

GEOSS-Asian Water Cycle Initiative
(AWCI)
Flood WG
- Activity Report -

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7th International Coordination Group (ICG) Meeting,
GEOSS Asian Water Cycle Initiative (AWCI), Tokyo, Japan, 5-6, October 2010



Flood WGs and relevant international meetings

- 1st GEOSS Symposium on Integrated Observation for Sustainable Development in the Asia-Pacific Region (GEOSS AP Symposium) (Tokyo, Jan. 2007)
- 2nd Asian Water Cycle Symposium (Tokyo, Jan. 2007) and 3rd AWCS (Beppu, Dec. 2007)
- 1st APN & GEOSS/AWCI Joint Scoping Workshop (Tokyo, Apr. 2008)
- 4th APHW-AWCI Session & 3rd ICG (Beijing, November 2008)
- 3rd GEOSS-AP Symposium & 4th ICG (Kyoto, February 2009)
- 5th ICG (Tokyo, December 2009)
- 4th GEOSS-AP Symposium & 6th ICG (Bali, March 2010)
- Int. Workshop on Capacity Building in Asia “Earth Observations in the Service of Water Management” (Bangkok, Sep., 2006)
- Flood Monitoring WGs in the Joint Project Team for “Sentinel Asia” promoted by APRSAF: 1st WG (June 2006), 2nd WG (March 2007), 3rd WG (Sept. 2007) and 4th WG (June 2008)
- 1st & 2nd GPM Asia Workshop organized by JAXA (Tokyo & Hamamatsu, Dec. 2007 & June 2008)
- International Workshop on Application and Validation of GFAS/IFAS (October 2008 & August 2009), at ICHARM

Major Activities of Flood WG

- Preparation of Generic template for demonstration projects in GEO on use of satellite information for flood risk Management (led by Prof. Herath)
- **Demonstration projects**
- Identification of member countries' needs and resources for capacity building → shifted to capacity building WG
- Proposal to 2007 Annual Regional Call for Proposals (ARCP) , APN (Asia-Pacific Network for Global Change Research) → Approved for FY2008-2009 & 2009-2010.
 - To enhance demonstration projects through holding meetings (ICGs) and workshops (GFAS/IFAS Validation WS)
- Contributions to 4th APHW (Beijing) and GEOSS-AP activities (typhoon and cyclone session)
- Contributions to APWF's steering group for climate change adaptation strategy → climate change WG

2-year Project Proposal to 2007 Annual Regional Call for Proposals (ARCP) , APN

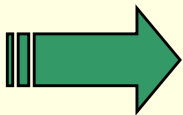
With in the context of the APN support the flood research project addressed the following overall objectives:

1. Converting observations and data, both through space borne platforms and data integration initiatives, to usable information for flood reduction.
 2. Improvement of quantitative forecasts for coupled precipitation - flood-forecasting systems.
 3. Facilitate risk assessment through the provision of scenarios and data for exposure estimation.
- It is essential to enhance and utilize regional cooperation to achieve these objectives using the resources and knowledge available at various specialized institutions. Training programs on the use of tools and data will form the basis for to capacity development activities.

