff Prediction with a Sensitive Artificial Neural Networks Model**
(*Guanghua Qin, Shunjiu Wang*)
- 1482  **Using Water Balance Model Output to Represent Initial Catchment Conditions in Statistical Forecasting of Seasonal Streamflows**
(*D.E. Robertson, Q.J. Wang, T.C. Pagano, H.A.P. Hapuarachchi*)
- 1490  **A Flexible Approach for Integrating Climate Change Projections with Changes in Human Water Use on River Systems**
(*K.A. Robinson, J. Bennett, F. Ling, M.I. Willis*)
- 1498  **Flow Modelling and Velocity Distribution in Small Irrigation Canals**
(*A. Schmidt, C. Huhta, J. Sloat*)
- 1506  **Challenges in Calibrating Storm Water Management Model (SWMM) to a Rural Catchment**
(*W.H.C. Subhashini, G.A. Hewa, D. Pezzaniti*)
- 1514  **Dynamic Evolving Neural-Fuzzy Inference System for Rainfall-Runoff (R-R) Modelling**
(*A. Talei, L.H.C. Chua, C. Quek*)
- 1522  **An Event Runoff Coefficient Approach for Assessing Changes in Short-Term Catchment Runoff Following Bushfires**
(*K.S. Tan, D.J.M. Flower, D.M. Flowers*)
- 1530  **Research on the Evolutionary Law of Runoff in the Nenjiang River Basin in Recent 45 Years**
(*Yun Tang, Hao Wang, Deng-hua Yan, Ke-wang Tang*)
- 1538  **Estimation of Climate Change Impact on Daily River Inflows Using a Consistent Method Across the Murray-Darling Basin**
(*J. Teng, J. Vaze, F.H.S. Chiew, B. Wang, J.-M. Perraud, S. Marvanek*)
- 1546  **Improving Hydrological Model Predictions by Incorporating Rating Curve Uncertainty**
(*M. Thyer, Benjamin Renard, Dmitri Kavetski, George Kuczera, Martyn P. Clark*)
- 1554  **Catchment Water Yield Estimation Tools (CWYET)**
(*J. Vaze, J.-M. Perraud, J. Teng, F.H.S. Chiew, B. Wang, Z. Yang*)

- 1562  **A Comparison of Methods to Generate Spatiotemporal Climate Data for Catchment Scale Rainfall Runoff Models**
(*A.L. Weeks, K.M. Barlow, B. Christy*)
- 1570  **Estimation of Precipitation Elasticity of Streamflow from Data and Variability of Results**
(*J.M. Whyte*)
- 1578  **Estimation of Monthly Gridded Rainfall by Merging Rain Gauge and Satellite Rainfall Data**
(*F.M. Woldemeskel, A. Sharma, B. Sivakumar*)
- 1587  **Analysis of Daily Precipitation Pattern in the Yellow River Basin**
(*Rui Ye, Genfa Chen, Dayong Qin*)
- 1595  **Stratification of Regionalisation Results for a Large Dataset of Unregulated Australian Catchments**
(*Y.Q. Zhang, N.R. Viney*)

3.2 Groundwater Hydraulics & Hydrology

- 1603  **Scaling of Field-Based Estimates of Steady-State Discharge Using Depth to Groundwater**
(*J.F. Costelloe, V. Matic, Andrew W. Western*)
- 1611  **Using Hydraulic and Chemical Data to Determine Groundwater Contribution to the Broken River, Victoria**
(*J.F. Costelloe, G. Sites, J. Moreau, Andrew W. Western*)
- 1619  **Coupled Surface Water/Groundwater Model for Hyporheic Flow in a Pool and Riffle Sequence**
(*A.A. Ibrahim, P.M. Steffler*)
- 1627  **Hydrograph Analysis for Parameter Estimation of Connected and Karst Systems**
(*A. Kovacs, P. Perrochet*)
- 1635  **Groundwater Risk Estimation of a River Basin**
(*K. Latu, J.F. Costelloe, H.M. Malano*)
- 1643  **Sensitivity of Optimal Baseflow Filter Parameter to Catchment Soil Characteristics**
(*L. Li, H.R. Maier, M.F. Lambert, Craig T. Simmons, D. Partington*)
- 1651  **Application of Visual AEM for Dewatering and Seepage Impact Assessments**
(*L.D. Luba, J.R. Craig, C.A. Russell, T.D. Graham*)
- 1661  **Groundwater Balance for a Partially, Highly Urbanized Basin, Through an Integrated Surface-Groundwater Approach**
(*A.N. Menéndez, N.B. Badano, F. Re*)
- 1669  **Handling of the 3D Behaviour of the Unsaturated Layer Using a Vertical 1D Model for the Richards Equation Along with Diffusive Horizontal Fluxes**
(*R. Paulus, P. Archambeau, S. Erpicum, B. Dewals, M. Pirotton*)
- 1677  **Time-Series Modelling of Groundwater Head and Its De-Composition to Historic Climate Periods**
(*T.J. Peterson, Andrew W. Western*)

- 1685  **Assessing the Impact of Pedoderms on Stormwater Harvesting in the ACT, Australia**
(*B.C. Phillips, S. Pells, J. Garside*)
- 1693  **Measurement of Water Content Profiles Using Spatial Time Domain Reflectometry (Spatial TDR)**
(*A. Scheuermann, S. Schlaeger, R. Becker, Ch. Hübner, N. Wagner*)
- 1701  **Experimental Study on Effects of Soil Pipe on Hillslope Water Dynamics and Slope Failure**
(*R.H. Sharma, H. Konietzky*)
- 1709  **Groundwater Modelling in a Highly Seasonal, Fractured Rock Environment Using FEFLOW**
(*C.D. Wasko, W.A. Timms, B.M. Miller*)

3.3 Lake & Reservoir Hydraulics






- 1717  **2DH Modelling of a Reservoir Flushing Compared with LSPIV Measurements**
(*B. Camenen, A. Paquier, A. Bouarab, J. Le Coz, G. Dramais, M. De Linares*)
- 1725  **Experimental Investigation and 3-D Numerical Simulation of Vortex-Structure in Stilling Basin of Multi-Horizontal Submerged Jets**
(*Jian-gang Chen*)
- 1733  **The Influence of Secondary Currents on Reservoir Sedimentation — Experimental and Numerical Studies**
(*G. Harb, S. Haun, S. Ortner, C. Dorfmann, J. Schneider*)
- 1740  **3D Numerical Modelling of Sediment Deposition and Flushing in the Angostura Reservoir, Costa Rica**
(*S. Haun, L.E. Hoven, N.R.B. Olsen, C.R. Rodríguez Meza, L. Lizano*)
- 1747  **Investigating Techniques to Reduce Evaporation from Small Reservoirs in Australia**
(*F. Helfer, C.J. Lemckert, H. Zhang*)
- 1755  **Influence of a Circular Jet Arrangement in a Rectangular Tank on Flow and Suspended Sediment Release**
(*J.M.I. Jenzer Althaus*)
- 1763  **Fine Sediment Release from a Reservoir by Controlled Hydrodynamic Mixing**
(*J.M.I. Jenzer Althaus, G. De Cesare, Anton J. Schleiss*)
- 1771  **Effect of a Deflector Island on the Performance of a Stormwater Retention Pond**
(*S. Khan, B.W. Melville, A.Y. Shamseldin*)
- 1779  **3-D Numerical Simulation Research of Flow in a Vortex Drop Shaft Which Have Two Volute Chambers with Aeration**
(*Gang Lei, Jian-min Zhang, Jian-gang Chen, Fei Yu, Lu Liu*)

- 1787  **Evaluating the Capability of Adaptive Neuro-Fuzzy Inference System to Predict of Flushing Half-Cone Volume in Reservoirs**
(*M.E. Meshkati Shahmirzadi, T. Sumi, S.A. Kantoush, S. Emamgholizadeh*)
- 1795  **Experiments on Turbulence and Settling Down of fine Sediments Induced by Pumped Storage Operations in a Cuboidal Reservoir**
(*M. Müller, G. De Cesare, Anton J. Schleiss*)
- 1803  **Comprehensive Sediment Management Strategies in Japan: Sediment Bypass Tunnels**
(*T. Sumi, S.A. Kantoush*)
- 1811  **Reservoir Capacity-Potential Power Generation-Reliability Estimation Based on Gould-Dincer Approach**
(*Jinming Xie, George W. Annandale, Baosheng Wu*)

3.4 Contaminant Transport & Interactions






- 1818  **Assessment of Surface Water Quality in Peel Harvey Region, Western Australia**
(*A.H.M.F. Anwar, M. Wong*)
- 1826  **Large Eddy Simulation of Contaminant Dispersion in a Boundary Layer**
(*Keisuke Asakura, Akihiko Nakayama*)
- 1834  **Investigating the Impact of Contaminated Sediments in an Integrated Approach**
(*C. Cofalla*)
- 1842  **Modeling Patterns of Variation in Stormwater Discharge-Induced Water Quality in Lake Pontchartrain**
(*Z.Q. Deng, H.S. Jung*)
- 1849  **Atmospheric Deposition as a Source of Stormwater Pollution in Gold Coast, Australia**
(*Janaka Gunawardena, Prasanna Egodawatta, Godwin A. Ayoko, Ashantha Goonetilleke*)
- 1857  **Continuous Simulation of Suspended Sediment Transportation Along a Stream Section**
(*Iqbal Hossain, Monzur Alam Imteaz*)
- 1865  **The Major Ion and Nutrient Behaviour of Streams on a Dairy Farm, Victoria, Australia**
(*Sh. Saffarpour, R. Adams, A.J. Weatherley, Vera Folkman, M.R. Grace, Andrew W. Western*)
- 1873  **Numerical Simulation of Exchange Flows Through Rigid, Emergent Vegetation**
(*D. Souliotis, P. Prinos*)

