IAHR 2027 World Congress Topics

Pillar A: Climate Change Adaptation and Mitigation

Theme A-1: Climate Change Adaptation

Sub-themes *(keywords)*

A-1.1 Climate Adaptation: Decision-Making Under Uncertainty *(Deep Uncertainty, Robust Decision-Making (RDM), Adaptive Pathways)*
A-1.2 Systemic Climate Risk: Multi-Hazards and Cascading Impacts *(Cascading Climate Risks, Multi-Hazard Risk Assessment, Systemic Adaptation)*
A-1.3 Decision Support under Climate Uncertainty *(Deep Uncertainty, Robust Decision-Making, Decision-Support Tools)*
A-1.4 Resilient Water Systems: Infrastructure and Irrigation Adaptation *(Irrigation Resilience, Water Scarcity Management, Salinity Control)*
A-1.5 Hydrological Extremes, Floods and Basin-Scale Adaptation *(Hydrological Extremes, Basin-Scale Adaptation, Flood and Drought Risk)*

Special Sessions:
SS-06 Integrated Flood Risk Management from Science to Practice *(Flood Risk Assessment, Hazard Mapping, Risk Governance, Mitigation Strategies, Adaptive Management, Climate Change Adaption)*
SS-08 Digital Twin of Detailed River Basin Morphology and Hydraulic Structures for Advanced Basin Management *(Digital Twin, Flood, Inundation, River Basin, Hydraulic Structures)*
SS-12 Advances and Guidelines for Water Resources Management: Adaptation Under Evolving Climate *(Climate-sensitive design, Adaptation, Guidelines, Decision making under change)*
SS-27 Buoyancy-Driven Flows *(Gravity currents, Internal waves, Atmospheric flows, Oceanic flows, Natural ventilation)*
SS-32 Integrated Water Resilience in Arid Regions: Diversified Portfolios, Digital Systems, and Adaptive Governance *(Integrated Water Resilience, Non-Conventional Water Portfolios, Water-Energy-Environment Trade-offs, Brine Resource Recovery, Adaptive Governance, Digital Water Systems)*

Theme A-2: Water and Nature

Sub-themes *(keywords)*

A-2.1 Nature-Based Solutions for Flooding, Stormwater and Water Quality *(Nature-Based Solutions (NbS), Hybrid Green–Gray Infrastructure, Stormwater Quality Management)*
A-2.2 Ecohydraulics and Biophysical Interactions in Aquatic Systems *(Ecohydraulics, Biophysical Interactions, Aquatic Ecosystems)*
A-2.3 River, Catchment and Urban Nature-Based Solutions *(Nature-Based Solutions, Catchment Restoration, Urban Water Resilience)*
A-2.4 Coastal, Estuarine and Riparian Nature-Based Solutions *(Coastal Nature-Based Solutions, Estuarine Resilience, Riparian Restoration)*
A-2.5 Digital, AI-Based and Data-Driven Ecohydraulics *(Digital Ecohydraulics, Artificial Intelligence, Data-Driven Modelling)*

Special Sessions:
SS-01 Ecohydraulics: Biophysical Interactions in Natural and Engineered Aquatic Systems *(Ecohydraulics, Flow–vegetation–sediment feedbacks, Restoration & climate resilience)*
SS-03 AI and Data-Driven Ecohydraulics: Monitoring, Modelling, and Design *(Ecohydraulics, Intelligent Environmental Sensing, Artificial Intelligence, Machine Learning)*
SS-14 Nature-Based Solutions for Upstream Catchments and Small Streams *(Nature-based Solutions, Ecohydraulics, Upstream catchments and small streams)*
SS-15 Nature-Based Solutions for Urban Areas *(Nature-based Solutions, Ecohydraulics, Urban areas)*
SS-16 Nature-Based Solutions for Large Rivers *(Nature-based Solutions, Ecohydraulics, Large rivers)*
SS-17 Nature-Based Solutions for Coasts and Estuaries *(Nature-based Solutions, Ecohydraulics, Estuaries and coasts)*