Approved, with the budget of USD 42,000

for **Oct. 2008 – Sep. 2009. (1st Year)**

& for **Oct.2009 - Sep.2010 (2nd year)**



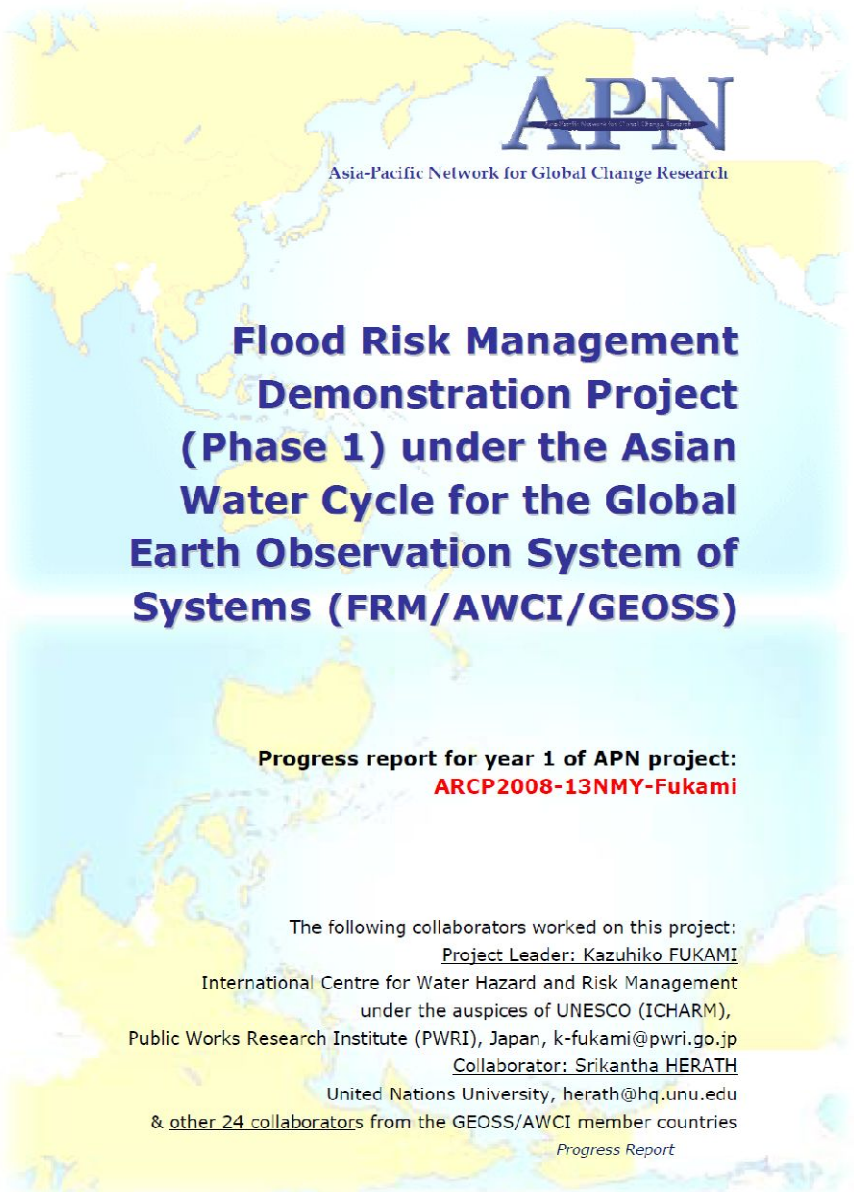
Goal of APN-ARCP (Flood)

- To build up a scientific basis for sound decision-making and developing policy options for most suitable flood risk management for each country and region in Asia, through the full utilization of new opportunities on global, regional and in-situ dataset under the scheme of AWCI (contributing to GEOSS)

List of Flood WG-related Study Presentations at 4th APHW & 3rd ICG, Nov. 2008, Beijing

- Bangladesh: Climate Change Impacts and long-term Surface Water Forecasting in Bangladesh
- India: Flood Hazard Modeling and Flood Risk Zoning for a River Basin
- Indonesia: Application of Distributed Hydrological Model for Mamberamo River Basin for Flood Assessment and Management
- Indonesia: Development of Climate Induced Flood Prediction System in Jakarta, Indonesia
- Japan: Assessment of Soil Moisture Dynamics and Storm-induced Landslides Hazard in Forest Landscapes
- Japan: Experiences of Japan in flood risk management and the introduction of Integrated Flood Analysis System (IFAS)
- Japan: Applications of a Distributed Hydrological Model to the AWCI Demonstration River Basins
- Korea: A Comparative Study of Model-Driven Soil Moisture Estimates on the Chungju Demonstration Basin
- Lao PDR: Flash Flood in the Mountainous Area of Lao PDR (the case study of Luangnamtha province)
- Nepal: Moving Science Community to the Flood Affected Community: AWC Initiative
- Sri Lanka: Flood Modelling in the Mahaweli River Reach from Kotmale to Polgolla
- Thailand: A study of Disastrous Flash Flood in Khlong U-Tapao River Basin Utilizing a Combined Physical and Mathematical Simulation Model
- Thailand: Appropriate flood warning system in Northern Thailand Vietnam: An application of numerical weather forecast and satellite rainfall prediction to flood forecasting
- Uzbekistan: Assessment of Water Resources Change on the Aral Sea Basin under Possible Climate Change
- Vietnam: Flood and Landslide in Central Part of VIETNAM
- And so forth....

