

# 5<sup>th</sup> International Conference on Flood Management (ICFM5)

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**Plenary Session 1**  
**“Flood Forecasting and Early Warning Systems”**

**Organized under the auspices of**  
**INTERNATIONAL FLOOD INITIATIVE**

*U-Thant Hall (UNU), 27 September (10:10 to 11:30)*

**Overview and Scope of the Session**

Floods play a vital role in the economic development and societies in many parts of the world have taken full advantage of the rivers and other water bodies that are highly prone to flooding, as vehicles for development. At the same time floods also pose the most taxing water-related natural hazard to humans, economic activities, as well as to cultural and ecological resources. Integrated approach to flood management, therefore, calls for a balanced approach to make best use of the flood plains while reducing the risks due to flooding to a minimum.

Hashimoto Action Plan prepared by UN Secretary-General’s Advisory Board (UNSGAB)’s High-Level Expert Panel in the “Water and Disaster” identifies flood early warning as an essential element that supports the Hyogo Framework for Action. Many international efforts are focusing on assisting nations and regions in dealing with challenges of water related disasters. The International Flood Initiative jointly proposed by UNESCO and WMO and supported by ISDR, UNU, IAHS and IAHR; the Associated Program on Flood Management and other similar initiatives, in their own way are implementing follow up on the actions identified therein.

Efficient early warning system that deliver dependably accurate information on the likely flood events for preparation and response to the impending flood situation, which form a vital element of this integrated approach are not getting the investment they deserve as a risk reduction tool. Particularly, in the developing countries, the benefits of latest scientific and technological advances are not being fully reaped. Full exploitation of basic and advanced information technologies to improve flood forecasting and early warning, fostering inter-sectoral communications, and collaboration is called for. New developments in aerial photography, satellite communication and computational sciences have to be used to further expand our understanding of the climate system and forecasting and warning of flood events.

There is need for greater thrust in international efforts to share new, innovative developments in flood risk reduction methodologies; exchanging experiences gained in the areas of integrated flood management; bridging the gaps that exist between the flood research and development community on one hand and the flood professionals responsible for responding to and mitigating the adverse impacts of major flood events on the other.

The session will provide a brief overview of some of the present mechanisms being used for transferring the existing technologies in flood forecasting and early warning to the developing countries and would discuss the advancements in the flood forecasting and early warning technologies and the gaps that need to be addressed through research.

## **Agenda**

**Venue:** U-Thant Hall, United Nations University

### **Session Chair:**

Mr. Avinash Tyagi, WMO

### **Co-conveners:**

WMO and UNESCO through IFI

#### **1. Introduction of IFI and overview and scope of the session (5 Minuets)**

*Mr. Avinash Tyagi, WMO*

#### **2. Invited Speaker: (15 Minutes)**

*Mr. Harry Baayen, The Netherlands*

#### **3. Keynote Speakers (45 Minutes)**

- Flood early warnings and the response mechanisms (Australia Case Study)

*Mr. Jeff Perkins, Bureau of Meteorology, Australia*

- Flood early warning systems – research gaps and future needs

*Prof Slobodan Simonovic, University of Western Ontario, Canada*

- A proposal on practical approach to implement flood forecasting/warning system in poorly-gauged river: applications of IFAS

*Mr. Kazuhiko Fukami, PWRI/ICHARM, Japan*

#### **4. Question and Answers (15 minutes)**

Moderator: Mr. Avinash Tyagi

**Plenary Session 2**  
**“Floods, Landslide and Debris Flow due to  
Torrential Downpours”**

*U-Thant Hall (UNU), 27 September (17:35 to 18:55)*

**Overview and Scope of the Session**

As the global climate changes, torrential rainstorms occur more frequently in many regions around the world. Flash flood, landslide and debris flow caused by heavy rainstorms always happen suddenly with poor predictability and short time for warning, and these are the main causes for the flood-related casualties. The destructive powers of such calamities are so strong that they not only damage encountered assets and infrastructures, but also deteriorate river ecosystem and environment. Meanwhile, pluvial flood due to heavy rains in urbanized areas are getting more and more serious. How to deal with the sudden floods, landslide and debris flow disasters has become one of the major challenges that communities are facing. Especially in developing countries, such risks have been increasing due to the intensification of human activities, rapid urbanization, accelerated development in high-risk areas, etc.

The objective of this plenary session is to explore the new features of such calamities in context of the global climate change and socioeconomic development, and how to strengthen the capacity building in a comprehensive way to restrain the growth of the risk effectively. The key points that will be discussed in the session include:

- Disaster chain of torrential downpours, floods, landslide and debris flow and their risk features;
- Predictability of the outburst floods, landslide and debris flow and the effectiveness of countermeasures
- Appropriate coping strategies for nations or regions with different social economic development level.

