List of special session proposal

Keynote Session 1
Title: The ecohydrology of river vegetation
Organizer: Dr. Matthew O’Hare (CEH Edinburgh, Bush estate, Penicuik, EH26 0QB, UK)
Synopsis: This session will focus on the developing field of riverine plant ecohydrology. Riverine plants including both aquatic macrophytes and riparian vegetation respond to their physical environment but they also influence it, effecting both hydrological and fluvial geomorphological processes. The topic has significant blue skies research components but the fundamental nature of the plant-ecohydrological interactions means they can also determine system response to damming, channel modification and system restoration. Not surprisingly the topic has attracted researchers from a wide variety of disciplines, physics, engineering, ecology, fluvial geomorphology, modelling and environmental management. We expect strong contributions from the following main areas; the fundamental physics of plant –flow interactions; ecological interactions and applied management questions relating to channel conveyance, river restoration and eflows. Empirical lab based studies, field studies and modelling are all welcome. There has been an intensification in research activity in recent years and we encourage contributions from all areas of research. We envisage a session where ideas can be exchanged and discussion encouraged.
Keywords: macrophyte, ecohydrology, ecohydraulics, riparian, flume

Keynote Session 2
Title: Ecohydraulics in River Restoration
Organizers: Dr. Gregory Pasternack, (University of California at Davis, Davis, CA), Dr. Martin Thoms (University of New England, Armidale, NSW), Dr. Hamish Moir (Rivers and Lochs Institute, University of the Highlands and Islands; cbec eco-engineering UK Ltd), Dr. Hironori Hayashi (Kyushu University, Fukuoka, Japan)
Synopsis: The worldwide practice of manipulating degraded rivers through active and passive efforts to improve ecological functionality is rapidly growing. Meanwhile, the topic of ecohydraulics has emerged as a dedicated, interdisciplinary endeavor to understand the links between physical and ecological dynamics. Often river restoration is designed on the basis of simple geomorphic metrics or traditional engineering practice, yet ecohydraulics is relevant to all stages of river restoration if the goal is to achieve ecological benefits. Some ecohydraulics methodologies may work best for monitoring river restoration projects, while others may work best for designing such projects. This session seeks new scientific findings from basic ecohydraulic studies that improve the theory and practice of restoration as well as practical applications in which ecohydraulics is used in river restoration.
Keywords: River restoration, ecohydraulics, channel design
Topics of interest:
The topics of this special session are, but not limited to, the following:
- Ecohydraulic restoration concepts
- Ecohydraulic restoration methodologies and approaches
- Bio-physical linkages required for restoration design
- Case studies of restoration projects using ecohydraulics
- Challenges and opportunities in practical use of ecohydraulics
### Keynote Session 3

**Title:** Using advanced genomics techniques to research and monitor freshwater biodiversity  
**Organizers:** Michael Monaghan (IGB, Germany), Kozo Watanabe (Ehime University, Matsuyama, Japan)  
**Synopsis:** Advanced genomics and bioinformatics techniques are increasingly used in biodiversity research and in environmental monitoring and assessment of freshwaters. Next-generation sequencing is now regularly used for the rapid identification of 100s-1000s of species in environmental samples, and more recent progress has been made in the use of sequence data to estimate relative abundance. Similar methods are also applied at the population level to examine adaptive genomic diversity in target species in large populations and over large spatial scales. This special session provides a forum for researchers and professionals working to apply methods in genomics and bioinformatics to the study of biodiversity in freshwaters (rivers, lakes, wetlands, etc.).  
**Keywords:** genomics; biodiversity; DNA-metabarcoding; eDNA; next-generation sequencing; assessment; monitoring; genetic databases  
**Topics of interest:**  
- DNA metabarcoding  
- Population genomics  
- Metagenomics/Metatranscriptomics  
- Genome-wide SNP analysis  
- Landscape genomics

