

# International Symposium on Flash Floods in Wadi Systems

Disaster Risk Reduction and Water Harvesting in the Arab Region



*14<sup>th</sup> – 15<sup>th</sup> of October 2015*

Obaku Plaza, Kyoto University, Gokasho, Uji, Kyoto, Japan

Supported by:

Global Alliance of Disaster Research Institutes (GADRI)

&

Water Resources Research Center

Disaster Prevention Research Institute

Kyoto University



## **Symposium Statement**

The second Global Summit of Research Institutes for Disaster Risk Reduction in March 2015 has strongly recommended development of a research road map for the next decade. Based on an agreement of all participants, Global Alliance of Disaster Research Institutes (GADRI) has been established. Through the discussion, the atmospheric and water related disaster and integrated disaster risk management groups agreed to establish a network of international research groups to investigate flash floods disasters, and implement new research methodologies, and emphasizing transdisciplinary approaches. The first international symposium on flash floods in Wadi system focus on the Disaster Risk Reduction (DRR) by discussing current mitigation measures for protection against flash floods in arid and semi-arid regions, and consequent wise use of floodwater (water harvesting) in Wadi systems.

The topic of integrated flash flood management is discussed on several fronts: flood protection, hydrological modelling, water harvesting, social implications, future development of Wadi's, integrated risk management, sedimentation in reservoirs, water resources management and dam constructions. Global Alliance of Disaster Research Institutes (GADRI) aims at strengthening collaboration and exchanging in research with other international institutes and researchers. Flash flood problems in arid and semi-arid regions can be listed up one of target issues for such collaboration. It is hoped that introducing Japanese technologies provide an innovative way in integrated flash flood protection and harvesting.

There are twenty-two Arab countries with a total population of 420 million. The Arab region is located in arid and semi-arid zones. The climate is characterized by hot dry summers, moderate winters, and very little rainfall. Rapid increase of population and urbanization has pushed people to high disaster risk zones such as on unstable hills and Wadi's flood plain located in Saudi Arabia, Egypt and Yemen. In these countries overlooking the red sea, the climate change has a great impact on the frequency and intensity of extreme weather events. High variations of rainfall with an increase in flood events affect the Arab region. Recently, severe flash floods hit several mountainous in the Wadi's plain leaving more than 100 people in fatality.

In January 2010, and February and April 2011 several areas within the Wadi's plains in Egypt including Aswan, Luxor, Assiut, and Sinai Peninsula were impacted by

flash flood. Records of severe flash floods from 2008 to 2009 in Saudi Arabia and Yemen indicated an estimated total damage of approximately 1.3 billion USD (UNISDR-ROAS, March 2013). Continued heavy rains and consequent flash floods from early August 2013 across Sudan caused extensive damage and loss of life in fifteen states, with Khartoum, Gezira, Blue Nile, River Nile, White Nile and Northern state being the most affected. The Government estimates that 114,000 households have been affected with at least 110 people injured and 14 people killed. A total of 40,000 houses have been completely destroyed, displacing a large part of the affected population.

Egypt is fairly unique in the distribution of its population, land-use and agriculture, and economic activity which makes it extremely vulnerable to any potential impacts on its water resources and coastal zones. Despite being a large squarely shaped country with an area of about a million square kilometer, its lifeline is constrained along a narrow T-shaped strip of land (which constitutes less than 5% of its total land area). This is extends along the Nile River and the northern coast around the Nile delta. However, the combination of population growth, economic development and climate change pose to reduce the available water per capita in the region and shift the dynamics of power in the basin. The technical program consists of the following seven sessions. The final closing discussion will discuss the road map for future collaboration within the scope of the proposed project as one of important topics of GADRI network.