3.5 Urban Hydrology

- 1881  **Probabilistic Hydrologic Simulation of Urbanized Catchments with Sparse Data**
(*J. Cantone, Michelle Hollander, A. Schmidt*)
- 1889  **Experimental Study on Validation of Stormwater Interaction Model Between the Ground Surface and Sewerage System**
(*K. Kawaike, H. Nakagawa, Yasuyuki Baba, A. Shimizu*)
- 1897  **A Behavioural Approach for Household Outdoor Water Use Modelling**
(*T. Micevski, M. Thyer, George Kuczera*)
- 1905  **Household Characteristics That Influence Household Water Use in the Hunter Region**
(*D. Orr, T. Micevski, M. Thyer*)
- 1913  **The Impact of Rainwater Tanks on Stormwater Runoff from a Single Lot Development in Western Sydney Based on XP-SWMM Modelling**
(*M. van der Sterren, A. Rahman*)



THEME 4: Responding to Shifting Water Resources

4.1 Decision-Support Systems



- 1921  **A Decision-Making Process for Water Leakage Management Using AHP**
(*Xitlali Delgado-Galván, Julio Benitez, Joaquín Izquierdo, Rafael Pérez-García*)
- 1929  **The Decision Support Tool MINDS for Flood Management in the Upper Rhone River**
(*Javier García Hernández, Anton J. Schleiss, Jean-Louis Boillat*)
- 1937  **Development and Application of a Decision-Support System for Water Resources Distribution in the Wei River Basin**
(*Y.W. Jia, X.H. Lei, Z.H. Zhou, G.Y. Yang, Y.Q. Qiu, C.W. Niu*)
- 1945  **A Level of Service Approach to Guide Planning Decisions for Achieving Water Supply Security in South East Queensland**
(*Dan Spiller*)
- 1953  **Optimal Operation of Selective Withdrawal System Using Fitted-Q Algorithm in a Reservoir**
(*H. Yajima, A.F. Castelletti, R. Soncini-Sessa, E. Weber*)

4.2 Water Resources Management

- 1961  **Towards a Framework for Optimal Operation of Water Grids**
(*S.C. Ashbolt, S. Maheepala, B.J.C. Perera*)
- 1969  **Do Rainwater Tanks Punch Above Their Weight? The Use of a Probabilistic Distributed Demand Model to Estimate the Contribution of Decentralised Water Sources to Supply Security**
(*Russell Beatty, Ian Varley, Pavel Kozarovski*)
- 1977  **Estimating Temporal Soil Moisture Dynamics Using the HYDRUS-1D and IBIS Models**
(*M. Chen, G.R. Willgoose, P.M. Saco*)
- 1985  **Operation Study of Hydraulic Flushing of Shimen Reservoir in Taiwan**
(*Frederick N.-F. Chou, C.W. Wu*)
- 1994  **Salt and Water Balance at the Tutuka Coal-Fired Power Station, Mpumalanga, South Africa and Options for Sustainable Brine Management**
(*D.A. Cobban, D.J. Hanekom, F. Rusinga*)
- 2006  **Optimal Deployment of Pressure Reduction Valves for Leakage Minimization in Urban Water Distribution Systems**
(*C. Covelli, L. Cozzolino, R. Della Morte, D. Pianese*)
- 2014  **Multi-Level Governance and Politics of Innovation Uptake in the Water Sector**
(*Katherine A. Daniell, P.J. Coombes, I. White*)
- 2024  **Optimised Planning for Management of Integrated Surface Water and Groundwater Systems**
(*L.M. Deschaine, V. Guvanasen, J.D. Pinter, L.R. Townley*)
- 2032  **Calibration of Kinetic Constant for Predicting Trihalomethanes Formation in Water Distribution Networks**
(*C. Di Cristo, G. Esposito, A. Leopardi*)







- 2039  **Potential Analyses for Low Head Energy Converters — An Example for Irrigation Canals in Pakistan**
(*Steffi Dimke, Frank Weichbrodt, Peter Fröhle*)
- 2047  **Development of an Input-Output Model for Irrigation and Land Use Management**
(*Eva Fenrich, Fabio Italiano, Manuel Haas, Walter Marx*)
- 2055  **Updating Regional Farm Dam Characteristics for Use Across the Murray Darling Basin**
(*K. Fowler, R. Morden, C. Wiesenfeld, P. Delaney, N. Kiely, L. Walpole, L. Lowe*)
- 2064  **Rainwater Catchment Systems Under Climate Change: An Assessment of Brazilian and Japanese Cases**
(*C.O. Galvão, S. Oishi, R.L.B. Nóbrega, M.S. Dantas*)
- 2070  **An Assessment of Potential Operational Benefits of Short-Term Stream Flow Forecasting in the Broken Catchment, Victoria**
(*B.A. George, R. Adams, D. Ryu, Andrew W. Western, P. Simon, B. Nawarathna*)
- 2078  **Simulation and Optimisation of Integrated Urban Water Management Schemes**
(*A.R. Graddon, George Kuczera, M.J. Hardy*)
- 2086  **Estimation of Rainfall Intensity by Using X-Band Polarimetric Radar with Raindrop Falling Trajectory**
(*K. Hasegawa, S. Suzuki, S. Oishi, T. Sano, K. Sunada*)
- 2094  **Wildfire Impact on Water Yield Within Sydney's Drinking Water Supply Catchments: A Preliminary Assessment of the 2001/2002 Outer Sydney Basin Wildfires**
(*Jessica Heath, Chris J. Chafer, T.F.A. Bishop*)
- 2101  **The Great Artesian Basin Sustainability Initiative — A Decade of Success and Beyond**
(*James Hill*)
- 2106  **Water Scarcity and Climate Change in Greek Islands**
(*E.G. Kolokytha, E.K. Traikapi, Y.A. Mylopoulos*)
- 2114  **New Approach for Estimating the Environmental Risk of a River Basin**
(*K. Latu, J.F. Costelloe, H.M. Malano*)

- 2122  **Short-Term Water Demand Forecasting for the Auckland Region**
(*K. Latu, A.Y. Shamseldin*)
- 2130  **Initialization Policy for Genetic Algorithm in Optimization of Reservoir Operations Using Incremental Dynamic Programming**
(*Fangfang Li, Jiahua Wei, Xudong Fu, Xinyu Wan*)
- 2137  **Application of Dynamic Time Warping Algorithm in Prototype Selection for the Disaggregation of Domestic Water Flow Data into End Use Events**
(*K.A. Nguyen, H. Zhang, R.A. Stewart*)
- 2145  **Integrated River Basin Management with Human Sensitivity and Traditional Water Use**
(*Yosuke Nitta, Toshiharu Kojiri, Keiki Takata, Kozo Fukunari*)
- 2153  **River Water Quality Response to Climate Change**
(*S. Rehana, P.P. Mujumdar*)
- 2161  **Analysis of Chemical Film Monolayers Under Wind and Wave Conditions**
(*P.W. Schouten, C. Palada, C.J. Lemckert, D. Sunartio, D.H. Solomon*)
- 2169  **Estimation of Uncertainty for the Line Items in National Water Account**
(*R. Srikanthan, L. Shelley, S. Comeadow*)
- 2177  **Menindee Lakes — Water Savings, Environmental Flows and Water Supply**
(*J.R. Wall*)
- 2185  **Distribution Evaluation and Optical Allocation Modes of Sediment Resources in Irrigation System of the Lower Yellow River**
(*Yan-gui Wang, Lin Qi*)
- 2193  **Pricing of Urban Water Supply Using the Smart Market Approach**
(*Saleh A. Wasimi, Sabrina Hassa*)
- 2201  **Water Management in the Australian Minerals Industry**
(*D.J. Williams*)









- 2209  **Coastal Reservoirs — A Possible Strategy in Diversifying Water Supplies and Its Case Study in Australia**
(*Shu-Qing Yang*)
- 2217  **Formulation of River Health Index and Its Application**
(*Y. Zhai, G.H. Ni*)