### Special Session 8

**Title:** Towards Activating the Role of Wetlands in Mitigating the Global Warming  
**Organizer:** Dr. Ebrahim M. Eid (Botany Department, Faculty of Science, Kafr El-Sheikh University, Kafr El-Sheikh 33516, Egypt)  
**Overview:** Combustion of fossil fuel and changes in land use, such as those resulting from deforestation, are considered the primary causes for the increasing concentration of atmospheric CO₂. Recently, CO₂ is increasing at 1.7 ppmv yr⁻¹ or 0.46 % yr⁻¹, which accelerating the global climate change. Global warming mitigation is becoming increasingly important as the effects of climate change are becoming apparent around the world. Wetlands are transitional systems occur intermediately between terrestrial ecosystems and aquatic ones and occur in areas where soils are artificially or naturally inundated or saturated by ground or surface water during part or all the year. Although wetlands occupy only 5-8 % of the earth’s land surface, they contain about 68 % of the terrestrial soil carbon reserves and have an important role in carbon sequestration. Hence, wetlands represent one of the largest biological carbon stocks and play a decisive role in the global carbon cycle. Wetlands can be considered as a significant carbon sinks on earth and are key ecosystems to consider when managing and weighing earth’s carbon stock. Their anoxic wet conditions are considered the fundamental factor slowing or resulting in incomplete decomposition of dead plant materials, resulting in accumulation of organic matter. The goal of this session is to provide a focused discussion between those working on problems related to wetlands and their role in mitigating the global warming.  
**Keywords:** Carbon capture and sequestration; Climate change; Global warming; Kyoto Protocol; Loss of wetlands; Mitigation and adaptation strategies; Mitigation measures; Simulation models; Soil organic carbon; Wetland management; Restoration of wetlands.
**Special Session 9**

**Title:** Eco-DRR (Ecology based disaster risk reduction)  
**Organizer:** Prof. Dr. Yukihiro Shimatani (Kyushu University, Japan)  
**Synopsis:** In the disaster research field, disaster prevention using Ecosystem which is one of the green infrastructures, Eco-DRR (Ecology based disaster risk reduction) are attracting international attention. Eco-DRR is generally cheaper in cost than countermeasures by artifacts. Furthermore, ecosystems have multifaceted value and provide us with grace from ecosystem to human beings in normal times. For this reason, Eco-DRR was also taken up in the Sendai Framework of the 3rd World Conference on Disaster Reduction held in 2015, so that Eco-DRR is an international trend. Eco-DRR cannot prevent all disasters, but can be more effective by combining with engineering techniques and software measures. Hybrid Eco-DRR combined with engineering technology is expected as an extremely effective method, but Eco-DRR is not familiar to engineers and its research is delayed worldwide. This session will exchange information on practical efforts of the world Eco-DRR.  
**Keywords:** Eco-DRR, traditional knowledge, mangrove, riparian and coastal forest, resilience  
**Topics of interest:**  
- Is Eco-DRR more effective than conventional disaster prevention technique?  
- Is the cost cheap?  
- Is there a hint of Eco-DRR in traditional knowledge?

**Special Session 10**

**Title:** Assessing the eco-hydraulic implications of sediment transport: novel methods and tools  
**Organizers:** Dr. Manousos Valyrakis (University of Glasgow), Dr. Oral Yagci (Istanbul Technical University), Dr. Mário J. Franca (École Polytechnique Fédérale de Lausanne)  
**Synopsis:** Obtaining a better understanding of the dynamics of transport processes of earth material due to the action of geophysical flows, occurring in rivers, estuaries, lakes, coasts and other natural environments, remains one of the most fundamental challenges in eco-hydraulics. Geomorphologic transport processes, spanning a wide range of scales, are intrinsically interlinked to the ecology of earth’s surface water systems. Thus their study finds a range of important applications, from hydraulic engineering and infrastructure risk assessment to ecological restoration and river rehabilitation.  
**Keywords:** turbulence, sediment transport, monitoring  
**Topics of interest:**  
In this session, contributions focusing on the measurement, monitoring and assessment of sediment transport processes are invited. We particularly welcome submissions that include, but are not limited to:  
- Experimental studies of particle scale transport processes  
- Fieldwork or case studies demonstrating novel sediment transport monitoring methods and/or applications of innovative measurement techniques  
- Numerical investigations investigating fundamental and/or practical aspects of transport processes, across scales (from particle to reach scale).
### Special Session 11