## **Themes of the Symposium**

- 1- Case Studies of Flash Flood Management
- 2- Wadi's Future Developments Projects and Integrated Water Management
- 3- Hydrological Modelling and Climate Change Impacts
- 4- Flood Mitigation and Water Harvesting Strategies
- 5- Innovative Technologies
- 6- Integrated Risk Management I
- 7- Integrated Risk Management II
- 8- Summary and Closing Discussion

## Speakers

Japan: Prof. Dr. Kaoru Takara, Director, DPRI, Kyoto University

Japan: Prof. Dr. Hirokazu Tatano, DPRI, Kyoto University

Japan: Prof. Dr. Tetsuya Sumi, DPRI, Kyoto University

Japan: Prof. Dr. Ana Maria Cruz, DPRI, Kyoto University

Japan: Associate Prof. Dr. Muneta Yokomatsu, DPRI, Kyoto University

Japan: Associate Prof. Sameh Kantoush, DPRI, Kyoto University

Japan: Associate Prof. Dr. Koichi Unami, Graduate School of Agriculture, Kyoto University

Japan: Dr. Subhajyoti Samaddar, DPRI, Kyoto University

Japan: Mr. Mohamed Abdelfatah, Ph.D. Student, DPRI, Kyoto University

Japan: Dr. Takuji Kubota, Japan Aerospace Exploration Agency (JAXA)

Japan: Mr. Yoichi Iwami, Chief Researcher, ICHARM

Japan: Mr. Hitoshi Yoshida, Japan Dam Engineering Center (JDEC)

Japan: MLIT Representative, MLIT

Egypt: Prof. Dr. Ahmad Wagdy, Vice Dean for Graduate Studies, Faculty of Engineering, Cairo University

Egypt: Prof. Dr. Karima Attia, Director of Water Resources Research Institute, National Water Research Center (NWRC)

Egypt: Prof. Dr. Mohamed EL-Bastawesy, National Authority for Remote Sensing

Egypt: Dr. Mohamed Al-Aawah, Programme Specialist, UNESCO- Cairo.

Egypt: Associate Prof. Dr. Eman Hassan, Water Resources Research Institute, National Water Research Center (NWRC)

Jordan: Associate Prof. Dr. Osama Mohawesh, Guest Scholar, Kyoto University and Water Resources and Environmental Engineering, Mutah University

Saudi Arabia: Associate Prof. Dr. Khalid A. Al-Ghamdi, Umm Al Qura University, Mecca

Sudan: Prof. Dr. Abdalla Abdelsalam Ahmed, Director General, UNESCO Chair.

Oman: Eng. Ahmed Al Barwani, Ministry of Regional Municipalities and Water Resources

Oman: Dr. Saif Al Hinai, Water Management Systems, Special Economic Zone Authority.

Europe: Associate Prof. Dr. Ir. Biswa Bhattacharya, UNESCO-IHE, Delft, The Netherlands

Europe: Prof. Dr. Uwe Tröger, TUB, Berlin, Germany

Europe: Dr. Mohammad Meshkati Shahmirzadi, Antea Group, Antwerpen, Belgium

Europe: Associate Prof. Dr. Gabriele Landucci, University of Pisa, Italy

Europe: Dr. Junko Mochizuki, International Institute for Applied Systems Analysis (IIASA), Austria

## Program

### First Day Program: 14<sup>th</sup> October (Wednesday), 2015 at KIHADA Hall

#### 9:00-10:00 *Registration*

**Opening Session:** *Chaired by: Prof. Shigenobu Tanaka* (Kyoto University, Japan)

Time	Title of presentation	Presenter
10:00 – 10:05	Opening Remarks and Guest Welcome	<b>DPRI Representative</b> (DPRI, Kyoto University, Japan)
10:15 – 10:10	Vision and Interest of MLIT for Flash Floods Disaster in the Arab Region	<b>Mr. Yusuke Amano</b> (Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Japan)
10:10 – 10:20	Urgent Capacity Development for Managing Natural Disaster Risks of Flash Floods in Egypt, Jordan, Sudan and Yemen	<b>Dr. Mohamed Al-Aawah</b> (UNESCO- Cairo, Egypt)
10:25 – 10:30	Symposium Program, Statement and General Vision	<b>Prof. Tetsuya Sumi</b> (Kyoto University, Japan)

10:40 – 11:00 **Coffee Break**

#### **Session 1: Case Studies of Flash Floods Management**

*Chaired by: Associate Prof. Sameh Kantoush* (Kyoto University, Japan)