Progress Report for APN-ARCP (1st Year, FY2008-2009)



APN
Asia-Pacific Network for Global Change Research

**Flood Risk Management
Demonstration Project
(Phase 1) under the Asian
Water Cycle for the Global
Earth Observation System of
Systems (FRM/AWCI/GEOS)**

**Progress report for year 1 of APN project:
ARCP2008-13NMY-Fukami**

The following collaborators worked on this project:
 Project Leader: Kazuhiko FUKAMI
 International Centre for Water Hazard and Risk Management
 under the auspices of UNESCO (ICHARM),
 Public Works Research Institute (PWRI), Japan, k-fukami@pwri.go.jp
 Collaborator: Srikantha HERATH
 United Nations University, herath@hq.unu.edu
 & other 24 collaborators from the GEOS/AWCI member countries

Progress Report

Feb. 2009

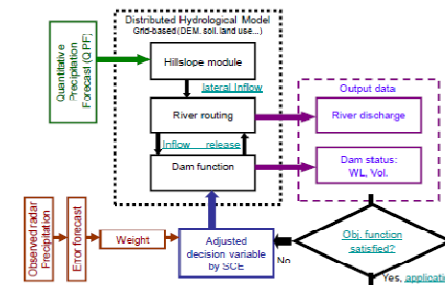


Fig.1 Structure of decision-support model for dam-network operations at the Tone River, Japan, coupled with QPF and distributed hydrologic model (Saaavedra et al., 2008)

the distributed hydrologic modeling technologies developed by Univ. of Tokyo and ICHARM are expected to be most promising ones for capacity building and possible wide trial applications in AWCI member countries. The approach of Univ. Tokyo is characterized by the coupling of most advanced technologies such as rainfall-downscaling technology for rainfall forecast, physically-based distributed hydrologic modeling one, and optimum dam-network operating one. On the other hand, the approach of ICHARM is characterized by a user-friendly, easy-to-use, all-in-one and free-of-charge software package (IFAS: Integrated Flood Analysis System) for practioners for basin-wide conceptual distributed hydrologic modeling (Fig.4). Those technologies are expected to offer good opportunities to make the best use of GEOS/AWCI framework for better integrated water resources management with earth observational data, including flood disaster mitigation through flood forecasting and

The cases of another Thailand (Winai), India (Kumar), SriLanka (Weerakoon), UNU (Herath) and ICHARM (Fukami) are also very unique and challenging studies in their own countries. In these examples, it can be said that the activities 1-2 and 1-3 have been properly initiated. Besides, most advanced studies in those examples are expected to be prevailed in other river basins not only in the same country but also in neighbor AWCI member countries though information exchanges and discussions at these meetings. In particular,

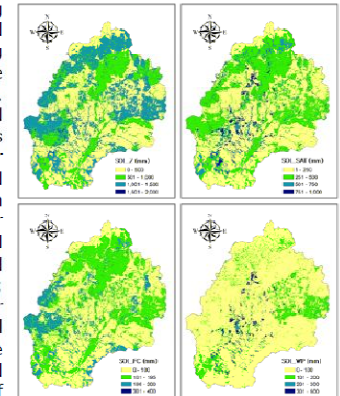


Fig.2 Identification of soil hydraulic properties with GIS, to study their effect on hydrologic regime at the Chungju Dam basin, Korea (Lee et al., 2008)

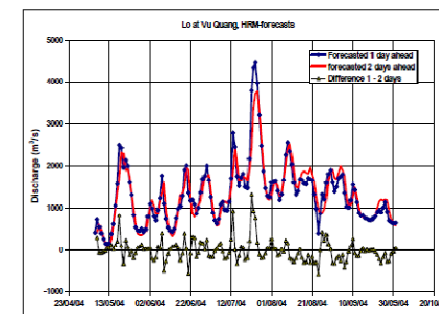


Fig.3 Forecasted (1 and 2 days ahead) river flows of the Lo river at Vu Quang Station, Vietnam, and the difference between the forecasts based on HRM rainfall data and those using error corrections to simulated flows (Tinh et al., 2008)

warning. At the 3rd GEOS/AWCI-ICG, the activity reports on the demonstration projects were made and discussed through the flood WG. Most of the demonstration projects have already been started according to the GEOS/AWCI Implementation Plan (Table 1). Observations as an experimental (demonstration) basin were started for them. However, a major part of them (i.e. the cases except the above most-advanced examples) does not seem to utilize a new data availability and opportunity provided by the GEOS/AWCI