**Title:** Innovative measurement techniques in the lab and field  
**Organizers:** Dr. Jeffrey A. Tuhtan (Tallinn University of Technology), Dr. Markus Noack (Universität Stuttgart)  
**Synopsis:** New applications of existing image-based, optical and acoustic methods. Novel physical methods for the measurement and classification of biotic and abiotic conditions to advance ecohydraulics.  
**Keywords:** velocity, pressure, vorticity, turbulence, turbidity, temperature, vegetation, fish, flow sensing, classification, machine learning, sensor networks, underwater robotics  
**Topics of interest:**  
The topics of this special session are, but not limited to, the following:  
- Image processing (e.g. fish tracking, sediment motion, PIV)  
- Optoelectronic methods (e.g. fiber optic strain gauges)  
- Pressure-based sensing (e.g. pressure sensitive particles for sediment transport, lateral line probes)  
- Hydroacoustics (e.g. hydrophones, geophones and acoustic Doppler methods)  
- Inertial measurement units  
- High-frequency measurements in the lab and field

### Special Session 12

**Title:** Advances in ecohydraulic modeling: metrics and approaches towards genuinely integrated models  
**Organizers:** Dr. Davide Vanzo (Laboratory of Hydraulics, Hydrology and Glaciology (VAW), Swiss Federal Institute of Technology (ETH). Zürich, Switzerland), Dr. Christoph Hauer (Inst. for Water Management, Hydrology and Hydraulic Engineering, Univ. of Natural Resources and Life Sciences (BOKU). Vienna, Austria), Dr.- Ing. Klaus Jorde (KJ Consult. Klagenfurt, Austria), Dr. Alexander McCluskey (Fakultät Bau Geo Umwelt, University Technische Universität München (TUM). Munich, Germany), Dr. Valerie Ouellet (Stroud Water Research Center. Avondale, PA, USA), Emilio Politti (Dept. of Civil Environmental and Mechanical Engineering (DICAM), University of Trento. Trento, Italy), Dr. Nicolas Lamouroux (Irstea Lyon, France), Dr. Davide Vettori (Dept. of Geography, Loughborough University. Loughborough, UK), Prof. Daniele Tonina (Dept. of Civil Engineering, Center for Ecohydraulics Research, University of Idaho. Boise, Idaho, USA), Dr. Paolo Vezza (Dept. of Environment, Land and Infrastructure Engineering, Polytechnic University of Torino. Torino, Italy)  
**Synopsis:** Ecological and hydraulic models are common tools rooted into distinct paradigms (empirical/stochastic or deterministic) and evolved into diverse reference frameworks. At modeling level, their integration has traditionally been possible by adapting either hydraulic or ecological tools to face interdisciplinary problems. The challenge of the early and next generation of ecohydraulic modelers is to explore new approaches to genuinely couple ecological and hydro-morphological processes towards the development of integrated ecohydraulic models.  
This session focuses on the physical and mathematical modeling of river ecosystem processes occurring at a broad range of spatial scales, hence from grain-water interface to river reach scale. Coherently with the variety of spatial scales, several temporal scales may also be considered, spanning from single-event (e.g. physical and biological responses to natural and artificial flow peaks) to long-term evolution (e.g. ecological response to hydro-morphological adjustment or climate change).  
In this context we solicit contributions on consolidated approaches, novel tools as well as recent advances to model and predict interplays and feedbacks among different dynamic processes, such as (but not only): micro and meso-habitat changes, macrobiota (fish and macroinvertebrate) responses, sediment-water interface exchanges, water temperature and biochemical alterations, sediment transport and sorting, river morphodynamics, aquatic and riparian vegetation.  
**Keywords:** modeling, physical habitat, vegetation, sediment, interface, surface and subsurface hydraulics
### Special Session 13

