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Establishing Network focusing on Flash Flood Disaster: Comparison between MENA and Asia (JSPS Flash Flood Project)

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Introduction

Flash floods are a worldwide concern and one of the significant hazards that hit African and Asian cities. Flood risk has significantly increased in the Middle East and North Africa (MENA) over the last 15 years due to climate risks, population growth, urbanization, human interference, and socio-economic factors. There are many shared challenges in African and Asian Countries. The MENA region needs proper protection from Wadi flash floods (WFFs). Under the umbrella of the JSPS flash floods Core to Core Project, this paper summarizes the new advances and progress in research activities about flash floods and sediment disasters in both African and Asian basins to compare the impacts of climate change in these different climatic regions. Therefore, this paper highlights the current challenges, recent research achievements, and future perspectives regarding flooding and sedimentation impacts. The main aim of this Core-to-Core project is to connect the developed separated efforts in the MENA region for flooding research studies, sharing achievements, extending collaboration, and initiating the new Middle East and North Africa "wadi" flash floods Network {WaFFNet} for advancing flood risk science and database.

Objectives and Methodologies

The network aims at promoting academic knowledge and technology transfer for flood risk management through scientific exchanges between Japanese Universities as (Kyoto university, Miyazaki University, Tohoku University and ARENA Center of the University of Tsukuba, ICHARM, Kyoto University of Advanced technology) and universities/research institutions from the MENA region, including Morocco, Algeria, Tunisia, Egypt, Sudan, Jordan, Oman, and UAE. The main project goals are 1) Implementing an international research center for advancing flood risk science and database in collaboration with DPRI and research centers of countries working on flood issues in Asia and Africa; 2) A platform for networking and sharing experiences and data among collaborative countries; 3) Stimulating the collaboration research primarily for the flood management. 4) Fostering young researchers and graduate students to create a research network as well as direct mutual collaboration at the institutional levels, which will be an opportunity to share practical solutions for flash flood challenges and sedimentation impacts under the climate change variability.

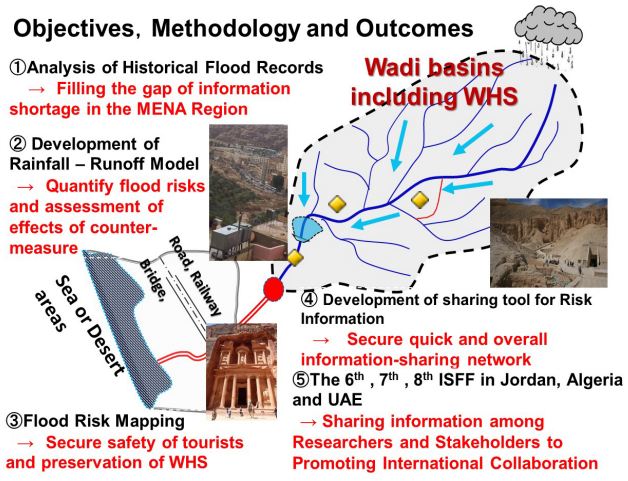

Fig. 1 JSPS Flash Floods Project objectives and methods

The project methodology is centralized through the three pillars that are depicted in Fig. 1:

1- Monitoring and Rainfall-Runoff Modeling includes accurate rainfall and runoff predictions and building hydro and morphologic networks in ungauged and transboundary wadis.
2- Flood risk mapping and enhancing the local wadi community awareness
3- Mitigation measures and efforts have been undertaken by governments and private sectors of MENA countries to enhance structural and nonstructural measures.

Integrated Approach for JSPS Flash Flood Project

Due to the absence of water management and sustainable mitigation strategies, developing effective hydrological models is desperately needed to overcome wadi system problems. Therefore, we propose a multidisciplinary approach relying on the addressed factors. Such a proposed research strategy focuses on WFF modeling, mitigation, and harvesting and the related socioenvironmental issues. We offer an integrated strategy based on multidisciplinary research according to the following matters:

I. Innovative approaches: What factors need to be added to the existing approaches for flash floods? How can we enhance the forecasting and mitigation of models and methodologies?
II. Databased networks: What are the existing challenges of observation and monitoring networks for modeling and forecasting? How can we enable these ungauged wadi basins?
III. Teamwork: What are the existing global and national networking programs for research collaboration? How can we start efficient networks that include researchers, professionals, engineers, and stakeholders from different countries?
IV. Risk reduction and sediment management: How can we propose flash flood risk reduction approaches based on innovative hydrological models and mitigation actions?
V. Water harvesting and water management: How can we integrate methods for surface and subsurface water management for water harvesting and groundwater recharge?
VI. Society and environment: How can we develop wadi societies and communities by involving the local population in research project implementation?
VII. Decision making, planning, and governance: How can we improve the existing national and global plan for wadi society development? Rainfall-Runoff Inundation Model.

Conclusion

This paper attempts to present recent efforts for flash flood issues from different countries, covering modeling, case studies, experiences, approaches to flood risk assessment, and climate change. Based on the best practices from Japan for monitoring and early warning, modeling techniques, and understanding processes related to hydrology, climate risks, and flood management strategies, the project addresses the long-term effects of coming up with a feasible strategy to reduce the disaster risk in MENA and Asian specific regions.

Acknowledgment

This work is funded by JSPS “Core-to-Core Program/ B. Asia-Africa Science Platforms” under the project of the Japan Society for the Promotion of Science (JSPS), grant number JPJSCCB20220004

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