We expect to improve the understanding of the complexity of such outburst calamities through the discussion and exchange in the plenary session, and then, contribute to the best choice of solutions proper to the local conditions, and to promote the combination of the effective traditional experiences and new technologies. It is a long-term and arduous task, coexisting risk and opportunity. We have to devote more efforts consistently to enhance the security level step by step.

## **Agenda**

**Venue:** U-Thant Hall, United Nations University

### **Session Chair:**

Prof. Yangwen Jia, China Institute of Water Resources and Hydropower Research (IWHR)

### **Co-conveners:**

- Peng Cui, Professor, Institute of Mountain Hazards and Environment (IMHE), CAS, China
- Nigel Wright, Professor, School of Civil Engineering, University of Leeds, UK

### **1. Keynote Speakers (45 Minutes)**

1. Xiaotao Cheng, Changes of Flood Risk and the Coping Strategies in China, 15 minutes
2. Peng Cui, Debris Flow Disaster and Mitigation in China, 15 minutes
3. Nigel Wright, Assessing and Mitigating the Risk of Torrential and Debris Flow Across the Globe, University of Leeds, UK, 15 minutes

### **2. Panel Discussion (35 minutes)**

Moderator:

Yangwen Jia, Professor, China Institute of Water Resources and Hydropower Research (IWHR)

Panelists:

1. Keiichi Toda, Professor, Disaster Prevention Research Institute (DPRI), Kyoto University, Japan.
2. Nigel Wright, Professor, School of Civil Engineering, University of Leeds, UK
3. Peng Cui, Professor, Institute of Mountain Hazards and Environment (IMHE), CAS, China
4. Xiaotao Cheng, Professor, China Institute of Water Resources and Hydropower Research (IWHR)
5. Yueian Liou, Professor, President of Taiwan Group on Earth Observation, Chinese Taipei.

## Special Session 1

# **“Flood Risk Management Approaches as Being Practiced in Japan, the Netherlands, United Kingdom and United States”**

*UDX-Theatre, 28 September (11:00 to 12:30)*

### **Overview and Scope of the Session**

Floods affect some 520 million people every year, claiming the lives of about 25,000 worldwide and causing global economic losses between \$50 and \$60 billion annually. Therefore, it is essential to seek to manage flood risk effectively and appropriately. Consideration of flood risk includes the probability of occurrence of a flood hazard; the vulnerability of individuals, society, and the environment despite flood mitigation from a broad variety of measures implemented to dampen flood consequences; and the consequences that result from the mitigated hazard event.

The Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the Dutch Rijkswaterstaat, the United Kingdom Environment Agency, and the United States Army Corps of Engineers agreed to develop a document to explore risk-informed approaches as being practiced and developed primarily in those four countries. Although very different in frequency and scale of flooding as well as cultural and governmental characteristics, each country had significant efforts underway to better orient its practices to flood risk realities, including those induced by altered land use and by climate change and variability. The collaboration was envisioned as a continuing step in international collaboration and as a way to share information more broadly within the four participating countries and perhaps beyond.

Commonalities among the four countries are striking. Despite their varied histories and circumstances, the four countries face similar key challenges. These include adapting to new understandings of risk that take into account the impacts of climate change, bridging gaps between land-use decisions and flood risk management considerations, effectively communicating risk to the general public in a way that promotes individual as well as societal responsibility, and aligning planning and actions to identify and meet the most critical risks within a framework that is socially, environmentally, economically, and politically acceptable.

There are also some notable distinctions in approaches between the four countries. These include whether or not national levels of protection are specified and, if so, whether those levels are legislated or aspirational; whether or not the government supports flood insurance programs; and historic practices that influence how flood risk management is delivered in each country.

This special session will provide an overview of the four countries' collaboration and their resulting jointly-prepared document. Presentations by each country will then highlight example approaches, the drivers for those approaches, and practices that are working or hold particular promise. The session will conclude with a facilitated discussion.