**Title:** Innovative Monitoring Techniques for Ecohydraulic Research’

**Organizers:** Dr. Ellis Penning (Delttares, Delft, The Netherlands) and Dr. Daniele Tonina (Univ. of Idaho, Boise, USA)

**Synopsis:** This special session is dedicated to sharing the latest developments in monitoring techniques relevant for ecohydraulic research. This ranges from new measurement devices, such as fine-scale full spectrum cameras, green lidar applications and passive samplers, to new platforms such as Unmanned Aerial Systems (UAS) to host such devices, remotely operated boats or online sampling stations. We welcome contributions that show how these new techniques and instrumentation have furthered our understanding in ecohydraulics with a focus on cross-disciplinary research at larger spatial and temporal scales.

**Keywords:** innovative monitoring techniques, remotely operated vehicles, sensor development, online data acquisition, spatial scales

### Special Session 14

**Title:** Ecosystem-based Disaster Risk Reduction (Eco-DRR) and combined defense against tsunami and storm surge by artificial and natural systems

**Organizers:** Prof. Norio Tanaka (Saitama University, Japan), Prof. Sundar, V. (Indian Institute of Technology Madras, India), Prof. Murali, K. (Indian Institute of Technology Madras, India), Dr. Nandasena, N.A.K. (University of Auckland, New Zealand), Dr. Samarakoon, M. (General Sir John Kotelawala Defence University, Sri Lanka), Dr. Iimura, K. (Utsunomiya University, Japan)

**Synopsis:** Coastal vegetation has been widely recognized as a natural method to reduce tsunami energy after the 2004 Indian Ocean tsunami and the 2011 Japanese tsunami. However, the effectiveness depends upon the local magnitude of tsunami and also on the characteristics of the structure of vegetation. With respect to the Ecosystem-based Disaster Risk Reduction (Eco-DRR) for high-energy events likely tsunamis and storm surges, optimal risk reduction should be discussed not only by natural systems like coastal vegetation, coastal lagoons and/or sand dunes, but also by artificial structures such as embankments, breakwaters, and seawalls and the combination of both as well. Disadvantages of the natural systems should also be discussed; for example, during a tsunami event, open gaps in a forest which can channel and amplify flow velocity, and floating debris from broken trees which also can increase in damage to the surroundings. Many studies have revealed that these demerits can be overcome with proper planning and management of coastal forests. This session discusses the proper planning and management of vegetation for promoting and strengthening the concept of Eco-DRR by analyzing the effectiveness of combination of artificial and natural structures and tangibility of the combined system as a holistic approach to disaster risk reduction.

**Keywords:** Bioshield, Eco-DRR, combined defense, energy reduction of tsunami

**Topics of interest:**

The topics of this special session are, but not limited to, the following:

- Energy reduction by coastal forest
- Management of coastal forest
- Effective stand structure of forest
- Combined defense with artificial and natural systems
### Special Session 15