4.3 Flow Conveyance Systems

- 2225  **Turbulence and Mean-Velocity Structure of Flows Over Filamentous Biofilms**
(*J.M. Andrewartha, J.E. Sargison*)
- 2233  **Development of a Canal Model System with Automatic Control**
(*Wenxue Chen, Xiaochen Guo, Wei Cui, Yihong Wu, Jianqiang Xu*)
- 2241  **Canal Controller for the Largest Water Transfer Project in China**
(*Wei Cui, Wenxue Chen, Xiangpeng Mu, Xiaochen Guo, Qi Wang*)
- 2249  **Analysis of Surge Effects Caused by Inlet Altitude Valves Operation Under Different Demands Along a Water Main System**
(*V. Diniz, P. Souza, E. Luvizotto Junior*)
- 2257  **Particle Image Velocimetry of a Y-Bifurcator**
(*W. Dobler, G. Zenz*)
- 2265  **Least Cost Design of Water Distribution Networks Under Uncertainty of Nodal Demands**
(*S.R. Dongre, Rajesh Gupta, P.R. Bhawe*)
- 2273  **The Effect of Random Inhomogeneities of Pipe Cross-Sectional Area on Wave Propagation**
(*H.-F. Duan, J.L. Lu, A.A. Kolyshkin, M.S. Ghidaoui*)
- 2281  **Water Surface Profile and Hydraulic Jump Along a Side Weir**
(*S. Farhadi Rad, M.R. Jalili Ghazizadeh, J. Attari*)
- 2289  **Monitoring of Steel-Lined Pressure Shafts Using Water-Hammer Records and Wavelet Filtering and Decomposition**
(*F.H. Hachem, Anton J. Schleiss*)
- 2298  **Investigations on Self-Cleaning Culvert Designs**
(*H.-C. Ho, M. Muste, R. Ettema*)



- 2306  **Negative Surge in Open Channel: Physical, Numerical and Analytical Modelling**
(*M. Reichstetter, H. Chanson*)
- 2314  **Beware the Roughness of Riprap**
(*C.A. Russell, L. Toombes, J.T. Riley, C. Johnson*)
- 2322  **Numerical Limitations of Hydraulic Models**
(*L. Toombes, H. Chanson*)
- 2330  **Assessment of Morphological Properties of a Braided River Predicted by a Process-Based Model**
(*H.Y. Yang, B.L. Lin, J.J. Zhou*)
- 2338  **Sufficient Conditions for the Passivity of Numerical Unsteady Friction Operators for Transient Pipe Flow**
(*Aaron C. Zecchin, Pedro J. Lee*)
- 2346  **Hydraulic Characteristics of Flows in Stepped Spillway Tunnel with Curved Shape**
(*Jian-min Zhang, Jian-gang Chen, Gang Lei, Fei Yu, Lu Liu*)

4.4 Hydraulic Structures & Machinery

- 2354  **An Experimental Study of Flow Depth and Energy Losses on Stepped Spillway of 45 Degree of Slope**
(*Nadjadji Anwar, Edijatno, Very Dermawan*)
- 2364  **Potential for Using the Floating Body Structure to Increase the Efficiency of a Free Stream Energy Converter**
(*W.M.J. Batten, G.U. Müller*)
- 2372  **Design and Stability of a Floating Free Stream Energy Converter**
(*W.M.J. Batten, Frank Weichbrodt, G.U. Müller, J. Hadler, C. Semlow, M. Hochbaum, Steffi Dimke, Peter Fröhle*)
- 2380  **Non-Intrusive Measuring of Air-Water Flow Properties in Self-Aerated Stepped Spillway Flow**
(*D.B. Bung*)
- 2388  **Air Entrainment and Scale Effects in Hydraulic Jumps with Small Froude Numbers**
(*Y. Chachereau, H. Chanson*)
- 2396  **Arced and Linear Projecting Labyrinth Weirs in Reservoir Applications**
(*B.M. Crookston, B.P. Tullis*)
- 2404  **Dynamic Response of a Rock Block in a Plunge Pool Due to Asymmetrical Impact of a High-Velocity Jet**
(*M.P.E.A. Federspiel, E.F.R. Bollaert, Anton J. Schleiss*)
- 2412  **Energy Dissipation and Air Entrainment on Stepped Spillways with Non-Uniform Cavity Sizes**
(*S. Felder, H. Chanson*)
- 2420  **Laboratory Studies on the Cavitation Potential of Stepped Spillways**
(*K.W. Frizell, F.M. Renna*)





- 2428  **3D-Numerical Optimisation of an Asymmetric Orifice in the Surge Tank of a High-Head Power Plant**
(*R. Gabl, S. Achleitner, J. Neuner, H. Götsch, Markus Aufleger*)
- 2436  **Newly Achievements on Dam Hydraulic Research in China**
(*Jizhang Gao, Zhiping Liu, Jun Guo*)
- 2444  **Performance of Circular Drop Manholes in Ventilation Absence**
(*F. Granata, G. de Marinis, R. Gargano, W.H. Hager*)
- 2452  **Bubble Clustering in a Large-Size Dropshaft: Comparative Analysis of Different Cluster Criteria**
(*C. Gualtieri, H. Chanson*)
- 2460  **Some Observations on Submerged Hydraulic Jumps with Blocks**
(*A. Habibzadeh, M.R. Loewen, N. Rajaratnam*)
- 2468  **Evaluation of Vortex-Suppressing Devices Installed in Intake Channel of Hydropower Facility Using LES**
(*N. Hisasue, Akihiko Nakayama*)
- 2476  **Development of Large Scale Vortex Around T-Type and L-Type Groynes**
(*A. Kadota, K. Suzuki*)
- 2484  **Observations on Jet-Flipping in Localized Scour by 2-D Wall Jets**
(*Siow-Yong Lim, Chen Xie*)
- 2492  **Influence of the Alveoli Slopes on the Discharge Capacity of Piano Key Weirs**
(*O. Machiels, S. Erpicum, P. Archambeau, B. Dewals, M. Piroton*)
- 2499  **Evaluation of Hydrodynamic Force on Solidly Connected Natural Stone and Proposal of Its Design Method**
(*S. Maeno, K. Kaseguma, A. Yamamura*)
- 2507  **Extension of Siphon Operation Range**
(*C. Mateos, V. Elviro, D. Cordero, T. Ramos*)

- 2515  **Experimental Study on Scour Due to Simultaneous Wall and Impinging Circular Jet**
(*M. Mehraein, M. Ghodsian, Anton J. Schleiss*)
- 2522  **Experimental Study of Back Flushing of Trash Racks**
(*H. Nøvik, O. Jørstad, L. Lia*)
- 2530  **Application of Annular Aerators in Tunnels**
(*M.J. Ostadmirza, A.R. Zarrati, R. Roshan, K. Safavi*)
- 2538  **Analysis of Scour Characteristics in Presence of Aerated Crossing Jets**
(*S. Pagliara, M. Palermo, D. Roy*)
- 2546  **Plunge Pool Scour with 3D Protection Structures**
(*S. Pagliara, D. Roy, M. Palermo*)
- 2554  **Effect of Pre-Aerated Approach Flow on Deflector-Generated Jets**
(*M. Pfister, J. Lucas, W.H. Hager*)
- 2562  **Optimization of Splitters to Reduce Scouring Downstream of Overflow Spillways**
(*K. Safavi, A.R. Zarrati, S. Ghafoori, A.R. Karaminejad*)
- 2569  **Laboratory Investigation of Hydraulic Effects of End Sills on Energy Dissipation Over Stepped Spillways**
(*S. Sedaghatnezhad, A. Shamsai, H. Kiafar*)
- 2577  **An Experimental Study on the Effect of Under-Scouring Depth and Horizontal Spacing Between Two Bed Protection Blocks on the Stability of Frontal Block**
(*Prem Shah, N. Tanaka, Junji Yagisawa*)
- 2585  **Hydraulic Model Study of Screening Facility Upgrade at Eastern Treatment Plant**
(*L.P. Sue, R.J. Keller, F.B. Winston*)
- 2593  **Drag Coefficients of Bodies in Aerated Flows on Stepped Channels**
(*M. Takahashi, I. Ohtsu*)
- 2601  **Reinventing the Wheel: The Return of the Cascade Dropshaft**
(*L. Toombes*)

- 2609  **Effects of Entrained Air Manner on Cavitation Damage**
(*Jianhua Wu, Chao Luo*)
- 2616  **Impact of Grain Size Distribution on Bed Topography Around a Groyne**
(*H. Zhang, H. Mizutani, H. Nakagawa*)

4.5 Urban Water Cycle Management Including Drainage

- 2624  **Comparison of 3D Numerical Modelling with an Experimental Scaled-Model of Urban Flooding**
(*R.F. Carvalho, M. Oertel, T. Motz, R. Martins, J. Leandro*)
- 2631  **Towards Sustainable Cities — Integrated Water Cycle Management (IWCM) at the Existing Principal Activity Centre at Doncaster Hill**
(*P.J. Coombes, A. Cullen, K. Bethke*)
- 2639  **The Effect of Pipe Wall Roughness and Network Geometry on the Design and Performance of Pressurised Sewerage Networks**
(*S. Gharavi, V. Chin*)
- 2647  **Variability of Input Parameters Related to Pollutants Build-Up in Stormwater Quality Modelling**
(*A. Liu, Prasanna Egodawatta, Ashantha Goonetilleke*)
- 2655  **Sediment Blockage Testing of Permeable Pavements**
(*T. Lucke, Simon Beecham*)
- 2663  **Odor Control Modeling in Sewage Drop Structures and Tunnels**
(*T.C. Lyons, A.J. Odgaard, M. Muste, S. Cowden, K. Nielsen, S.H. Orakzai*)
- 2671  **A Comprehensive Investigation into the Hydrodynamic and Capture/Retention Performance of a Gross Pollutant Trap**
(*J.T. Madhani, R.J. Brown*)
- 2679  **The Impact of Residential Source Management Practices (SMPs) on Sewer Pipe : A Review**
(*N. Marleni, S. Gray, A. Sharma, S. Burn, Nitin Muttill*)
- 2687  **Urban Water Cycle Management In Beaudesert — Stormwater Management Perspective**
(*S. Oldridge, J. Trail, B. O'Loan*)