**Note:** *Allocated time for Oral Presentations : 20 min. talk + 5 min. discussion*

11:00 – 11:25	Flash Floods in Egypt: Strategies, Measures, and Harvesting	<b>Prof. Karima Attia</b> (National Water Research Center, Egypt)
11:25 – 11:50	Flash Floods Mitigation and Harvesting Case Study of Oman	<b>Eng. Ahmed Said Al Barwani</b> (Ministry of Regional Municipalities and Water Resources, Oman)
11:50 – 12:15	Flash Floods in Arid and Semi-arid Region: Overview of Sudan Experience	<b>Prof. Abdalla Abdelsalam Ahmed</b> (UNESCO Chair, Sudan)

12:05 – 12:10      *Greetings from DPRI Director*      **Prof. Kaoru Takara** (Director, DPRI  
Kyoto University, Japan)

12:10 – 12:15      *Group Photo at “KIHADA Hall”*

12:15 – 13:15      *Lunch*

## **Session 2: Wadi’s Future Developments Projects and Integrated Water Management**

*Chaired by: Prof. Tetsuya Sumi* (Kyoto University, Japan)

**Note:** *Allocated time for Oral Presentations : 20 min. talk + 5 min. discussion*

13:15 – 13:40      Integrated Strategies for Management of      **Associate Prof. Sameh Kanoush**  
Flash Floods in the Arabian Wadi Basins      (Kyoto University, Japan)

13:40 – 14:05      Integrated Water Management Strategy in      **Dr. Saif Alhinai** (Special Economic  
Duqm Area, Sultanate of Oman      Zone Authority at Duqm, Oman)

14:05 – 14:30      Tangible and Potential Risks of Flash      **Associate Prof. Osama Mohawesh**  
Floods in the Hashemite Kingdom of      (Mutah University, Jordan/ Guest  
Jordan      Scholar, Kyoto University)

14:30 – 14:50      *Coffee Break*



### Session 3: Flood Mitigation and Water Harvesting Techniques

*Chaired by: Associate Prof. Kenji Tanaka (Kyoto University, Japan)*

*Note: Allocated time for Oral Presentations : 20 min. talk + 5 min. discussion*

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|---------------|---|---|
| 14:50 – 15:15 | Developing Groundwater Resources in Arid Lands: the Eastern Desert Project - EDP  | <b>Prof. Ahmed Wagdy</b> (Cairo University, Egypt)  |
| 15:15 – 15:40 | Managing Groundwater Recharge and Recovery, as Reuse Method: a Chance for Egypt's Water Supply  | <b>Prof. Uwe Tröger</b> (TUB, Germany)  |
| 15:40 – 16:05 | Using Remote Sensing and GIS For Estimating the Flash Flood Parameters for the Dryland Catchments: Implication for Water Resources Management | <b>Associate Prof. Mohamed EL-Bastawesy</b> (National Authority for Remote Sensing and Space Sciences, Egypt) |
| 16:05 – 16:30 | Establishing a Saudi Arabia Land Data Assimilation System for Proper Water Resources Management   | <b>Associate Prof. Khalid A. Al-Ghamdi</b> (Umm Al-Qura University, Kingdom of Saudi Arabia)                  |

16:30– 16:50 **Coffee Break**

### Session 4: Innovative Technologies

*Chaired by: Associate Prof. Tetsuo Tobita (Kyoto University, Japan)*

*Note: Allocated time for Oral Presentations : 20 min. talk + 5 min. discussion*

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|---------------|---|--|
| 16:50 – 17:15 | Feasibility Study on Application of Trapezoidal CSG Dam for Flash Flood Mitigation Measures   | <b>Mr. Hitoshi Yoshida</b> (Japan Dam Engineering Center, Japan) |
| 17:15 – 17:40 | A Case Study on Flood Forecasting Applicable to Insufficient Observation Areas                | <b>Mr. Yoichi Iwami</b> (Public Works Research Institute, Japan) |
| 17:40 – 18:05 | Operational Flash Flood Forecasting, Warning System and Management for Sinai Peninsula, Egypt | <b>Dr. Mohammad Meshkati Shahmirzadi</b> (Antea Group, Belgium)  |