## **Agenda**

### **Session Chair:**

Steven Stockton, US Army Corps of Engineers (United States)

### **Co-conveners:**

Ministry of Land, Infrastructure, Transport, and Tourism (Japan)

Rijkswaterstaat (Netherlands)

Environment Agency (United Kingdom)

US Army Corps of engineers (United States)

## **1. Presentations**

- 1) "Overview of Flood Risk Management Approaches as Being Practiced in Japan, Netherlands, United Kingdom and United States," Steven Stockton, US Army Corps of Engineers (United States), 15 minutes
- 2) "Flood Risk Management in the Netherlands and Risk Assessment Example," Durk Riedstra, Rijkswaterstaat (Netherlands), 15 minutes
- 3) "Flood Risk Management in the United Kingdom and Policy Development," Craig Elliott, Environment Agency (United Kingdom), 15 minutes
- 4) "Flood Risk Management in the United States and Executive Aspects," Pete Rabbon, US Army Corps of Engineers (United States), 15 minutes
- 5) "Flood Risk Management in Japan and Executive Aspects," Kenichiro Tachi, Ministry of Land, Infrastructure, Transport, and Tourism (Japan), 15 minutes

## **2. Facilitated Discussion**

### *Moderator:*

Steven Stockton, US Army Corps of Engineers (United States)

### *Panelists:*

- Jos Van Alphen, Delta Commission (Netherlands)
- Craig Elliott, Environment Agency (United Kingdom)
- Kenichiro Tachi, Ministry of Land, Infrastructure, Transport, and Tourism (Japan)
- Pete Rabbon, US Army Corps of Engineers (United States)

## Special Session 2

# “Practical Steps for Adapting to Climate Change”

*UDX-Theatre, 28 September (13:30 to 15:00)*

### **Overview and Scope of the Session**

The session should focus on presenting ideas for an international consortium of leading world hydrologic centers to undertake a coordinated program of activities that would address the key aspects of adaptation to climate uncertainty related to the development of a new family of methods and procedures for planning and design of hydraulic infrastructure and water management approaches consistent with IWRM. This initiative is part of the UN Secretary General's Advisory Board (UNSGAB) series of actions. The 'High Panel on Water and Disasters' (UNSGAB) recognizes that the world must move beyond reaction and disaster assistance, to prevention, mitigation and adaptation to climate change and increased variability. Floods, droughts and sea level rises are the most frequently mentioned immediate water related disasters projected under various climate change scenarios. Therefore water-related actions will be central to rich and poor societies' abilities to adapt to these projected changes. Since the importance is so high and time is short, the water resources community should bring together the best we have worldwide to discern what can be done to adapt.

UNSGAB Action 29 (Report: Water and Disasters: High Level Expert Panel on Water and Disasters/UNSGAB, March 2009) reads as follows:

*“National and international hydrological institutes must take the initiative to identify underlying analytical and data requirements to meet climate changes that are likely to be highly uncertain and so as to support structural and non-structural measures for disaster risk deduction.”*

Major practicing hydrologic research institutions worldwide should form a consortium to develop a new family of practical hydrologic engineering tools, methods, procedures and professional standards for the planning, design, operation and maintenance of infrastructure under non-stationary climate trends and climate change uncertainty. The consortium would assess existing, and generate new 'best management practices' under climate uncertainty, that could be used by water managers and specialists throughout the developed and developing countries that would guide them through the transitional period of improved GCM development. International aid agencies such as the World Bank, USAID, FAO and UNDP, would be engaged, as they would also benefit from these new procedures,

There are five complementary parts to the issue:

- Analytical Tools: the technical development of new hydrologic/hydraulic tools and techniques which adapt to the new climate variability trends which can be used for engineering design and operation of the existing water infrastructure; and
- Vulnerability assessment protocols: the integration of new climate variability /change hydrologic assessments and protocols as part of watershed planning, formulation of response actions and evaluation of benefits and costs under increasing climate uncertainty. This is the IWRM component of the inquiry.
- Development of project evaluation/justification protocols that are based on accepted benefit cost procedures that rely on concepts of flood and drought frequency, return periods and 'expected annual damages', along with risk assessment procedures.
- Development of risk-based engineering design criteria for various types of water-based infrastructure (spillway design, levees, 'safe yield', maximum probable flood, etc.)
- Improvement of reliability of short-term hydrologic forecasting tools for flood, drought and reservoir management (10-, 30-, 60- and 90-day seasonal forecasts)



## **Agenda**

### **Session Chair:**

Mr. Robert Pietrowski, Director, UNESCO-ICIWaRM

### **Co-conveners:**

UNESCO-IHP and Institute for Water Resources, U.S. Army Corps of Engineers.