- 2696  **Flow Configurations in Stormwater Pits**
(*Xiaohang Pang, Geoffrey O'Loughlin*)
- 2704  **Assessing Flood Risks in a Regional Shopping Centre in Sydney, Australia**
(*B.C. Phillips, S. Yu*)
- 2712  **An Estimation of Head Loss Coefficient at Surcharged Combining Junction Manholes**
(*Ju Il Song, Jung Soo Kim, Chang Soo Rim, Sei Eui Yoon*)
- 2720  **Managing Urban Regrowth with an 'at Capacity' Stormwater Infrastructure**
(*A. Tennakoon, J.R. Argue*)

4.6 Wastewater Treatment

- 2728  **Development of a Sewerage Infrastructure Buffer Assessment Tool for Local Authorities**
(*Julia Cheong, Patrick O'Flaherty, Les Dawes, Yin Foong*)









THEME 5: Environmental Hydraulics and Hydrology

5.1 Ecohydraulics Including Low Flows

- 2736  **A Numerical Model for Fish Movement Through Culverts**
(*S.M. Abdelaziz, R. Jhanwar, M.D. Bui, P. Rutschmann*)
- 2744  **Influence of Leaf Mass on Drag Forces in Vegetated Flows**
(*J. Aberle, T. Schoneboom, B. Rhiner*)
- 2752  **Modelling and Analysis of Hydropeaking in Alpine Catchments Equipped with Complex Hydropower Schemes**
(*M. Bieri, Anton J. Schleiss*)
- 2760  **Visual Effects of Waterfalls Affected by Water Diversion**
(*R.M. Boes, P.H. Hiller, Å. Killingtveit*)
- 2768  **Turbulence Kinetic Energy Dissipation Rate Estimation from PIV Velocity Fields: Application to the Study of the Flow in Vertical Slot Fishways**
(*D. Calluau, L. David, G. Pineau, A. Texier, M. Larinier*)
- 2776  **Experimental Characterization of the Flow Across Fish-Friendly Angled Trashrack Models**
(*L. Chatellier, R.-W. Wang, L. David, D. Courret, M. Larinier*)
- 2784  **Optimization of Reservoir Operation Considering Both Hydropower Generation and Ecological Flow Requirement**
(*Duan Chen*)
- 2792  **Behavioural Experiments on the Design of Downstream Fish Passage Facilities for Potamodromous Species**
(*M. Cuchet, M. Mühlbauer, C. Ratschan, A. Hartlieb, B. Brinkmeier*)
- 2799  **Optimising the Porters Creek IWC Strategy for Management of Wetland Hydrology**
(*N.M. Evans, B.C. Phillips, L.R. Evans*)

- 2807  **Sediment Dynamics in a Laboratory Channel with Bank Vegetation**
(*S. Gorricks, José F. Rodríguez*)
- 2815  **Temperature Regime in a Braided River System: An Indicator for Morphological Heterogeneity and Ecological Potential**
(*W. Gostner, A. Peter, Anton J. Schleiss*)
- 2823  **Substantially Better Than Nothing: A Case Study of an Initial Environmental Flows Assessment Establishing Instream Flow Requirements for an Ephemeral, Pristine Stream in Australia**
(*G. Hadzilacos, May-Le Ng, K. Taske, A. Small, B. Loney*)
- 2831  **An Experimental Study on Hydraulic Stability of Vegetation Mat at Multi-Functional River Experiment Station in Korea**
(*S.D. Hwang, E.J. Han, J.M. Kim, Y.D. Kim, J.H. Park*)
- 2838  **Sediment Replenishing Measures for Revitalization of Japanese Rivers Below Dams**
(*S.A. Kantoush, T. Sumi*)
- 2847  **Investigation of Recovery Techniques of Ecology Potential Downstream from a Dam Using Bed Form Improvement**
(*Eito Kase, S. Maeno*)
- 2855  **Biofilm Growth and Hydraulic Conditions in Sewers**
(*F. Larrarte, M.-N. Pons*)
- 2862  **Fate and Transport of Suspended Particulate Discharged into Marine Environments via Ocean Outfalls**
(*A. Mariani, W.C. Glamore*)
- 2870  **Mitigating the Drowning Hazard at the Salmon River Sea Lamprey Barrier**
(*K.A. Mazurek, M. Amos, J. Thomson, Arif Akhtar, A. Hallett*)

- 2878  **H-ADCP Flood Routing and Flow Modeling for Evaluation of Flow Conveyance Capacity in a Tree-Vegetated River Channel**
(*K. Michioku, Hitoshi Miyamoto, K. Kanda, Y. Ohchi, K. Aga, J. Morioka, T. Uotani, K. Yoshida, S. Yoshimura*)
- 2886  **Understanding the Flow Pathways Through the Macquarie Marshes**
(*T.N. Morrison, S.C. Rayburg, C. Allery, M.D. Atiquzzaman*)
- 2893  **Effects of Suspended Solids Concentration and Particle Size on Survival and Gill Structure in Fish**
(*K. Muraoka, K. Amano, Jyunji Miwa*)
- 2901  **Ensuring Effective Rehabilitation and Translocation: Genetic Diversity of Freshwater Sculpins (*Cottus Pollux*)**
(*K. Muraoka, S. Yamashita, M. Nakayama, Jyunji Miwa*)
- 2907  **Effects of Flush Discharge Hydrographs on the Removal of Attached Algae**
(*Y. Nakadoi*)
- 2915  **Effects of Regularly Arrayed Roughness on Flow Resistance and Turbulent Flow Structure in an Open Channel**
(*Terunori Ohmoto, T. Sukarno*)
- 2923  **Investigating the Role of Fish Rocks on the Movement of Sand Over Gravel Bed Rivers**
(*A.N. Thanos Papanicolaou, M. Elhakeem, D. Dermisis, A. Tsakiris*)
- 2931  **Flow Characteristics in Vegetated Compound Channels**
(*X. Sun, K. Shiono, T.L. Huang, X.Y. Fu*)
- 2939  **Study on Change of Fish Habitat Based on Instream Flow Incremental Methodology**
(*Yanping Tan, Yurong Wang, Jia Li, Kefeng Li, Min Liu*)
- 2947  **Flow Resistance and Momentum Transport in Open Channel with Longitudinally Discontinuous Vegetation**
(*T. Tanaka, Terunori Ohmoto*)

- 2954  **Influence of One-Line Vegetation on the Edge of Floodplain on Velocity and Boundary Shear Stress Distributions in Compound Channel**
(*B. Terrier, Y. Peltier, K. Shiono, A. Paquier, N. Rivière*)
- 2962  **Effect of Reynolds Number on the Propagation of Lock Exchange Gravity Currents in a Porous Medium**
(*T. Tokyay, Y.A. Mohamed, G. Constantinescu*)
- 2970  **Effects of Configuration on Flow Structures and Sediment Deposition in a Concavity Zone of Flood Plain**
(*A. Tominaga, J. Jong*)
- 2978  **Vegetative Drag in Natural, Foliated Plant Stands**
(*K. Västilä, J. Järvelä, J. Aberle, T. Schoneboom*)
- 2986  **Impacts of Regulation on Low Flow Ecological Habitat**
(*G.J. Vietz, M. Sammonds, M.J. Stewardson*)
- 2994  **Study on Fish Habitat Changes in Reducing Reach of Long Diversion Type Hydropower Station**
(*Yurong Wang, Jia Li, Kefeng Li, Yanping Tan*)
- 3002  **Hydraulic and Hydrologic Investigations into Vegetation Recruitment on "White" Sandbars at Historical Village of Hahoe on the Nakdong River, Korea**
(*Hyoseop Woo, Ji-Sung Kim, Kang-Hyeon Cho, Hyeong-Jin Cho*)
- 3010  **Using Hydrodynamic Modelling Tools to Optimise the Design of Fishways in Victoria**
(*Y. Zhu, J.R. Rennie, C.M. Beardshaw, F. Donohue*)