Theme A-3: Hydro-Environment Engineering and Society

Sub-themes *(keywords)*

A-3.1 Sustainable Hydropower and River Ecosystems *(Environmental Flows, Hydropeaking Impacts, River Connectivity)*
A-3.2 Innovation in Hydro-Environmental Education and Training *(AI-Enhanced Learning, Digital Twin Training, Immersive Experiential Education)*
A-3.3 Water and Hydro-Environment History and Heritage *(Historical hydraulic infrastructure, Water heritage conservation, History of hydro-environment management)*
A-3.4 Socio-Ecological Sustainability Transitions and Governance *(Socio-Ecological Transitions, Systems Innovation, Data-Enabled Governance)*
A-3.5 Climate Adaptation Governance and Finance *(Adaptation Governance, Climate Finance, Implementation Pathways)*

Special Sessions:

SS-33 Binding Without Erasure: River Monitoring, Plural Evidence and Environmental Obligation in Transboundary Governance *(River Governance, Environmental Evidence, Adaptive Water Resources Management)*

Pillar B: Water Engineering and Energy, Ecological and Digital Transition

Theme B-1: Hydropower and water related renewable energy

Sub-themes *(keywords)*

B-1.1 Reservoir Renewable Energy Systems *(Floating Photovoltaics (FPV), Hydropower Flexibility, Structural Reliability)*
B-1.2 Marine & Offshore Renewable Energy Systems *(Offshore Renewable Energy, Hybrid Systems & Grid Integration, Resilience, Monitoring & Environmental Impacts)*
B-1.3 Hydropower and Transient Flow Phenomena: Modelling, Monitoring and Mitigation *(Water Hammer Mitigation, Hybrid Physics–AI Modelling, Digital Twin Monitoring)*
B-1.4 Water–Energy Nexus and Integrated Water Infrastructure *(Water–Energy Nexus, Hydropower–Desalination Integration, Integrated Water Infrastructure)*
B-1.5 Digital Hydropower and Smart Asset Management *(Hydropower Digital Twins, Asset Management, Smart Hydropower Operations)*

Theme B-2: Water engineering for inland water bodies

Sub-themes *(keywords)*

B-2.1 Monitoring, Remote Sensing and Digital Observation of Inland Waters *(Inland Water Monitoring, Remote Sensing, Digital Observation)*
B-2.2 Hydrodynamics, Mixing and Environmental Fluid Processes in Inland Waters *(Environmental Fluid Mechanics, Mixing and Transport, Inland Water Hydrodynamics)*
B-2.3 River Morphodynamics, Sediment Transport and River Training *(River Morphodynamics, Sediment Transport, River Training)*
B-2.4 Extreme River Flows, Floods and Droughts in Inland Systems *(Hydrological Extremes, Floods and Droughts, River Flow Monitoring)*
B-2.5 Water Quality, Pollution and Ecosystem Health in Rivers and Lakes *(Inland Water Quality, Aquatic Pollution, Ecosystem Health)*

Special Sessions:
SS-05 Advances in Monitoring Extreme River Flows Across the Hydrologic Spectrum *(Advanced streamflow monitoring methods, Drought, Flood)*
SS-09 Ice Processes in Inland and Transitional Waters *(River and lake ice, Ice dynamics, Climate variability)*

SS-10 Sediment Transport and River Training in Alluvial Rivers: Current Understanding and Open Challenges *(Alluvial River hydraulics, Turbulence monitoring and modelling, Scour protection and river training works)*

SS-21 Plastic Transport in Rivers: Connecting Empiricism and Modelling *(Microplastics and Litter, Multiphase flow, Numerical modeling)*

SS-26 Advances in Environmental Fluid Mechanics *(Fluid Mechanics, Modelling, Numerics)*

SS-31 High-Fidelity 3D CFD and CFD–DEM Methods for Predictive Bed Morphodynamics *(High-Fidelity 3D CFD, CFD–DEM and Multiphase Sediment Modelling, Morphodynamic Model Verification and Validation)*

Theme B-3: Water engineering and society

Sub-themes *(keywords)*

B-3.1 Water Justice, Equity and Affordability in Water Infrastructure *(Water Justice, Equity in Water Services, Affordability & Tariff Design)*