### **Invited Participants:**

Academics (educators and researchers), policy makers and practitioners, students, government officials etc. in the field of flood management (estimated 150 attendees)

### **1. Opening remarks**

Robert Pietrowsky (USA), 10 Minutes

### **2. Keynote Speakers**

- 1) Changes in flood risk in Europe – climate track (Dr Kundzewicz, Poland)
- 2) Impact of climate change on water resources in China and adaptation strategy (Dr Chang, China)
- 3) Uncertainty assessment associated with a climate change scenario for water resources management - with environmental consideration (Dr. Chung, S. Korea)
- 4) Climate change impacts on German water ways - what we know and what we need to know (Dr. Cullman, Germany)
- 5) Climate change impacts on Australian water availability and adaptation (Dr. Prasantha Hapuarachchi, CSIRO, Australia)

### **3. Panel Discussion (with invited speakers)**

*Moderator: Robert Pietrowsky*

## Special Session 3

# “A Decade of Integrated Flood Management”

Organized to celebrate the 10<sup>th</sup> Year Anniversary of  
**Associated Programme on Flood Management (APFM)**

*UDX-Theatre, 28 September (15:15 to 16:45)*

### **Overview and Scope of the Session**

Established jointly by the World Meteorological Organization (WMO) and the Global Water Partnership (GWP) in 2001, the Associated Programme on Flood Management (APFM) is the world's premier comprehensive knowledge base for the development and implementation of best practices in Integrated Flood Management (IFM), worldwide. Realizing that IFM has a high return on investment, this innovative approach – where implemented – creates tangible socio-economic benefits for national flood management strategies and related programmes as well as on river basin and regional scales.

Floods are increasingly affecting the world's population. Growing population pressure in flood-prone areas, combined with increasing climate variability, climate change and often inadequate land use and natural resource management, are increasing the challenge to address floods in a sustainable manner. While flood waters are an essential water resource in many countries and floodplains hold many benefits for society for economic development, they can also cause huge losses of lives, livelihoods and properties and thus can be a hindrance to socio-economic development of nations.

Therefore, an integrated approach to flood management is necessary to balance development opportunities on flood plains and flood risk. An important aspect of integrated flood management strategy is coordinating the needs of different stakeholders.

The APFM draws on the professional capacity of its multidisciplinary partners – including highly specialized centres of excellence, established development partners, national governments and international organizations – to provide a demand-driven mechanism for addressing flood management realities.

Case studies, demonstration projects, and a considerable number of technical tool publications are the main elements that form the growing knowledge base of the APFM since its inception. The IFM HelpDesk is the main access gate to this knowledge base that has been accumulated to facilitate finding pragmatic solutions bridging the gap between international policy consensus and management challenges.

The IFM HelpDesk is designed for use by stakeholders in the fields of water resources management, disaster risk reduction and climate change adaptation. They include national, provincial and local agencies, National Meteorological and Hydrological Services, river basin organizations, non-governmental organizations, universities, community-based organizations and other flood management practitioners and planners. The domain [www.floodmanagement.info](http://www.floodmanagement.info) provides the central access point where a range of services can be requested; and various tool documents, capacity building and learning materials retrieved.

In occasion of ICFM 5, the APFM Team and its partners take the opportunity to present its achievements and lessons learnt over the past decade and to express its continued dedication to promote the IFM concept. The way forward will be guided by the vision for IFM implementation at all levels and the APFM Team looks forward to your inputs and thoughts during the open discussion of this special session.

## **Agenda**

### **1. Introduction**

Chair: Mr Arthur Askew, Former President, International Association of Hydrological Sciences (IAHS)

Moderator: Mr Joachim Saalmüller, German Weather Service (DWD)

Video message by the Chair of the APFM Advisory and Management Committees  
Mr Torkil Jønch-Clausen, Global Water Partnership (GWP)

### **2. Welcome to the Event**

Mr Tomoo Inoue, Ministry of Land, Infrastructure, Transport and Tourism (MLIT)  
Ms Letitia A. Obeng, GWP

### **3. Achievements of APFM**

#### **3-1. Implementation of IFM over the Past 10 Years**

Mr Avinash Tyagi, World Meteorological Organization (WMO)

#### **3-2. Strategy for IFM in Kenya**

Mr John Olum, Water Resources Management Authority (WRMA), Kenya, and  
Mr Mikio Ishiwatari, Japan International Cooperation Agency (JICA)

### **4. Future orientation of APFM**

#### **4-1. IFM HelpDesk – Framework of IFM Implementation**

Mr Wolfgang Grabs, WMO

#### **4-2. Private Partnerships**

Mr Evžen Zeman, DHI Group

### **5. Open discussion**

### **6. Summary and conclusions**

### **7. Closing remarks**

Mr Tomoo Inoue, MLIT

## Special Session 4

# “Education and Capacity Building in Flood Management”

*UDX-Theatre, 28 September (17:00 to 18:30)*

### **Overview and Scope of the Session**

The challenges related to flood management are huge! Humans continue to live more and more in flood prone areas (floodplains, deltas etc.), which results in an increasing exposure to severe flooding. At the same time, climate change and other global changes (incl. land use changes, concentration of economic values, river channelization) continue to alter the frequency and severity of floods and coastal storm surges. A number of studies demonstrated that the stationarity assumption, which is key for most of the usually applied time series analysis methods, often does not apply any more. In addition, in most river basins human activities have disrupted the natural hydrological regimes. Therefore, new methods need to be developed to better understand coupled human/natural systems and provide suitable inputs for sustainable flood management. To this end, a great opportunity is offered by the current growing availability of remote sensing products and, in particular, of globally and freely available space-borne data. However, so-called ground-truthing data is essential for fully utilizing the potential of remotely sensed data and this is often not available in particular in the developing world.