5.2 Ecohydrology

- 3018  **A Landscape Approach to Assess Impacts of Hydrological Changes to Vegetation Communities of the Tonle Sap Floodplain**
(*M.E. Arias, T.A. Cochrane, B. Caruso, T. Killeen, M. Kumm*)
- 3026  **An Eco-Hydrological Investigation of Stream Fish Habitat in the Lac de Gras Watershed, N.W.T., Canada**
(*A.B.M. Baki, M.F. Hulsman, B.D. Lunn, D.Z. Zhu, W.M. Tonn, K.L. Howland*)
- 3036  **Potential Impacts of Water Resource Development on Soil Character in a Semi-Arid Floodplain-Wetland Complex**
(*T. Carroll-Macdonald, S.C. Rayburg, M. Neave*)
- 3044  **Variation in Seedling Emergence and Mortality Amongst Key Habitat Types in a Semi-Arid Floodplain-Wetland Complex**
(*A. Cook, S.C. Rayburg, S.J. Capon, A. Leigh*)
- 3052  **Characterising Flow Stress Due to Farm Dams in the Murray Darling Basin**
(*K. Fowler, R. Morden, M.J. Stewardson, K. Williams, L. Lowe, R.J. Nathan, L. Walpole*)
- 3060  **Field Research on the Appropriate Growth Conditions for *Zostera* Bed**
(*M. Fujiwara, M. Miyagawa, Y. Suenaga*)
- 3068  **Restoration of the Geomorphic Activity in the Middle Ebro River Floodplain Using Numerical Simulation**
(*M. González-Sanchis, J. Murillo, F. Comín, P. García-Navarro*)
- 3075  **The Effect of Flood Frequency and Soil Character on the Distribution of a Perennial Shrub, Lignum (*Muehlenbeckia Florulenta*)**
(*R.J. Herron, S.C. Rayburg, S.J. Capon*)
- 3082  **Study on the Preservation of *Zostera Marina* Beds Behind Detached Breakwater**
(*H. Komatsu, T. Ueda, M. Fujiwara, H. Kakegawa, Y. Suenaga*)

- 3089  **A Stochastic Model for Vegetation Dynamics in Interaction with Flood Events**
(*Hitoshi Miyamoto, K. Kanda, K. Michioku, J. Morioka, T. Uotani, Y. Ohchi, K. Aga*)
- 3097  **Linking Surface Hydrological Connectivity Patterns with Landscape Functionality in Semiarid Australian Ecosystems**
(*M. Moreno-de las Heras, P.M. Saco, G.R. Willgoose*)
- 3105  **Interpreting the Ability to Meet Daily Environmental Flow Recommendations from Monthly Water Resource Models**
(*B.P. Neal, S. Lang, S.A. Treadwell*)
- 3113  **Factors Affecting the Increase of Riparian Woody Vegetation and Adapting Management Practices in Gravel-Bed Rivers in Japan**
(*Shigeki Sanuki, Tetsuya Ohishi, Yoshinori Yajima, Junji Miwa*)
- 3121  **Definition of Middle Class Flood Disturbance for Increasing Biodiversity at Gravel Bar**
(*N. Tanaka, Y. Kikuji, Junji Yagisawa*)
- 3129  **Effect of Hyporheic Flows Induced by Alternate Bars on Benthic Oxygen Uptake**
(*D. Tonina, A. Marzadri, A. Bellin*)
- 3137  **New Tools for Aquatic Habitat Modeling**
(*D. Tonina, J. McKean, C. Tang, P. Goodwin*)
- 3145  **Simulation on the Water Transporting Process in Zoige Wetland SPAC System and Its Eco-Hydrological Effect**
(*Yan Wang, Guodong Liu, Hongliang Hu*)
- 3153  **The Influence of Physical Factors on Channel Morphology and Geomorphic Diversity**
(*A. White, S.C. Rayburg, M. Neave*)
- 3160  **Research on Improvement of Bottom Sediment Environment by Porous Material**
(*M. Yamanaka, K. Yasuoka, T. Nagatomi, H. Kakegawa, Y. Suenaga*)
- 3168  **Water Pollution Control Technology and Project for Shallow Lakes in the River Network**
(*Y.M. Zhang, Y.C. Zhang, Y.X. Gao*)

5.3 Water Quality Modelling

- 3175  **Modelling Phosphorus Sorption Processes in Kuwait Bay: Effects of Sediment Grain Size**
(*Y. Alosairi, E. Al Enezi, Roger A. Falconer, J. Imberger*)
- 3183  **A CFD Model to Evaluate the Effect of Sluiceway Deflectors on the Hydrodynamics and TDG Field in the Tailrace of Hells Canyon Dam**
(*A. Arenas Amado, Marcela Politano, K. Anderson*)
- 3191  **Modelling Climate Change Impact on the Salinity Distribution in Coastal Zone: A Case Study in Bangladesh**
(*Md. Javed Abdul Naser Bhuiyan, Dushmanta Dutta*)
- 3199  **Long-Term Predicting Model for Stream Temperature Variation in a Mountainous River**
(*Yuki Kajikawa, H. Yajima*)
- 3207  **Lake Wellington Salinity: Investigation of Management Options**
(*A.R. Ladson, M.A. Hillmacher, S.A. Treadwell*)
- 3215  **Effects of Large Water Level Fluctuations on Water Quality in Subtropical Reservoirs**
(*R.K. Laursen, B. Gibbes, A. Grinham, D. Gale, J. Udy, D. Lockington*)
- 3223  **3-Dimensional Hydrodynamic and Water Quality Simulation at Weir Section in Geum River Using EFDC-WASP**
(*J.M. Lee, H.J. Noh, Y.D. Kim, H.S. Lee*)
- 3231  **A Geostatistical Comparison Between Routine and Event-Based Water Quality Sampling**
(*J.S. Lessels, T.F.A. Bishop*)
- 3239  **Effluent Plume Dynamic During the Upwelling in the Southeastern Adriatic**
(*G. Loncar, E. Ocvirk, V. Andročec*)
- 3247  **A Stream Order Network Model for Predicting Basin-Wide Distribution of Stream Temperatures**
(*Hitoshi Miyamoto, K. Michioku, Hiroshi Maeba, Kazuya Nakayama*)

- 3255  **Development of Modeling System to Simulate Hydrodynamic and Environmental Quantities in the Hai Phong Estuary, Vietnam**
(*Kim Cuong Nguyen, Van Uu Dinh, Motohiko Umeyama*)
- 3263  **Numerical Simulation of Heterogeneous Mixing in Meandering Channels**
(*Il Won Seo, In Hwan Park, Sung Won Park, Jae Hyun Shin*)
- 3271  **Fate and Transport Modelling of Microbial Pollution in a Lake Used as a Drinking Water Source**
(*E. Sokolova, C. Borell Lövestedt, T.J.R. Pettersson*)
- 3279  **A 3D Numerical Model to Evaluate the Effect of Shutting Down a Once-Through Cooling System on the Ice Transport to Existing Intakes**
(*Yushi Wang, Marcela Politano, M. Muste, Jeff Stallings, Frank Michell*)
- 3288  **Applying SWAT for Non-Point Source Pollution Simulation to a Data Scarce Catchment in China**
(*X.H. Zhang, H.X. Li, Y. Chen, T.Q. Ao*)

5.4 Fluvial Hydraulics

- 3296  **Numerical Investigation of Flow and Sediment Transport Around a Circular Bridge Pier**
(*S.M. Abdelaziz, M.D. Bui, P. Rutschmann*)
- 3305  **Use of Evolutionary Computing for Predicting Sediment Transport of Malaysian Rivers**
(*Nadiatul A. Abdul Ghani, Mohamed A. Shahin, Hamid R. Nikraz*)
- 3313  **Time Resolved PIV Analysis of the Initial Stages of the Dam Break**
(*R. Aleixo*)
- 3321  **Flow Resistance of Vegetated Oblique Weir-Like Obstacles During High Water Stages**
(*S. Ali, W.S.J. Uijttewaai*)
- 3330  **Experimental and Numerical Modelling of Scour at Bridge Piers**
(*I. Andrés-Doménech, F.J. Vallés Morán, G. Palau-Salvador, Hans Bihs, Alberto Fernández Ortego, E. Albentosa Hernández, J. Martínez Corral*)
- 3338  **Measurements of the Turbulent Velocity Field in a Non-Uniform Open Channel**
(*C.J. Apelt, Qi Xie*)
- 3346  **Mound Formation by Slurry Jets on a Slope in a Water Pond**
(*A.H. Azimi, J. Cai, N. Hall, H. Oshikawa, D.Z. Zhu, N. Rajaratnam*)
- 3354  **Coherent Structure and Particle Turbulence Interaction in Suspended Sediment-Laden Laboratory Open-Channel Flows**
(*Fereshteh Bagherimiyab*)
- 3362  **Turbulence and Fine Sediment Suspension in Accelerating and Decelerating Open-Channel Flow**
(*Fereshteh Bagherimiyab, Ulrich Lemmin*)
- 3370  **Residual Flow Modelling: An Advance in Channel Resistance Calibration**
(*A.G. Barnett, C. Hellberg*)