B-3.2 Participatory Water Governance and Citizen Engagement *(Participatory Governance, Co-production, Citizen Science)*

B-3.3 Climate-Resilient Water Services and Social Vulnerability *(Climate-Resilient Water Services, Social Vulnerability Assessment, Adaptation Strategies)*

B-3.4 Responsible Digital Water: Ethics, Governance and Security *(Responsible AI, Data Privacy & Cybersecurity, AI Governance)*

B-3.5 Blue Economy, Financing and Economics for Sustainable Water Systems *(Sustainable Water Finance, Cost-Benefit Analysis, Life-Cycle Costing)*

Special Sessions:

SS-25 Water Security in Latin America: From Local Experiences to the Construction of a Regional Metric *(Water Security Index, Regional / Transboundary Water Assessment, Cooperative Governance & Coordinated Decision-Making)*

Theme B-4: Irrigation, drainage and pollution control

Sub-themes *(keywords)*

B-4.1 Smart Irrigation and Precision Agriculture Water Management *(AI-Driven Irrigation Scheduling, IoT Soil–Plant Sensing, Precision Fertigation)*

B-4.2 Agricultural Drainage and Edge-of-Field Water Quality Protection *(Controlled Drainage, Water Table Management, Drainage Water Recycling)*

B-4.3 Water Reuse for Irrigation: Safety and Water Quality *(Reclaimed Water Irrigation, Micropollutants & AMR, Quantitative Microbial Risk Assessment (QMRA))*

B-4.4 Digital Groundwater Monitoring and Remediation *(Groundwater Digital Twins, AI-Enabled Monitoring, Data-Driven Remediation)*

B-4.5 Emerging Contaminants in Agro-Water Systems *(PFAS in Agro-Water Systems, Microplastics Fate and Transport, Novel Remediation Technologies)*

Special Sessions:

SS-11 Advances in Marine and Freshwater Outfall Systems: Innovations in Modelling, Design, and Environmental Protection *(Outfall systems, Climate change adaptation, Digital transformation)*

Theme B-5: Water engineering for water infrastructures

Sub-themes *(keywords)*

B-5.1 Smart Water Infrastructure and Digital Transformation *(Smart Water Digital Twins, AI-Enabled Infrastructure Monitoring, Predictive Asset Management)*

B-5.2 Reservoir and Dam Management under Climate Change *(Forecast-Informed Reservoir Operations (FIRO), Dam Digital Twins, Sediment–Ecosystem)*

B-5.3 Ageing Infrastructure, Rehabilitation and Risk-Based Asset Management *(Ageing Infrastructure, Infrastructure Rehabilitation, Risk-Based Asset Management)*

B-5.4 Hydraulic Structures: Design, Performance and Safety *(Hydraulic Structures, Performance Assessment, Infrastructure Safety)*
B-5.5 Water Allocation, System Operations and Infrastructure Reliability *(Water Allocation, System Operations, Infrastructure Reliability)*

Special Sessions:
SS-04 Transient Flows in Hydraulic Systems *(Hydraulic transients, Dam break, Tidal bores, Tsunamis)*
SS-13 Scour around Hydraulic and Coastal Structures *(Hydrodynamic-structure interaction, Foundation design, Scour protection)*
SS-19 Hydraulic Challenges of Ageing Infrastructure *(Ageing Infrastructure, Climate change adaptation, Structural health monitoring)*
SS-20 Fundamental Flow Hydraulics at Hydraulic Structures *(Hydraulic Design, Numerical Modelling, Laboratory Experiments)*
SS-28 Digital Empowerment of Whole-Process Water Allocation *(Water Allocation, Digital Twin, Artificial Intelligence)*