**Title:** Restoring River-Floodplain Connectivity and Riparian Ecosystems  
**Organizers:** Dr. Kumud Acharya (Research Professor, Desert Research Institute, NV, USA), Dr. Mark Stone (Associate Professor, University of New Mexico, NM, USA), Dr. Ryan Morrison (Assistant Professor, Colorado State University, CO, USA), Dr. Shaohua Marko Hsu (Professor, Feng Chia University, Feng Chia, Taiwan), Dr. Yiping Li (Professor, Hohai University, Nanjing, China)  
**Synopsis:** The dynamic interaction between a river and its floodplain is important for a variety of hydrologic, ecological, and geomorphic processes. A notable example is the role of floodplain inundation in sustaining riparian ecosystems, which provide numerous water quality, habitat, and geomorphic benefits. Water management and river engineering activities have widely disrupted the natural flow regime, reducing floodplain connectivity and in many cases harming riparian ecosystems and other ecological processes. A growing appreciation of the human impacts on river-floodplain connectivity has led to many restoration efforts and studies over a range of scales, including both passive (e.g. environmental flows) and active (e.g. channel and bank modification) techniques.  
This session plans to bring together researchers who are working on river-floodplain connectivity, riparian ecosystem, and other river restoration areas. Abstracts from a variety of studies are welcome, including hydrodynamic, ecological, and geomorphic perspectives of river and floodplain systems. The discussion will focus on how to better understand hydrogeomorphic and ecological responses to restored connectivity and methods for assessing connectivity. Examples may include hydrodynamic and ecohydraulic modeling techniques, riparian ecosystem responses to improved connectivity, ecosystem services, evaluation of large-scale floodplain loss, or hydrogeomorphic responses to reduced connectivity.

### Special Session 16

**Title:** People and Politics in Ecohydraulics  
**Organizers:** Marin Wilkes (Centre for Agroecology, Water & Resilience, Coventry University, UK), Tom Wakeford (Centre for Agroecology, Water & Resilience, Coventry University, UK), Luiz Silva (Universidade Federal de São João del-Rei, Brazil/Charles Sturt University, Australia)  
**Synopsis:** Ecohydraulics plays a critical role in research applications that have the potential to cause public controversy. This was clearly evident at ISE 2016 when David Papps (Commonwealth Water Office, Australia) and Tom Chesson (National Irrigators’ Council) went head-to-head over the Murray-Darling Basin Plan, continuing an argument that has received intense media attention. At the same time, developing closer research partnerships between academics, policy makers and public participants holds great potential to improve the coverage, quality and impact of ecohydraulics, as it has in other hydrological and ecological sciences.  
Outcomes from a recent workshop held by the Early Careers on Ecohydraulics Network (www.ecoenet.link) showed that public and political engagement is a key priority for the next generation of ecohydraulics specialists (Wilkes et al., 2016, Journal of Ecohydraulics 1: 102-107). The incorporation of ideas from the social sciences was also seen as important for further developing ecohydraulics into a fully integrated discipline, particularly through increasing the coverage, quality and impact of ecohydraulics research.  
We welcome submissions that explicitly focus on the relationships between ecohydraulics, other disciplines, policy makers and the public. Specific examples include: supporting policy decisions; informing public debates; critical physical geography; political ecology; citizen science; and participatory action research.  
**Keywords:** Policy; public; citizen science; participatory research; critical physical geography; political ecology
**Special Session 17**

**Title:** Riparian Vegetation Processes – Knowledge, Modelling and Management  
**Organizers:** Dr. Hyoseop Woo (Gwangju Institute of Science and Technology), Dr. Takashi Asaeda (Saitama University), Dr. S.-U. Choi (Yonsei Univ), Dr. Mahito Kamada (Tokushima University, Dr. Gregory Egger, Dr. Rohan Benjankar (Southern Illinois University)

**Synopsis:** The riparian vegetation processes, recruitment, establishment, succession and retrogression, have been considered as a part of the natural phenomena, like flood and drought and changes in river course in fluvial system. Accelerated riparian vegetation processes due to anthropogenic changes and possibly climate change, however, have caused dramatic changes in the riparian ecosystem functions, and in some places, increased river-induced disaster risks. This phenomenon is called symbolically, in some regions, change from ‘white river’ to ‘green river’. This special session focuses mainly on 1) the scientific knowledge of riparian vegetation processes and interaction of each process with its non-biotic environment, 2) computer modelling of the processes based on the physical, chemical, and biological interactions and threshold conditions, and 3) management, based mostly on adaptation, of the detrimental effects of the accelerated riparian vegetation processes to human as well as conservation of the ecosystem. Relevant case studies in different geographic and climatic regions of each topic are also discussed.