- 3378  **A Large-Scale Particle Image Velocimetry for Resolving Unsteady Flow Features at Cylinders**
(*K. Basnet, R. Ettema*)
- 3388  **Refining Parameterization of Bar Vegetation Roughness Based on in-situ-Measurements of Vegetation Bending During Flood Events**
(*B. Blamauer, M. Klösch, M. Tritthart, H. Habersack*)
- 3396  **Monitoring Braided River Morphodynamics with an Acoustic Doppler Current Profiler**
(*J. Brasington, C.D. Rennie, D. Vericat, R. Williams, B. Goodsell, M. Hicks, R. Batalla*)
- 3404  **Direct Shear Stress Measurements in Open Surface Flows**
(*E. Carvalho, R. Maia, M.F. Proença*)
- 3411  **Strong Turbulence and Free Surface Interaction in a Grid-Stirred Tank**
(*L. Chiapponi, S. Longo*)
- 3419  **Suction Effects on Bridge Pier Scour**
(*Yee-Meng Chiew, Min Qi*)
- 3427  **Impact of Floodplain Vegetation on Morphological Process in the Straight Compound Open-Channel: A Numerical Study**
(*Sung-Uk Choi, Hyedeuk Bae*)
- 3434  **Downstream Control and the Interdependence of Pool-Riffle Units**
(*G.A.M. de Almeida, José F. Rodríguez*)
- 3442  **Skin Friction and Form Drag Contributions to Total Resistance and Its Calculation**
(*N. Dharmasiri*)
- 3450  **Experiments and Simulations of Dam Break Over Fixed and Granular Beds**
(*S. Evangelista, C. Di Cristo, G. de Marinis*)
- 3458  **Development Time of Dunes Under Time-Varying Flows**
(*A.M. Ferreira da Silva, J. Bielenberg*)

- 3466  **Inferring Channel Bed Topography from Known Free Surface Data**
(*A.F. Gessese, M. Sellier, E. Van Houten, G. Smart*)
- 3473  **Influence of Immobile Boulders on Bedload Transport in a Steep Flume**
(*T. Ghilardi, Anton J. Schleiss*)
- 3481  **Study of Unsteady Flow Generated by Boat Motion, Quantification of the Impacts on Riverbank Erosion**
(*G. Gomit, D. Calluad, L. David, R. Lafite, J. Deloffre, O. Blanpain, A. Ezersky*)
- 3489  **In-Depth Observations on the Formation and Disintegration of a Cluster Microform**
(*K.G. Heays, H. Friedrich, B.W. Melville*)
- 3497  **Evolution of Maximum Scour Depth Downstream of a Grade-Control Structure During a Flood**
(*Jian-Hao Hong, Jau-Yau Lu, Kai-Po Chang, Chih-Chiang Su*)
- 3505  **Determining Resistance Coefficients for Ice-Covered Rivers from Observed Velocity Profiles**
(*A. Hoque, S.S. Li*)
- 3513  **Numerical Simulation of NSF PIRE Benchmark with a Two-Phase Depth-Integrated Model**
(*M. Iervolino, M. Pontillo, A. Leopardi, M. Greco*)
- 3521  **Vorticity, Turbulence and Scour: Measurements from a Laboratory Channel Bend with Stream Barbs (Submerged Groynes)**
(*E.C. Jamieson, C.D. Rennie, R.D. Townsend*)
- 3529  **Two-Dimensional Hydraulic Modelling of the Tully River**
(*A. Joorabchi, D. Pokarier, R. Ayre, G. Rodger*)
- 3537  **The Impacts of a Groyne Field on Secondary Flow Phenomena in a High Curvature Bend**
(*S. Kashyap, G. Constantinescu, C.D. Rennie, R.D. Townsend*)
- 3545  **Spatial Variation of Coherent Turbulent Flow Structure Inside Ingoing Multi-Bend River Meander**
(*Alireza Keshavarzi, F.S. Esfahani*)

- 3553  **Stochastic Modelling of Bursting Process at Threshold Conditions**
(*Alireza Keshavarzi, Mohammadi Gholamreza, J.E. Ball*)
- 3561  **Discharge Measurement Method at Night Time Using the Surface Image Velocimetry (SIV)**
(*Seojun Kim, Kwonkyu Yu, Byungman Yoon, Jinho Lee*)
- 3566  **Possibilities and Restrictions for the Deployment of Basket Samplers Used for Bedload Transport Measurements**
(*A. Kreisler, H. Seitz, H. Habersack*)
- 3574  **Flow Characteristics in Wake Zone of a Pier Founded in Clay-Sand-Gravel Mixture**
(*Ajay Kumar, Rajesh K. Jain, Umesh C. Kothiyari*)
- 3582  **Effect of Relative Sediment Size on Clear-Water Equilibrium Scour Depth at Single Cylindrical Piers**
(*R. Lança, C. Fael, A. Cardoso*)
- 3590  **Influence of Tributary Widening on Morphology and Hydraulic Variability in Confluence Zones**
(*M. Leite Ribeiro, K. Blanckaert, Anton J. Schleiss*)
- 3598  **A Comparative Study of Capacity and Non-Capacity Models for Bed Load Sediment Transport by Unsteady Flows**
(*Zhijing Li, Zhixian Cao, Gareth Pender, Peng Hu*)
- 3606  **Measured and Modelled Transport Paths of Artificial Tracer Stones at a Large Gravel Bed River**
(*M. Liedermann, M. Tritthart, H. Habersack*)
- 3613  **Pitot-Static Tubes for Velocity and Pressure Measurement in Hole Erosion Test (HET)**
(*M. Lüthi, R.G. Millar, R.J. Fannin*)
- 3619  **Flow Resistance Over Plane Bed with Intense Sediment Transport**
(*V. Matoušek, J. Krupička*)




- 3627  **Detached Hydraulic Jump Upstream a Fixed Obstacle in Supercritical Flow**
(*E. Mignot, N. Rivière, K. Chakraborty*)
- 3635  **Sediment Transport Modelling in a Tropical River System**
(*M. Miloshevic, E.M. Valentine*)
- 3643  **On the Erosion Due to Inclined Jets**
(*L. Minatti, E. Paris, L. Solari*)
- 3651  **A Physical Modeling of Bottom Frictional Resistance on a Hydraulic Bore Propagating in an Open-Channel**
(*Hitoshi Miyamoto, Akira Kadota, Kouichi Morimoto*)
- 3659  **On the Use of Horizontal-ADCPs for Sediment Flux Measurements in Rivers**
(*S.A. Moore, J. Le Coz, D. Hurther, A. Paquier*)
- 3667  **Time and Space Analysis of Entrainment on Density Currents**
(*H.I.S. Nogueira*)
- 3675  **Flow Over a Rectangular Side Weir in an Open Channel and Resulting Discharge Coefficients**
(*M. Oertel, R.F. Carvalho, R.H.A. Janssen*)
- 3682  **Drag Coefficients and Forces for Boulders on Block Ramps**
(*M. Oertel, S. Peterseim, Andreas Schlenkhoff*)
- 3690  **On Rheology of Hyper-Concentrated Sediment Laden Flow Over Dune Type Bed in Open Channel**
(*Terunori Ohmoto, Liany Hendratta*)
- 3698  **Laboratory Experiments on Debris Flows in a Rectangular Culvert**
(*Joongcheol Paik, Youngil Kim*)
- 3706  **Field Evaluation of a Pool Sustainability Predictor in Gravel Bed Rivers**
(*S. Parkinson, D. Caamaño, P. Goodwin, R. Benjankar*)

- 3714  **Effect of Different Inlet Flow Conditions on Turbulence in a Straight Compound Open Channel**
(*S. Proust, Y. Peltier, J. Fernandes, J.B. Leal, F. Thollet, M. Lagouy, N. Rivière*)
- 3722  **Reevaluating on Foundation Scour of Bridge Immediately Below the Three Gorges Dam — Case Study**
(*M. Qi, H. Guo, J. Wu*)
- 3730  **Logarithmic versus Q-Based Flow Resistance Equations**
(*A. Recking, D. Rickenmann*)
- 3737  **Sediment Transport in a Northern Regulated Semi-Alluvial River**
(*C.D. Rennie, M.R. Ahsan, M. St. Laurent*)
- 3745  **Experimental Characterization of Flow Reattachment Downstream Open Channel Expansions**
(*N. Rivière, S. Gautier, E. Mignot*)
- 3753  **Temporal Variations of Scour Dimensions by Turbulent Impinging Jets**
(*S. Amin Salamatian, Masood Godsian, Mojtaba Karimae, Elham Foyouz, M.R. Pirestani*)
- 3761  **Studies on Hydrodynamic Erosion with Soil Protrusion Apparatus**
(*Sarik Salim, Ravindra Jayaratne*)
- 3769  **Floodplain Morphology at the Austrian Danube and Its Impact on Flood Hydrology and Hydraulics Applying the New FEM-Method**
(*B. Schober, C. Hauer, H. Habersack*)
- 3777  **Velocity Distribution in a Channel for Erosion Research in Cohesive Soils**
(*Haoyin Shan, Andreas Wagner, Kornel Kerenyi, Junke Guo*)
- 3785  **Time-Resolved Tomo-PIV Measurements to Study 3D Coherent Structures in a Pulsed Jet in Cross-Flow**
(*L. Thomas, R. Vernet, B. Tremblais, L. David*)
- 3793  **Variability in Measured and Simulated Bed Load Transport at a Large Gravel Bed River**
(*M. Tritthart, M. Liedermann, H. Habersack*)