Pillar C: Improving Resilience Against Water Hazards and Disasters

Theme C-1: Climate Change Mitigation and hydraulic-infrastructure resilience

Sub-themes *(keywords)*

C-1.1 Digital Innovation for Sustainable Water Systems *(Low-Carbon Digital Twins, AI-Driven Operations, Operational Decision Support)*
C-1.2 Net-Zero Strategies for Water Utilities *(Net-Zero Accounting, Decarbonization Roadmaps, Best-Practice Frameworks)*
C-1.3 Circular Economy and Resource Recovery in Wastewater Systems *(Water Resource Recovery, Circular Economy, WRRF Transformation)*
C-1.4 Climate-Resilient Management of Surface Water and River Basins *(Climate-Resilient Operations, Storage & Allocation, Integrated Basin Management)*
C-1.5 Early Warning, Flash Floods and Hydraulic Infrastructure Safety *(Early Warning Systems, Flash Flood Risk, Hydraulic Infrastructure Safety)*

Special Sessions:
SS-18 Digital Ecohydraulics for River Resilience: Integrating Remote Sensing, Machine Learning, and Advanced Modelling *(Digital Ecohydraulics, Remote Sensing, Machine Learning, Hydromorphological Modelling)*
SS-22 Resilience against climate change in the Asia-Pacific Region *(Climate trends, Nature-based solutions and engineered strategies, Community-led resilience initiatives)*
SS-23 Intelligent Early Warning Systems: Machine Learning Integration for Hydrometeorological and Tsunami Hazard Management *(Physics-Informed Neural Networks (PINNs), Intelligent Early Warning Systems (EWS), Responsible AI (bias & data deserts))*
SS-29 Digital-Intelligent Empowerment of Flash Flood Disaster Prevention *(Flash Flood Early Warning, Digital Twin, AI-based Hydrological Simulation)*
SS-30 Debris and Driftwood Accumulation at Hydraulic Structures *(Driftwood and floating debris, Hydraulic structures, Flood resilience and debris management)*

Theme C-2: Urban water cycle, industrial water and water treatment

Sub-themes *(keywords)*

C-2.1 Urban Water Resilience and Sustainable Drainage *(Blue–Green Infrastructure (BGI), Sponge City Design, Hybrid Urban Drainage)*
C-2.2 Emerging Contaminants and Risk Mitigation in Water Treatment *(Microplastics Removal, Plastisphere Microbiome, Antimicrobial Resistance (AMR))*
C-2.3 Water Quality Dynamics, Modelling and Control in Urban Water Networks *(Water Quality Modelling, Urban Water Networks, Digital Twins and AI-enabled Control)*

C-2.4 Next-Generation Asset Management for Urban Water Networks *(Predictive Asset Management, Smart Water Networks, Condition Monitoring)*
C-2.5 Water Loss Management in Distribution Networks *(Non-Revenue Water (NRW), Leak Detection & Localization, Pressure Management)*

Special Sessions:
SS-07 Theory and Applications of Smart Water Networks *(Smart Water Networks, Autonomous & adaptive control, AI–Hydraulics Verification & Safety)*
SS-24 From Scarcity to Smart Management: Solutions for Intermittent Water Supply Systems *(Intermittent Water Supply (IWS), Digital Transformation (Sensors & IoT), Intermittence Modelling & Management)*

Theme C-3: Deltas, coastal and maritime engineering

Sub-themes *(keywords)*

C-3.1 Advanced Coastal Modelling, Digital Twins and Hazard Forecasting *(Coastal Modelling, Digital Twins, Hazard Forecasting)*
C-3.2 Advanced Marine Biodiversity Monitoring and Assessment *(Environmental DNA (eDNA), Autonomous Sampling Platforms, AI Ecological Assessment)*
C-3.3 Coastal Protection, Design and Management *(Coastal Defense Performance, Design Standards, Scaling & Validation)*
C-3.4 Sustainable and Resilient Ports and Maritime Systems *(Shore Power (Cold Ironing), Green Shipping Corridors, Port Energy Hubs)*
C-3.5 Delta and Estuarine Resilience: Compound Flood Risk, Sediment Dynamics and River–Coast Connectivity *(Compound Flood Risk, Sediment Dynamics, River–Coast Connectivity)*

Special Sessions:
SS-02 Ecohydraulics in Coastal and Riparian Zones as Critical Interfaces under Change *(Coastal zone, Riparian zone, Transitional ecosystem, Ecohydraulics process)*