**Keywords:** riparian vegetation, dynamic succession model, ‘white to green’ river, adaptive management

**Topics of interest:**
- Fundamentals of riparian vegetation processes (including field observation)
- Change in flow and sediment regimes and riparian vegetation
- Climate change and vegetation recruitment
- Invasion of exotic species in riparian vegetation
- Effects of non-point source pollutions to riparian vegetation
- Effects of riparian vegetation on flood management
- Riparian vegetation models: dynamic succession models
- Adaptive management of riparian vegetation (including stream restoration)

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**Special Session 18**

**Title:** Development of the Kanto Region Ecological Network  
**Organizers:** Masami Hasegawa (Ph.D, Professor, Toho University)

**Synopsis:** The Kanto Region used to have a wealth of biodiversity in its wetlands, but as the region was urbanized, rich ecosystems were rapidly lost. To reverse the situation, it is needed to conserve and restore wetlands and green spaces, to develop a blue and green network, and to protect habitats of wild fauna and flora.

The Kanto Region once was a major distribution area of Oriental white stork (Ciconia boyciana) and Japanese Crested ibis (Nipponia Nippon), which can be good indicator species of wetlands and green spaces. For this reason, various stakeholders are collaborating with each other to conserve and restore waterside environments in riparian areas by using storks and ibises as indicator or symbolic species.

Those stakeholders are also making efforts to develop a nature-rich water and green ecological network and to promote robust economic development and economic revitalization.

**Keywords:** Wetland restoration, habitat recovery, economic development, and economic revitalization

**Topics:**
1 Efforts of river administrators: Wetland creation and restoration in river areas
2 Efforts of local municipalities: Spreading of eco-farming
3 Efforts of NPOs/NGOs: Conservation and management of wildlife habitats
4 Efforts of private companies: Nutrition education and environmental education hands-on events, and facilitation of the urban-suburban economic benefit flow
### Special Session 19

**Title:** Integration of Eco-hydrology with RS and GIS for monitoring water resources.

**Organizers:** Dr. Le Quoc Hung (Vietnam National Remote Sensing Department, Vietnam), Assoc. Prof. Dr. Tran Ngoc Anh (VNU University of Science -Vietnam National University, Hanoi, Vietnam), Dang Truong Giang (Vietnam National Remote Sensing Department; Vietnam), Dr. Tran Tuan Ngoc (National Remote Sensing Department, Vietnam), Dr. Chu Hai Tung (Vietnam National Remote Sensing Department, Vietnam), Assoc. Prof. Pham Van Cu (Hanoi University of Natural Resources and Environment, Vietnam)

**Synopsis:** Under climate change and human activities, water management must face a lot of challenges in 21st century. There are increased pressures on water resources with many high competitions of the water users at local, regional and international scales, between upstream and downstream. Thus, monitoring water resources must provide the explicit description of water quantity and quality, water redistribution and water use from reservoir, river and groundwater systems, achieving greater spatial detail. RS and GIS is the strong tool to collect the data of the earth in large scale. Integration of Eco-hydrology with RS and GIS can estimate water surface volume, some chemical and physical features of water to improve accuracy and spatial detail in hydrological and ecological model estimation. Besides, it can detect abnormal index of hydrology, ecology, topography characteristics under changing of water flow whereby people can prevent and reduce water disaster water disaster to ecosystem.