- 3801  **Study on the Impact of tidal Behaviour on the Characteristics of Water Quality in Hori River**
(*Regmi Ugendra, Takeda Makoto, Matsuo Naoki*)
- 3808  **Horizontal Mixing in Shallow Flows**
(*W.S.J. Uijtewaal*)
- 3815  **Multi Fractioned Sediment Transport Modelling — An Approach Towards an Optimum Discretisation of Grain Size Distributions**
(*L. Umach, Robert Klar, S. Achleitner, Markus Aufleger*)
- 3823  **Porosity Model of Flow Through an Idealised Urban District Influence of City Alignment and of Transient Flow Character**
(*M. Velickovic, S. Soares-Frazão, Y. Zech*)
- 3831  **Comparison of 2D Laser Scanning with 3D Magnetic Resonance Imaging (MRI) Scanning; Analysis of Graded Gravel Bed Porosity**
(*E. Vignaga, A. Ockelford, H. Haynes, W.M. Holmes, D. Bertram*)
- 3839  **Invalidity of Classical Log-Law and Its Mechanism**
(*Shu-Qing Yang*)
- 3847  **Turbidity Maximum and Secondary Flow in a Cross-Section of a Meandering Estuary: Chikugo River, Japan**
(*Katuhide Yokoyama, Yu Kaneko, Kouichi Yamamoto*)
- 3853  **Characteristics of Sediment Transport by Flood Events in the Lower Yellow River**
(*Yanyan Zhang, Baosheng Wu, Xudong Fu*)
- 3861  **Effect of Air Release Height on the Formation of Sediment Thermal in Water**
(*B. Zhao, A.W.K. Law, E.E. Adams, D.D. Shao, Z.H. Huang*)
- 3869  **Hydrodynamic Erosion Process of Undisturbed Clay**
(*Gensheng Zhao, Paul J. Visser, Han J.K. Vrijling*)
- 3877  **Physical Modeling of the Impacts of Construction of Dongting Lake Railway Bridge on the River Regime and Riverbed Development**
(*Y.H. Zhu, H. Zhang, L.H. Gu, F.Z. Li, Y. Feng*)

THEME 6: Professional Development: Bridging the Gap between Research and Practice




6.1 University Education

- 3886  **Natural Hazards Education Using Regional Environment Simulator**
(*Han Soo Lee, Fei Ding, Hendri, Takao Yamashita*)
- 3894  **Experiences in Conducting On-Line Courses in Hydroinformatics**
(*I. Popescu, A. Jonoski*)
- 3900  **University Education in Hydraulic Engineering: A View from the Caribbean Islands**
(*G.S. Shrivastava*)
-




6.2 Professional Development

- 3906  **Historical Development of Side-Channel Spillway in Hydraulic Engineering**
(*W.H. Hager, M. Pfister*)

6.3 Research Into Practice










- 3914  **Collaborative Research on Flood Resilience in Urban Areas: The CORFU Project**
(*Jelena Batica, Philippe Gourbesville*)
- 3921  **Cost-Benefit Analysis for Low Potential Hydropower Converters**
(*J. Hadler, K. Broekel*)
- 3928  **JE-HydroNet: Modern Methodologies for the Management, Monitoring and Planning of Integrated Water Resources in the Nile Delta of Egypt**
(*S.A. Kantoush, T. Sumi, Toshiharu Kojiri, M. Saber, I. Elshennawy, H. Awad, A. Sefelnaser*)
- 3936  **SWOT Analysis of Breach Models for Common Dike Failure Mechanisms**
(*P. Peeters, T. Van Hoestenbergh, L. Vincke, Paul J. Visser*)
- 3944  **Wet Feet in the Ivory Tower — A 50 Year Research Partnership Supporting Hydropower Development in Tasmania**
(*J.E. Sargison, M. Wallis, B. Lord, G. Walker, J.M. Andrewartha*)
- 3952  **Simulation of Spatial and Temporal Trends in Upper Mississippi River Physical Habitat**
(*T.J. Smith, Jesse A. Piotrowski, Nathan C. Young, D.J. Schnoebelen, L.J. Weber*)
- 3960  **Airborne Hydromapping and Hydro^{Connect} Shallow Water Bathymetry — Pioneering Underwater Insights**
(*Frank Steinbacher, Martin Pfennigbauer, Robert Klar, Markus Aufleger*)
- 3968  **Designing a Lot Scale Stormwater System with Rainwater Tanks and WSUD: Possible Upgrade of Design Practices to Enhance Sustainability of Urban Water Cycle**
(*M. van der Sterren, A. Rahman, G. Ryan*)

6.4 Interactions Between Hydraulics in Hydrology











- 3976  **Characterization of Ephemeral Rivers**
(*L.G. Castillo, M.D. Marin*)
- 3984  **Indexing Floodplain Effects for Flood Estimation**
(*J.J. O'Sullivan, S. Ahilan, M. Bruen*)
- 3992  **Direct Rainfall — Verifying the Technique Across Two States**
(*R. Swan, R.S.D. Thomson*)











THEME 7: Hydroinformatics




7.1 Computational Hydraulics & Hydrodynamics

- 4000  **Modeling of Steady State Source Term Dominated Saint-Venant Equations with Shock Capturing Numerical Schemes**
(*M.M. Ali, P.M. Steffler*)
- 4008  **Simplified Discontinuous Galerkin Schemes for Shallow Water Simulations**
(*Quentin Araud, Pascal Finaud-Guyot, Robert Mosé, José Vazquez, Sandra Isel, Vincent Guinot*)
- 4016  **Filling Missing Data in Streamflow Series for Supporting Models**
(*Mijail Arias-Hidalgo, Gonzalo Villa-Cox, Ann van Griensven, Arthur E. Mynett*)
- 4023  **A Numerical Simulation of Large-Scale Flow Motion in Curved Channels and Rivers**
(*Junli Bai, Junhua She, Pengzhi Lin*)
- 4031  **Hybrid Boussinesq — Saint Venant Wave Propagation Model**
(*B. Carrión, R. Cienfuegos*)
- 4039  **Comparison of Numerical Techniques for the Solution of Richards' Equation**
(*D.E. Caviedes-Voullième, P. Garcia-Navarro, J. Murillo*)
- 4047  **An Improved Approach to Stage-Discharge and Velocity Distribution Prediction in Straight Compound Channels Using CFD Models**
(*P. Conway, J.J. O'Sullivan, M.F. Lambert*)
- 4055  **Scale Effects in 3-D Modelling of Straight Compound Channels**
(*P. Conway, J.J. O'Sullivan, M.F. Lambert*)
- 4063  **A Generalized Reconstruction Technique for the Approximate Solution of Discontinuous Bed Shallow-Water Equations**
(*L. Cozzolino, R. Della Morte, D. Pianese*)




- 4071  **Accurate Simulation of Large-Scale Hydrodynamic Events Using TELEMAC-2D**
(*C. Denis, C. Moulinec, R.W. Barber, D.R. Emerson, E. Razafindrakoto, J.-M. Hervouet*)
- 4079  **2D-Vertical Model for Free Surface Incompressible Flows: Validation and Applications**
(*S. Detrembleur, B. Dewals, M. Piroton*)
- 4087  **Three-Dimensional Numerical Investigation of Spillway and Reservoir Hydraulics**
(*R. Feurich, F. Kettner, N.R.B. Olsen*)
- 4095  **Modelling River Ice Freeze-Up on the Red River Near Netley Cut**
(*M. Haresign, S.P. Clark*)
- 4103  **Dealing with Dry Zones in Free Surface Flows: A New Class of Advection Schemes**
(*J.-M. Hervouet, E. Razafindrakoto, C. Villaret*)
- 4111  **Calculation of Turbulent Open Channel Flow by Particle Method**
(*Hiroshi Inokuma, Akihiko Nakayama*)
- 4119  **Prediction of Momentum and Solute Transfer in a Vegetated Compound Channel**
(*Fatima Jahra, Yoshihisa Kawahara, Fumiaki Hasegawa, Takuya Yamamoto*)
- 4127  **Numerical Analysis of Transient Pipe Flow: Steady State to Comprehensive Water Hammer Model**
(*B.S. Jung, B.W. Karney*)
- 4135  **Modeling Dam Break Flows Using SPH Technique**
(*H.M. Kao, C.H. Wang, T.J. Chang, M.H. Hsu, Y.C. Tan*)
- 4143  **Modified Shallow Water Model with Possibility of Flying Flow Existence**
(*V.I. Klimovich*)
- 4151  **Effect of Reynolds Number and Abutment Geometry on the Flow and Turbulence Structure Around an Abutment with a Large Scour Hole**
(*M. Koken, G. Constantinescu*)