Many studies showed that flood management approaches that rely only on hard engineering (dams, dykes etc.) do not result in a desired outcome. They are restricted due to physical, societal, environmental and financial conditions. Therefore, integrated flood management approaches are suggested that include a case-specific combination of structural and non-structural measures. It has been shown that integrated approaches are often more effective in reducing flood risk, while at the same time maximizing the benefits of floods. However, how to implement integrated flood management schemes including the needed capacity development activities in an ever changing world is often unknown and requires research and rethinking of our current approaches. This seems to be true in particular in the developing world, where a better flood management is very much needed to limit the societal impacts of floods.

This special issue aims at discussing challenges in education and capacity building as well as ways forward. The following questions will be addressed (not limited to):

- What are the main challenges for education with particular emphasis on integrated flood management? And, how they can be addressed?
- What are the necessary skills and competency profiles for flood experts of the future to remain effective in a changing and increasing complex world?
- What are the best ways to improve the education of flood experts?
- What are the roles of tertiary education programmes, continuous professional development (CPD) programmes and international collaboration programmes in the field of integrated flood management?
- How can integrated flood management in less developed countries be improved, countries which are most vulnerable to global changes but have the least resources for training and capacity building?

## **Agenda**

### **Session Chairs:**

Prof. Stefan Uhlenbrook, UNESCO-IHE (Netherlands) and Prof. Kuniyoshi Takeuschi, ICHARM (Japan)

### **Co-conveners:**

UNESCO-IHE, JICA, ICHARM and IFI Partners

### **Invited Participants:**

Academics (educators and researchers), policy makers and practitioners, students, government officials etc. in the field of flood management (estimated 150 attendees)

### **1. Opening remarks**

Kuniyoshi Takeuschi, ICHARM (Japan), 5 Minutes

### **2. Keynote Speakers**

Invited presentation on "*Flood management in a changing world - why and how do we have to change our approach in education?*" Uhlenbrook et al., UNESCO-IHE

Invited presentation on "*Experiences and lesson learned from flood management training courses at ICHARM*" Tanaka et al., ICHARM, Japan

Invited presentation on "Flood Management - Urgent Needs for Interdisciplinary Education", Slobodan Simonovic, Canada

Invited presentation on "*Review on Japanese assistance of in the field of flood management*" Amano Yusuke Amano, Japan International Cooperation Agency (JICA), Japan

### **3. Panel Discussion**

*Moderator:*

Stefan Uhlenbrook (UNESCO-IHE, the Netherlands)

*Panelists:*

- Yusuke Amano, JICA, Japan
- Arthur Askew, chair of IAHS (IFI partner) Working Group on Education
- Julius Wellens-Mensah, WMO(IFI partner) and Ministry of Water Resources Work and Housing, Ghana
- Slobodan Simonovic, ICLR (IFI partner), Canada
- Kuniyoshi Takeuschi, ICHARM (IFI Secretariat), Japan

## Special Session 5

# “Building Flood Resilient Communities”

*UDX-Theatre, 29 September (9:15 to 10:45)*

### **Overview and Scope of the Session**

Floods are among the most common and destructive natural disasters bringing devastation to human life/settlements and causing extensive damage to infrastructure, public and private services, environment and economy. A study based on CRED<sup>1</sup> database revealed that, in the last decade of 20th century, floods killed about 100,000 persons and affected over 1.4 billion people. For the past few decades, the pattern of floods across all continents has been changing, becoming more frequent, intense and unpredictable for local communities. IPCC<sup>2</sup> also confirms that ‘heavy precipitation events, which are very likely to increase in frequency, will augment flood risk’. While flooding can not be protected fully, there are measures that can be put in place to minimize the damage and speed up the recovery time.

Conventional flood control measures mainly focused on constructing dams, levees and other hardware structures which tend to incur large costs and attracts much public attention due to environmental problems. Often, the general strategy adopted to control flood is to prevent high floods through the incremental construction of flood control infrastructures. Global change (for example, climate change, urbanization etc., which increase flood frequency and intensity) will require ever increasing flood control investment that makes floods rarer. This process inevitably leads to a stalemate situation where further flood control works are too expensive, while a flood, which is greater than the design levels would cause catastrophic losses. This situation compels governments, NGOs and communities to take community-based approaches to reduce disaster risks and build resiliency.