**Keywords:** Eco-hydrology, RS, GIS, water management, water disaster, climate change.

**Topics of interest:**
- Developing integration of Eco-hydrology with RS and GIS method.
- Integration of Eco-hydrology with RS and GIS for monitoring water quantity and water quality.
- Integration of Eco-hydrology with RS and GIS to prevent and reduce polluted water disaster; flood and drought; impact of water exploitation.
- Developing and applications of Integration of Eco-hydrology with RS and GIS to improve accuracy of hydrological and ecological model.
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<th>Special Session 20</th>
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| **Title:** A Thousand And One Ways to Explore Hydrosystems Using Remote Sensing  
**Organizers:** Ana Adeva Bustos (NTNU, Norway), Christian Haas (I AM HYDRO, Germany), Knut Alfredsen (NTNU, Norway), Richard Hedger (NINA, Norway)  
**Synopsis:** Remote sensing (RS) of hydrosystems experienced a vast development over the last years. With increasing computing capacity, development and improvement of sensors, the field offers a wide range of new possibilities. However, remote sensing, particularly on riverine systems has still a big potential for developing new methods and applications. This session will focus on RS applications for monitoring and managing freshwater ecosystems in terms of physical, chemical and biological parameters varying from micro and meso scales up to the full extent of catchments. It offers an effective approach in terms of cost, output and effort as subject to the project scale.  
This session will offer the opportunity to present latest state of the art in remote sensing on riverine systems as well as current research and development, including methods, sensors, data processing as well as implementation of data and technology.  
**Keywords:** Remote sensing applications, sustainable management, remote sensing methods, remote sensing challenges  
**Topics of interest:**  
- Methods and retrieval of RS data  
- Cost-effectiveness of the sensor and method used  
- Challenges during data processing  
- Early stage methods (testing phase)  
- Comparisons of RS methods  
- Multi-observation (sensors, resolutions, monitoring) analysis of RS data  
- Applications of image retrieval in remote sensing:  
  - Climate change and flood control/lake imaging  
  - Thermal applications  
  - RS as inputs to biological models  
  - RS and vegetation  
  - RS and ice |

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<th>Special Session 21</th>
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| **Title:** Hydrology and ecology of brackish water zones  
**Organizers:** Masumi Yamamuro (The University of Tokyo, Chiba, Japan), Takashi Asaeda (Saitama University, Saitama, Japan)  
**Contact information:** Masumi Yamamuro (The University of Tokyo, Chiba, Japan)  
**Synopsis:** Brackish water zones provide with various kinds of important aquatic resources, such as fish and finfish, clam, etc.. These organisms are highly affected by the conditions related to salinity of water in the zone. Higher density of saline water compared to freshwater produces the stable stratification in the brackish zone and the anoxic condition in the bottom layer. The anoxic condition affects several chemical properties of the sediment, such as the production of hydrogen sulfide, etc., and prohibits the colonization of benthic invertebrates. Salinity also determines the animal species, and temporal and spatial compositions of vegetation. The source of the salinity in brackish water zones is the intrusion of sea water, and is affected by the geomorphology of the connection to the sea, meteorological conditions, sea level, freshwater and sediment inflows, wave action, etc.. These intricately connected features of the brackish water zones are discussed in this session.  
**Keywords:** brackish water; salinity stratification; anoxic zone; benthic invertebrates; Corbicula clam  
**Topics of interest:**  
The topics of this special session are, but not limited to, the following:  
- Lagoons  
- Estuaries  
- Tidal zone of the river |
**Special Session 22**

**Title:** GIS and remote sensing application on rivers and watersheds management  

**Organizers:** Dr. H.L.K. Sanjaya (Department of Limnology and Water Technology, Faculty of Fisheries and Marine Sciences and Technology, University of Ruhuna Matara, 81000, Sri Lanka)  

**Synopsis:** GIS and remote sensing technology has received a considerable interest in river and watershed management in the recent years. This technology is now widely applied on collecting and processing data, as it has proved to be a practical approach to study complex geographic terrain types and diverse inaccessible ecosystems. It provides a wide range of sensor systems including aerial photographs, airborne multi-spectral scanners, satellite imagery, low and high spatial and spectral resolution and ground based spectrometer measurements. Remote sensing technology has many attributes that would be beneficial to detecting, mapping and monitoring the dynamics of the rivers and their watersheds. The multi date nature of satellite imagery permits monitoring dynamic features of landscape and thus provides a means to detect changes and quantify the rates of change in relation to the rivers. Integrated GIS and remote sensing have already successfully been applied in various other aspects including hydrological and environmental modeling. On the other hand, an increasing number of publications dealing with the application of remote sensing and GIS can be seen in recent years. Therefore, having such a strong topic in the ISE2018 conference will be an added value to the conference to attract a wide range of audience.  