- 4159  **The Wave Speed of Surge Pressure Under the Interaction of Vapour, Water and Steel Pipes**
(*Y. Kono, K. Kato, K. Ishikawa, A. Haga, Y. Shimoasa*)
- 4167  **A Study of the Mechanism of Vortex Merging in Shallow Mixing Layers**
(*M.Y. Lam, H.W. Liu, M.S. Ghidaoui*)
- 4175  **Backwater Effects of Bridge Piers and Abutments in 2D — Replication of Physical Model Tests in a 2D Hydrodynamic Model**
(*J.G. Leister, M.A. Jempson*)
- 4183  **Large Eddy Simulation of Flow Characteristics in Hydraulic Aeration Facilities with Sudden Lateral Enlargement and Vertical Drop**
(*Guojing Li, Guangqing Dai, Qing Yang, Xu-dong Ma*)
- 4190  **A Comparison Study of BGK- and MRT- Lattice Boltzmann Method for Plane Cavity Flows**
(*H. Liu, M. Li, A.P. Shu, Y. Gao*)
- 4198  **The Analysis of the Influence of High-Speed Aeration Jet on the Side-Wall of Spillway Tunnel**
(*Xu-dong Ma*)
- 4205  **A New Conservative Form of the 1D Saint Venant Equations and Its Numerical Solutions**
(*Hongbo Ma, Fan Liu, Xudong Fu*)
- 4213  **An Improved Upwind Finite Volume Scheme for Large-Scale Shallow Flows**
(*A.M. Mohammadian, A.V. Mohammadian, B.A. Mohammadnezhad*)
- 4221  **Effect of Interpolation Technique on Numerical Accuracy and Computational Cost**
(*M. Moradi Larmaei, T.F. Mahdi*)
- 4227  **Parametric Estimation of Optimal Mesh Size for Depth-Averaged Numerical Flow Models**
(*R. Morales, R. Ettema*)






- 4235  **Definition of the Weak Solution for the 2D Shallow Water Equations with Source Terms in Presence of Source Terms Using Roe's Approach**
(*J. Murillo, P. García-Navarro*)
- 4243  **Finite Volume Modelling of One-Dimensional Flows on Movable Bed**
(*A. Palumbo, L. Cozzolino, R. Della Morte, D. Pianese*)
- 4251  **A 2D Shallow Water Simulation Model of Flow Near Bridges**
(*H. Ratia, J. Murillo, P. García-Navarro*)
- 4259  **Simplification Strategies for Water Distribution System Modelling**
(*D.A. Savić, O. Giustolisi*)
- 4267  **Laminar Flow Around a Cylinder Subject to Navier-Slip Condition**
(*Il Won Seo, C.G. Song*)
- 4276  **A Robust and Efficient Solver for the Shallow Water Equations and Its Application to a Complex Natural Hydrosystem**
(*F. Simons, T. Busse, J. Hou, K.V. Notay, R. Hinkelmann*)
- 4284  **SPH Modeling of Extreme Hydrodynamic Forces on Slender Structures**
(*P. St-Germain, I. Nistor, D. Palermo, R.D. Townsend*)
- 4292  **Numerical Simulation of Bed Variation in a Channel with a Series of Submerged Groins**
(*T. Uchida, S. Fukuoka*)
- 4300  **Cell Based Modelling of Bridge Piers Using TUFLOW**
(*P. Vienot, B. Sexton, F. McNulty*)
- 4308  **Urban Hydroinformatics: Towards the Synergy Between Social and Technical Dimensions of Urban Water Management**
(*Z. Vojinovic*)
- 4316  **Unstructured Simulation of Thermal and Shallow Circulation Flow Using Depth Averaged EASM Model**
(*L.H. Xing, G.B. Huang, Min Yan*)

- 4321  **Comparison of Two Types of Roughness Model for a Dam Break Simulation Using SPH**
(*D. Žagar, E. Džebo, M. Jeromel, M. Četina, G. Petkovšek*)
- 4328  **Modeling and Simulations of Flow Pattern and Chlorine Distribution in a Potable Water Service Reservoir of Singapore**
(*J.M. Zhang, H.P. Lee, B.C. Khoo, C.P. Teo, N. Haja, K.Q. Peng*)
- 4336  **Coupled Depth Averaged-RANS Model for Open Channel Flow**
(*H. Zobeyer, P.M. Steffler*)










7.2 Emerging Computational Methods







- 4344  **A Novel ILES/VOF Solver for the Simulation of Turbulent Free Surface Flows**
(*Peter D.M. Brady*)
- 4352  **Comparison of the SPH and Finite Volume Methods for Simulating Free-Surface and Confined Flows**
(*M. Ferrand, C. Kassiotis, O. Mahmood, D. Violeau*)
- 4360  **Inundation Simulation Model with Local Grid Refinement**
(*M.H. Hsu, C.J. Huang, A.S. Chen, Y.T. Chou*)

7.3 Data Mining & Data-Driven Modelling





- 4368  **A Hybrid Approach in Combining Numerical and Data-Driven Models in Modelling Fine Sediment Transport**
(*B. Bhattacharya, S. Sewagudde, T. van Kessel, D.P. Solomatine*)
- 4376  **Application of LSSVM in Estimating the Metabolism Rate for a River Restoration Study**
(*Wei Huang, Shinichiro Yano, Jian-min Zhang*)
- 4384  **Predicting Ocean Surge: Optimized Ensembles of Data-Driven Chaos-Based Models in Phase Space**
(*M. Siek, D.P. Solomatine*)
- 4392  **Inverse Estimation of Bed Roughness Coefficients of Open-Channel by Using Shallow-Water Adjoint Model**
(*K. Yoshida, T. Ishikawa*)
- 4400  **A Study of Ice Thickness During Ice Breakup on the Teshio River**
(*Yasuhiro Yoshikawa, Yasuharu Watanabe, Hiroshi Hayakawa, Yasuyuki Hirai*)

7.4 Applications of Models & Hydroinformatics Tool

- 4408  **Comparison of Hydro-Environmental Impacts for Ebb-Only and Two-Way Generation for the Severn Barrage**
(*Reza Ahmadian, Roger A. Falconer, Bettina Bockelmann-Evans*)
- 4416  **Numerical Simulation and Validation of Hydrodynamics Actions in Energy Dissipation Devices**
(*Luis Gerardo Castillo Elsitdié, José María Carrillo Sánchez*)
- 4424  **Identifying Critical Pipes in the Barwon Water Potable Water System**
(*R. Erinawati, A. McKoy*)
- 4430  **Verification and Validation of Computational Fluid Dynamics Simulations of Compound Channel Flow**
(*M.S. Filonovich, R. Azevedo, L.R. Rojas-Solorzano, J.B. Leal*)
- 4438  **Experimental Verification of Pure Frequency Domain Method for Pipeline Leak Detection**
(*Xinlei Guo, Kailin Yang, Yongxin Guo, Tao Wang, Hui Fu*)
- 4445  **Estimation of Typhoon Maximum Potential Intensity Using Artificial Neural Network**
(*P.K. Huang, G.F. Lin, H.Y. Lin*)
- 4451  **Coupled 2D Modelling of Tangjiashan Landslide Dam Breach**
(*Wei Huang, Zhiyuan Yue, Zhixian Cao, Gareth Pender*)
- 4459  **Modelling of Bedrock River Evolution**
(*C.T. Liao, K.C. Yeh, M.W. Huang*)
- 4468  **A New Fast Inundation Model Using Support Vector Regression and Modified Linear Interpolation**
(*Yang Liu, Gareth Pender*)

- 4476  **Optimising Reservoir Operation Using a Multi-Objective Simulation-Optimisation Framework**
(*H. Madsen, B. Richaud, E. Gelati, C.B. Pedersen, D. Rosbjerg*)
- 4484  **Calibration of a 3D Model with Measurements in a Fully 3D Flow in the Sava River**
(*R. Rajar, A. Širca, M. Krzyk, A. Vidmar, M. Četina*)
- 4492  **A Unified Approach for Sediment Routing Over Partially Non-Erodible Bottoms and Wetting-Drying Areas**
(*F. Rulot, B. Dewals, P. Archambeau, S. Erpicum, M. Pirotton*)
- 4499  **A Novel Decision Support System for Operational Management of the Reservoirs of Bhakra and Beas Dams**
(*Claus Skotner, John Alasdair MacDonald, Rajeev Bansal*)
- 4505  **Composite Modelling: Combining Physical and Numerical Models**
(*J. Sutherland, S.L. Barfuss*)
- 4513  **Hydrodynamic Model of a Flood Wave Propagation in the Lower Biebrza Basin**
(*D. Swiatek, S. Ignar*)
- 4521  **Improving Predictions of Water Levels and Currents for Singapore Regional Waters Through Data Assimilation Using OpenDA**
(*X. Wang, R.R. Karri, S.K. Ooi, V. Babovic, H. Gerritsen*)
- 4529  **Multi-Objective Optimisation for Sewer Rehabilitation Investment Planning**
(*B. Ward, D.A. Savić*)
- 4537  **Numerical Modelling of 3D Baroclinic Flow and Thermal Discharge in Coastal Waters**
(*J. Yao, J.F. Tao, Changkuan Zhang*)

7.5 Cyber Infrastructure in Water

- 4544  **Application of Cyber Infrastructure in Field Monitoring in Fehmarnbelt**
(*C.Z. Chew, H. Kaas*)
- 4552  **GENESIS Project — Paving the Way Towards a Single Information Space for the Environment in Europe**
(*M. Erlich, A. Cabal, M. Gerbaux, J.-F. Humbert, A. Levasseur*)
- 4560  **Methodology for ICT Diagnostic and Implementation in Water Domain: The @qua Initiative**
(*Philippe Gourbesville*)
- 4568  **Development of a Hydrologic Modeling Environment Using the TRIDENT Workflow Engine**
(*B. Lu, M. Piasecki*)