Building community resilience to flood risk, which promote an integrated flood risk management approach that incorporates both hard and soft measures with active participation of community, is the way forward. Building flood resilient communities will become an essential adaptation measure to cope with flood risk increases brought about by climate change. This necessitates the need to incorporate ‘flood resilient communities’ as a specific target in development programmes. This session will focus on following themes:

- Capacity building at different institutional levels to enhance community based flood management
- Flood risk reduction projects that contribute to community development and vice versa
- Interventions and strategies that enhance community flood resilience

This session will benefit to those who have been involved in flood management issues as policy makers, developers, researchers, academicians and people from flood-prone region.

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<sup>1</sup> Centre for Research on the Epidemiology of Disasters (CRED), Brussels

<sup>2</sup> Fourth Assessment Report (2007) of the Intergovernmental Panel on Climate Change (IPCC)

## **Agenda**

**Session Chair:** Dr. Srikantha Herath, Senior Academic Programme Officer, UNU-ISP (Japan)

**Co-conveners:** UNU-ISP and JICA

### **Opening remarks (09:15 – 09:20)**

Dr. Srikantha Herath (UNU-ISP)

### **Presentations (09:20 – 10:05)**

09:20 – 09:35 Mikio Ishiwatari, Japan International Cooperation Agency (JICA)  
“Review on Japanese Assistance of Community-based Management for Flood Disaster “

09:35 – 09:50 Aslam Perwaiz, Asian Disaster Preparedness Center, Thailand  
“People-centered Approach in Integrated Flood Risk Management in Lower Mekong Basin”

09:50 – 10:05 Tadashi Nakasu, ICHARM, Japan  
“A Comparative Study of Disaster Recovery Process: Disaster Recovery Begins Before the Disaster”

10:05 – 10:20 Masimin, Syiah Kuala University, Indonesia (Abstract in Poster Session)  
“Residual Flood Risk Analysis for Banda Aceh Flood Control Project”

### **Panel Discussion (10:20 – 10:40)**

The central theme of the panel discussion will be ‘building flood resilient communities’. In particular, the discussion will aim to answer some of the following questions:

- (1) What are the general characteristics and challenges to “building flood resilient communities”?
- (2) How to revitalize traditional flood control measures and synergize them with the modern systems of social networking and flood risk reduction?
- (3) How can local government be strengthened for promoting flood resilient community?

**Moderator:** Dr. Srikantha Herath (UNU-ISP)

**Commentator:** Prof. Yutaka Takahashi, Professor Emeritus, University of Tokyo

#### **Panelists:**

Miki Ishiwatari, Japan International Cooperation Agency (JICA)

Aslam Perwaiz, Asian Disaster Preparedness Center, Thailand

Masimin, Syiah Kuala University, Indonesia

**Closing remark (10:40 – 10:45)** Dr. Srikantha Herath (UNU-ISP)

## Special Session 6

### “Advances and New Directions in Hydraulics of Flood Modelling”

*UDX-Theatre, 29 September (11:00 to 12:30)*

#### **Overview and Scope of the Session**

Probably the most frequent and widespread of all natural disasters, floods continue to cause every year loss of life and extensive property damage. Despite considerable advances in hydrology, hydraulics, numerical modeling and simulation, both the loss-of-life and the property damage due to floods seem to have increased considerably over the last century due to various factors. Rapid growth of urbanization leads to increased encroachment on the flood plains, reduces room for the river, and increases vulnerabilities. Increased impermeable surfaces lead to rapidly rising runoff hydrographs with higher peaks. Global climate change may modify precipitation patterns and intensities, and influence extreme event probabilities. Changes in hydrology lead to a serious questioning of the adequacy and safety of various hydraulic structures that store and/or control water. The expectations of the populations and the local and state governments with regard to protection against flood hazard and its direct and indirect consequences have evolved in recent years and more is expected of engineers, floodplain managers and decision makers with regards to flood protection.

In order to respond to emerging needs, the science and technology of flood modeling is rapidly changing in parallel with the advances in unsteady flow hydraulics, numerical modeling of unsteady flows with and without consideration of erosion, sediment transport and deposition processes, remote sensing and GIS technologies, and computer hardware and software. These new developments are likely to radically change the practice of flood modeling for flood protection, preparedness, response and mitigation.