**Keywords:** GIS and remote sensing, satellite imagery, river dynamics, watersheds, river dynamics  

**Topics of interest:**  
- Sediment processes in rivers  
- Influences of watershed processes on rivers  
- Spatial and temporal dynamics of river landscape

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**Special Session 23**

**Title:** Clarification of biotic production mechanism and application for river ecosystem management — Collaborative research through integration of ecology and river engineering —  

**Organizers:** Masatoshi DENDA (Public Works Research institute, Water environmental group, River restoration team, Japan)  

**Synopsis:** Present studies and restoration on river ecosystem mainly focus on habitat restoration. However, river ecosystems are established on not only habitat but also material and organic dynamism, that is consist of primary production and secondary production such as aquatic insects and fishes. To effectively conserve the river ecosystem, it is important that we focus on primary production and secondary production.  

River ecosystem academic research group of the Chikuma River corroborating ecologist and river engineer have conducted field research and numerical model research, trying to clarify mechanisms of the productions. We deal the production as continues systems consisting of river morphology, 3D flow on pool and riffle structure, primary production and secondary production. And we evaluated on influence of structure change of this system on fisheries resource, try to develop river channel management criteria to maintain the production.  

In this session, we will report the latest research results on the corroborating research, and will discuss total management method adding the view point on productivity to the habitat conservation  

**Keywords:** Morphology and hydraulics; Pool and riffle structure; Primary and secondary production; Management criteria of productivity  

**Topics of interest:**  
- Primary production and secondary production relating pool and riffle structure  
- Organic matter dynamism relating 3D hydraulics  
- Corroborations between filed observation on biotic and numerical hydraulic simulation  
- Management criteria on primary production and secondary production
**Title:** Ecohydraulic approaches to analyse multiple stressors in aquatic ecosystems

**Organizers:** Thomas Hein (University of Natural Resources and Life Sciences, Vienna & WasserCluster Lunz, Dept. Water – Atmosphere – Environment, Gregor-Mendel-Straße 33, 1180 Vienna), Takashi Asaeda (Saitama University, Department of Environmental Science, 255 Shimo-okubo, Sakura, Saitama, 338-8570 Japan), Elisabeth Bondar-Kunze (University of Natural Resources and Life Sciences, Vienna & WasserCluster Lunz, Dept. Water – Atmosphere – Environment, Gregor-Mendel-Straße 33, 1180 Vienna)

**Synopsis:** Aquatic ecosystems are exposed to multiple stressors ranging from alterations in geomorphology, hydrology, pollution and various other pressures related to changes in temperature and species composition. These stressors are not only affecting aquatic systems individually, moreover they also show interlinked effects based on complex stressor interactions. Conceptually, these interactions can be additive, antagonistic and synergistic compared to single stressor effects. In lotic environments flow alterations are a key issue and are related to water abstraction, damming, residual flow and hydro-peaking effects. These alterations in flow are combined with various other stressors in many aquatic ecosystems and thus, the understanding of these interactions is a critical issue for aquatic ecology and ecosystem management.

Various examples for different ecosystem components and for different regions and aquatic ecosystems will be discussed and allow a comprehensive overview on the current status and potential future development as well as the identification of relevant multiple pressure interactions and their effects on ecosystem health and provide a basis for future implementation in aquatic ecosystem management.

**Keywords:** drivers, pressures, multiple pressure effects, synergistic effects, antagonistic effects

**Topics of interest:**
- Types of multiple pressure interactions
- Experimental evidence of multiple pressure interactions
- Case studies demonstrating multiple pressure effects
- Further implication for ecosystem management