**18:30 – 20:00 Dinner Reception (In the Hybrid Space - Second Floor of Obaku Plaza)**

*Associate Prof. Yasuhiro Takemon (Kyoto University, Japan)*

## Second Day Program: 15<sup>th</sup> October (Thursday) 2015 at KIHADA Hall

### 8:30-9:00 Registration

#### Session 5: Hydrological Modelling and Climate Change Impacts

Chaired by: *Prof. Tomoharu Hori* (Kyoto University, Japan)

*Note: Allocated time for Oral Presentations : 20 min. talk + 5 min. discussion*

9:00 – 9:25	On Bayesian Probabilistic Flash Flood Guidance	<i>Prof. Biswa Bhattacharya</i> (UNESCO-IHE, Netherlands)
9:25 – 9:50	Rainfall Observation from Space: Global Satellite Mapping of Precipitation (GSMaP)	<i>Dr. Takuji Kubota</i> (Japan Aerospace Exploration Agency, Japan)
9:50 – 10:15	A Stochastic Model for Occurrence of Flash Flood Events in a Wadi of the Jordan Rift Valley	<i>Associate Prof. Koichi Unami</i> (Kyoto University, Japan)
10:15 – 10:40	Hydrological Modeling and Early Warning System in Egypt	<i>Associate Prof. Eman Hassan</i> (National Water Research Center, Egypt)
10:40 – 11:05	Hydrological Modelling of Flash Flood to Assess the Distributed Mitigation Structures in Wadi Abadi Case Study of the Eastern Desert in Egypt	<i>Mr. Mohammed Abdel-Fattah</i> (Kyoto University, Japan)

#### 11:05 – 11:25 Coffee Break

#### Session 6: Integrated Disaster Risk Management I

Chaired by: *Associate Prof. Kazuyoshi Nishijima* (Kyoto University, Japan)

*Note: Allocated time for Oral Presentations : 20 min. talk + 5 min. discussion*

11:25 – 11:50	Joint Natural and Technological Disasters: An Emerging Risk Issue	<i>Prof. Ana Maria Cruz</i> (Kyoto University, Japan)
11:50 – 12:15	Quantitative Assessment of Risk Due to NaTech (Joint Natural and Technological Hazards) Scenarios Caused by Floods	<i>Associate Prof. Gabriele Landucci</i> (University of Pisa, Italy)
12:15 – 12:40	What Does Integrated Disaster Risk Management Mean? From the Planning Perspective of Disaster Risk Reduction	<i>Prof. Hirokazu Tatano</i> (Kyoto University, Japan)

12:40 – 13:40 **Lunch Break**

### **Session 7: Integrated Disaster Risk Management II**

*Chaired by: Prof. Hirokazu Tatano (Kyoto University, Japan)*

**Note:** Allocated time for Oral Presentations : 20 min. talk + 5 min. discussion

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| 13:40 – 14:05 | An Economic Growth Model for Flood Risk Reduction with a Focus on Human Capital  | <b>Associate Prof. Dr. Muneta Yokomatsu</b> (Kyoto University, Japan)                      |
| 14:05 – 14:30 | From Risk Information to Policy Options- Understanding Scales, Contexts and Perspectives to Inform Global and Local Options for Disaster Risk Management | <b>Dr. Junko Mochizuki</b> (International Institute for Applied Systems Analysis, Austria) |
| 14:30 – 14:55 | What Constitutes a Successful Participatory Disaster Risk Management? Insights from Ghana.   | <b>Dr. Subhajyoti Samaddar</b> (Kyoto University, Japan)                                   |

14:55 – 15:15 **Coffee Break**

### **Session 8: Panel and Closing Discussions / GADRI / Future Plans (all)**

*Moderator: Associate Prof. Sameh Kantoush (Kyoto University, Japan)*

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|---------------|---|---|
| 15:15 – 15:25 | Vision and Mission of the Global Alliance of Disaster Research Institutes (GADRI) | <b>Prof. Hirokazu Tatano</b> (Kyoto University, Japan)          |
| 15:25 – 15:45 | Summaries and Outcomes of Flash Flood Symposium in Kyoto                          | <b>Associate Prof. Sameh Kantoush</b> (Kyoto University, Japan) |
| 15:45 – 17:30 | Plenary Discussion for Future Research Collaboration                              | <b>All participants</b>   |

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