During this special session four invited presentations will introduce a variety of topics such as automated two-dimensional dam-break modeling, operational flood modeling using game programming, bank stability and sediment transport issues during floods, the use of observations in flood modeling, and urban flood modeling. The panel discussion following the presentations will look into recent advances and new directions in hydraulics of flood modeling. Discussion topics may include, but are not limited to, the following:

- Realistic flood modeling over large areas, faster-than-real-time flood modeling and mapping, operational flood modeling, representation of hydraulic structures, etc.
- Challenges of urban modeling, representation of urban structure, interaction of flood with urban environment, integrated flood modeling by taking into account underground infrastructure, etc.
- Unsteady sediment transport, bank stability, erosion and deposition during floods, contaminant transport
- Data needs, data accuracy, data driven modeling, risk and uncertainty in flood modeling, etc.



## **Agenda**

### **Session Chairs:**

Prof. Mustafa Altinakar

*Director and Research Professor, National Center for Computational Hydroscience and Engineering (NCCHE) The University of Mississippi, USA*

### **1. Opening remarks (5 minutes)**

Prof. Nobuyuki Tamai

*Past President of IAHR, Kanazawa Gakuin University, Japan*

### **2. Keynote Speakers (60 minutes)**

1. Invited presentation on “Real-Time Flood Management and Emergency Management based on Fast Two-Dimensional Numerical Modeling”, Mustafa Altinakar et al., NCCHE, The University of Mississippi, USA (15 minutes)
2. Invited presentation on “Flood and Bank Erosion of the Brahmaputra/Jamuna River: Countermeasures and Indigenous Knowledge”, Hajime Nakagawa et al., Disaster Prevention Research Institute, Kyoto University, Japan (15 minutes)
3. Invited presentation on “Influence of Detailed Topography When Modeling in Street Junction During Urban Flood Modeling”, Peirre-Henri Bazin, et al., Cemagref, UR HHLY, France (15 minutes)
4. Invited presentation on “2D Numerical Computation for Flood Flow in Upper River Basin with Tributary Entries by Using Water Level Hydrographs Observed at Main Stream”, Tatsuhiko Uchida et al., Research and Development Initiative, Chuo University, Japan (15 minutes)

### **3. Panel Discussion (25 minutes)**

Moderator: Prof. Mustafa Altinakar

#### **Panelists:**

- Mr. Thomas Evans, Supervisory Hydraulic Engineer, U.S. Army Corps of Engineers, Washington, D.C., USA
- Prof. Arthur Mynett, Professor of Hydraulic Engineering and head of the Hydraulic Engineering and River Basin Development Core in the Water Engineering Department at UNESCO-IHE, Netherlands
- Prof. Keh-Chia Yeh, National Chiao Tung University; National Science and Technology Center, Taiwan.
- Prof. Nobuyuki Tamai, Past President of International Association for Hydro-Environment Engineering and Research, and Professor of Graduate School, Kanazawa Gakuin University, Japan
- Prof. Hajime Nakagawa, Director of Ujigawa Hyd. Lab., Res. Section of River Disaster Prev. System, Res. Center for Fluvial and Coastal Disasters, Disaster Prev. Res. Inst., Kyoto University, Japan

**Special Session 7**  
**“Flood Risk Management tools and their application”**

*UDX-Theatre, 29 September (13:30 to 15:00)*

**Overview and Scope of the Session**

This special session is about Flood Risk Management (FRM) tools and their applications, with a focus on showing how FRM tools can be used to assist decision makers and practitioners involved in flood risk management. Several international projects are presented in which FRM tools have been developed and successfully applied for flood mapping, risk mapping, calculation of failure probabilities of flood defenses, risk assessment, etc.

The results of these projects will be interesting for practitioners, researchers and decision makers, in both developed and developing areas in the world. We envision a lively setting, which allows for presentation and discussion of practical cases and research results, where participants from around the world can share their experiences and views.

The discussion session is intended to be a dynamic experience that will be stimulated by the presentations in the session. Discussion topics include the generality of the presented approaches, differences in methodologies, challenging application areas, ongoing research into improved techniques, experience with challenges, opportunities, etc.

## **Agenda**

### **Session Chairs:**

Jonathan Simm, MEng, HR Wallingford (UK) and Dr. Ferdinand Diermanse, Deltares (The Netherlands)

### **Co-conveners:**

HR Wallingford, Deltares

#### **1. Opening remarks (5 Min.)**

Jonathan Simm, MEng, Wallingford (UK)

#### **2. Invited Speaker (15 Min.)**

Mr. Durk Riedstra, Rijkswaterstaat, the Netherlands  
*life safety criteria for flood protection standards*

#### **3. Speakers (50 Min.)**

- Dr Ferdinand Diermanse (Deltares, The Netherlands)  
*Flood risk management: recent developments in the Netherlands*
- Ben Gouldby, BSc. (HR Wallingford, United Kingdom),  
*Multi-objective optimisation of flood risk mitigation measures*
- Dr. Bas Kolen (HKV Consultants, The Netherlands)  
*Cost-benefit approach in a two-layer flood risk management strategy of prevention and emergency management*
- Dr. Ferdinand Diermanse (Deltares, The Netherlands)  
*Flood Risk Analysis: challenges and applications*

