

# THEMATIC FRAMEWORK | 39<sup>th</sup> IAHR WORLD CONGRESS

## From Snow To Sea (S2S)

### Theme 1 Human-water relationships

*This theme focuses on bringing together the past and the future, knowledge and experience, with the goal of enhancing enlightened human-water relationships.*

- Dialogue of knowledge: academy and traditional hydro-environment engineering knowledge
- Hydro-environment cultural heritage
- Hydro-environment engineering history
- Sustainable Development Goals
- Gender balance, youth involvement and leadership
- Flood management risks from coincident calamities

### Theme 2 Snow, river and sediment management

*This theme addresses the main management challenges related to the first steps of the water cycle: snow and river processes and their impact on reservoir management.*

- Snow assessment and impact on fluvial processes
  - Sediment transport in rivers: processes, monitoring and modeling
- Watershed erosion processes and soil conservation
- River morphodynamics and hydraulic-structure effects
- River sediment management, basin-scale interactions and impact on the coast
- River conservation and restoration: nature-based solutions
- Sedimentation in reservoirs

### Theme 3 Environmental hydraulics and urban water cycle

*This theme addresses the environmental aspects as well as the urban use of water and its subsequent treatment and reuse.*

- Ecohydraulics
- Mixing processes
- Sensors, monitoring and management strategies in urban water and wastewater systems
- Restoration of water systems in a changing climate
- Desalination and water treatment
- Advanced treatment processes for wastewaters
- Water recycling and reuse
- Industrial flows

### Theme 4 Hydraulic structures

*This theme addresses on the design and performance of hydraulic structures, focusing on structures related to the water path from snow to sea.*

- Hydro-environment historical structures: management and restoration
- Aging hydraulic structures: upgrade and retrofit towards more sustainability
- Recent advancements to more reliable, sustainable and resilient hydraulic structures
- Sustainable renewable energy solutions
- Nature-based solutions as a way towards sustainability
- Large scale tests and field data - towards the ultimate validation of hydraulic structures design
- Case studies

### Theme 5 Water resources management, valuing and resilience

*Within the framework of sustainable water management, this theme focuses on improving resilience, valuing water, and mechanisms to improve cooperation and water governance.*

- Water resources planning and management under increasing uncertainty and climate change
- Alternative water resources
- Advanced water resources systems analyses: improving resilience
- Water and circular economy: valuing water
- Water-food-energy nexus: sustainability of water resources
- Water use efficiency
- Cooperation, governance of water and transboundary catchments
- Conflict resolution and stakeholder participation in water management

### Theme 6 Computational and experimental methods

*This theme focuses on the development and application of both experimental methods and new technologies to improve knowledge of water processes.*

- Computational methods in fluid dynamics and hydro-environmental problems
- Computational methods in sediment dynamics
- Computational methods in fluid-structure interactions
- Computational and experimental methods: towards composite modeling
- Optimization methods and uncertainty assessment
- Artificial intelligence in hydro-environment engineering
- Big data, data mining and high-performance computing under hydroinformatics
- Instrumentation, experimental facilities and field experiments
- Water from above: remote sensing and drones technologies

### Theme 7 Coasts, estuaries, shelves and seas

*Within the framework of sustainable goals, this theme focuses on those aspects of the coast, estuaries, shelf and seas that are most related to IAHR.*

- Hydrodynamics, sediments, and ecosystem services
- Water quality and pollution
- Coastal erosion
- Resilient coastlines in a changing climate
- Estuaries and shore protection and restoration: green coastal infrastructure in climate change scenarios
- From the inner shelf to the coastal zone: ecosystem challenges in a changing climate
- From Snow to Sea: the future of the Mediterranean Sea

### Theme 8 Extreme events: from droughts to floods

*This theme addresses extreme events, the occurrence and severity of which is expected to increase in the coming years as a result of climate change (among other aspects).*

- Drought prediction and management; impacts of climate change
- Tsunamis, storm surges and effects of tropical storms under rising sea levels
- Flood risk assessment, mitigation and adaptation measures
- Urban flood management
- Flood recovery and resiliency
- Impact of global change on extreme environments (cold/arid regions)
- Adaption to climate change: guidance to engineering design