Indonesian Seminar and Workshop on the Use of Satellite Base Information in Flood Risk Management (Jakarta & Bandung, July 2008)

From Dr. Loebis's presentation



Workshops for Validation & Application of Global Flood Alert System (GFAS) & IFAS

1) 3-8 October 2008, 2) 3-7 August 2009



Contents

- The purposes is to build capacities in the countries to be able to undertake hydrological prediction/ forecasting in relatively ungauged catchments, to share local experiences and subjects, and to consider next actions

From

- 1) Ethiopia, Zambia, Cuba, Argentina, Bangladesh, Guatemala, Nepal (7countries)
- 2) Bangladesh, India, Indonesia, Lao PDR, Nepal & Vietnam (6 countries)



Activity plan for 2nd year of APN-ARCP (flood) of the 1st-phase of demonstration project (FY2009-2010)

- 2-1. To continue in-situ observations as an experimental basin for each study basin area
- 2-2. To archive observational and analyzed data coupled with global/regional data
- 2-3. To make tentative validations of the systems and/or scenarios
- 2-4. Identification of the subjects to improve the demonstration systems
- 2-5. Technical supports and cooperation to validate the above demonstration systems
- 2-6. Investigation of the needs and requirements in relation to flood risk management and the above activities from operational point of view (esp. capacity building)
- 2-7. Summarizing a report of the ARCP project including proposals on policy options

Activity plan in APN-ARCP (flood) after Oct. FY2010
as the post-phase = 2nd phase of the demonstration project

P-1. To continue in-situ observations to get enough validation data

P-2. To improve the demonstration systems/scenarios and to make final validations of them with the archived & analyzed data

P-3. To develop capacity building tools for shifting the demonstration systems to operational ones for the next-stage AWCI.

Actions to be taken: (short-term, 1/2)

- How to collaborate with some specific demonstration projects through coordination?

Information exchange and mutual consultations among Flood WG meetings and e-mail communications

To share the findings and results of the **application of state-of-the-art models** in demonstration projects

- Which kind of data do you need to promote activities?

Long-term historical extreme data (flood and low flow) such as annual maximum (minimum) are to be shared for climate-change impact analysis. The combination of rainfall and “natural” (not affected by any regulation) river flow data of such events is preferable. If streamflow is not available, rainfall data only is also acceptable.

DEM data are important for flood & inundation analysis. Some reports mentioned the quality of ASTER-DEM data seemed insufficient. We should seek for any other data sources or make up our own methodology to create such DEM data to meet our requirements.

- **The quality of in-situ hydrological data is crucial** for us. The information of our practices (technical standards) especially for flood discharge measurement method and its data quality-check method (both on site and off site later) should be shared. Mr. Fukami will propose the points to be shared.
- The information of our practices (technical standards) to determine **design flow (and/or rainfall) for planning river projects, dams, weirs, etc.** should be also shared. Dr. Rakesh Kumar will propose the points to be shared.

Actions to be taken: (short-term, 2/2)

- Which types of **Capacity Building** do you need?
 - Technologies on state-of-the-art hydrological models such as UT- GBHM, ICHARM-IFAS(PWRI & BTOP), etc.
A table to show and compare the characteristics of each model should be arranged for reference by Mr. Fukami and Dr. Saavedra.
 - Rainfall forecasting (downscaling from global numerical weather forecast data)
- How to focus Flood WG activities on CCA in cooperation with Demonstration Projects?
 - To consider **the characteristics & the possible change of flood characteristics (frequency, magnitude, etc.) induced by climate change** in the demonstration projects
- How to collaborate with Water quality WG in the context of climate change adaptation?
 - To provide Water-Quality WG with the information with the change of flood characteristics (frequency, magnitude, etc.)
 - To include water-quality resource person to capacity-building seminars on hydrological modeling technologies

Actions to be taken: (mid-term)

- To promote each demonstration project of each member country according to its own specific objectives and the dissemination of its achievements through papers/presentations.
- To identify and share any problems to promote demonstration projects, and to support how to cope with them through our mutual cooperations, so that we will figure out what the next action should be, toward their operational uses
- To ask each AWCI member to give me any materials, including the information of presentations & papers so far, to summarize final achievements for two-year activities related to flood issues for the APN-ARCP project at this 7th ICG, since the deadline is just October 8 !!

Thank you for your attention!

Let's take advantage of AWCI network
and activate our mutual communication &
cooperation more and more!