#### **4. Discussion (20 Min)**

*Moderator:* Jonathan Simm, MEng, (HR Wallingford)

## Special Session 8

# “Flood resilience: Interdisciplinary approaches emerging from recent European research projects”

*UDX-Theatre, 29 September (15:15 to 16:45)*

### **Overview and Scope of the Session**

The existing concepts of resilience to natural hazards still vary in many respects: they are incompatible across temporal and spatial scales, and they are not carefully separated from related concepts such as vulnerability, sustainability and adaptive capacity. Timmerman (1981) defined resilience as a “measure of a system’s or part of the system’s capacity to absorb and recover from hazardous event” and was among the first to move from the concept of ecological resilience towards social resilience. Adger (1997) defined resilience as “the ability of human communities to withstand external shocks or perturbations to their infrastructure such as environmental variability or social, economic, or political upheaval and to recover from such perturbations”. The recognition of resilience in social sciences went hand in hand with the adaptation of the concept to natural hazards. In recent years, many other approaches were developed, which relate resilience to natural hazards.

Across the EU, the concept of resilience in the field of flood risk management has been investigated in a fragmented way. In this context previous or current European research projects address specific dimensions of flood resilience. In response to that, this session is presenting and bridging the knowledge gained from leading European projects in the field of societies’ resilience against flooding. The EU research projects whose flood resilience output on this topic will be presented under this session are the following:

- CONHAZ (Costs of Natural Hazards)
- CapHaz-Net (Social Capacity Building to Natural Hazards)
- RISK MAP (Improving Flood Risk Maps as a Means to Foster Public Participation and Raising Flood Risk Awareness)
- ENSURE (Enhancing resilience of communities and territories facing natural and na-tech hazards)
- MOVE (Methods for the Improvement of Vulnerability Assessment in Europe)

Demonstrating the research output of five leading EU projects, the scope of this session is to communicate, in a comprehensive way, these results to a wider scientific audience. Also another major objective of this session is to bridge different aspects of floods resilience (economic, social, communication, vulnerability) and to open the dialogue for establishing an integrated flood risk assessment approach.

The primary ambition of this session is to deliver a step change in flood risk management communities’ ability to exploit capacities as a way of enhancing resilience. This session will provide a major contribution towards flood resilience management and may, together with other sessions, complete a portfolio of strategies to enhance flood risk management in an integrated framework.

The expected results are:

- Communication of the output of leading EU research projects and bridging the gap in flood resilience scientific community.
- New clarified and largely accepted concept(s) and methods to define and measure the resilience of a society to flooding events.
- Framework for a more comprehensive approach to be shared and tested in Europe and elsewhere.
- Identification of mechanisms and measures to enhance flood resilience and improve prevention and recovery.

## **Agenda**

### **Session Chairs:**

Dr. Vasileios Markantonis, Helmholtz Centre for Environmental Research (UFZ), Germany

### **Invited Participants:**

Experts, researchers, policy makers and practitioners in the field of flood management (estimated 150 attendees)

#### **1. Opening remarks**

Dr. Vasileios Markantonis, 5 minutes

#### **2. Presentation(s)**

- a. Dr Christophe Viavattene, Flood damages assessment: towards a better approach in sustainable flood Risk management, 15 minutes (10 minutes presentation, 5 minutes discussion), Flood Hazard Research Centre (FHRC), Middlesex University, UK
- b. Dr Sue Tapsell, Social capacity building for floods: an emerging field of practice and research in Europe, 15 minutes (10 minutes presentation, 5 minutes discussion), Flood Hazard Research Centre (FHRC), Middlesex University, UK
- c. Jochen Luther, Improving Flood Risk Maps as a Means to Foster Public Participation and Raising Flood Risk Awareness – Recommendations from the RISK MAP project, 15 minutes (10 minutes presentation, 5 minutes discussion), Helmholtz Centre for Environmental Research (UFZ), Germany
- d. Dr Sue Tapsell, Developing an integrated vulnerability framework tool for flood risk management, 15 minutes (10 minutes presentation, 5 minutes discussion), Flood Hazard Research Centre (FHRC), Middlesex University, UK
- e. Michael Hagenlocher, Modeling the vulnerability to floods for the Salzach river - Application of the MOVE framework for different scales, 15 minutes (10 minutes presentation, 5 minutes discussion), Centre for Geoinformatics (Z\_GIS), Salzburg University, Austria

Closing discussion / concluding remarks, 10 minutes

Moderator: Dr Christophe Viavattene