Proceedings of the 1st Joint APN and GEOSS/AWCI Scoping Workshop 16-17 April 2008 Tokyo, Japan

APN Asia-Pacific Network for Global Change Research

AWCI Asian Water Cycle Initiative

GEO GROUP ON EARTH OBSERVATIONS

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Asia-Pacific Network for Global Change Research

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Tokyo, Japan
16th and 17th April 2008

Editor: Linda Anne Stevenson

EXECUTIVE SUMMARY

The 1st Asia-Pacific Network for Global Change Research (APN) and Global Earth Observation System of Systems (GEOSS)/Asia Water Cycle Initiative (AWCI) Joint Scoping Workshop was held in Tokyo, Japan, on 16-17 April 2008, back to back with the 2nd GEOSS Symposium on Integrated Observation for Sustainable Development in the Asia-Pacific Region (2nd GEOSS AP Symposium) which convened on 14-16 April 2008.

Following the adoption of the AWCI Implementation Plan under GEOSS, a discussion between APN and AWCI ensued on how to facilitate collaboration between the two organisations in addressing climate and water issues in the Asia-Pacific region. AWCI was able to hold three symposia through funding received from APN – ARCP Project "International Integrated Water Data Access and Transfer in Asia (IIWADATA). After a series of discussions and to further strengthen the collaboration that exists between APN and AWCI, it was agreed that a scoping workshop would be convened back to back with the 2nd GEOSS AP Symposium.

The present concept of the APN and AWCI collaboration activities focuses on two of the nine Societal Benefit Area (SBA) priority areas outlined in the GEOSS 10-year Implementation Plan: climate and water. It is expected that these two priorities will aid the Earth's response to climate change and its impacts as well as secure water resources. Currently, 12 and 19 countries in the APN region are members of GEOSS and of the AWCI, respectively.

Activities already undertaken by APN and AWCI have been published in the Group on Earth Observations (GEO) publication, *The First One Hundred Steps,* which was presented at the Fourth GEO Ministerial Summit held in Cape Town, in 2007. This publication highlights selected early achievements in the first two years of the GEOSS Implementation Plan. APN has demonstrated, in this publication, its GEOSS-related activities particularly the results of the two *APN Scoping Workshops on Global Earth Observations and the Capacity Building Needs of the Region: Focus – Climate*.

The objectives of the present workshop were to: 1) align climate and water-related activities currently being undertaken by APN and AWCI; and 2) discuss and plan potential future activities between APN and AWCI, which are to be co-funded or separately funded by both sides and are related, but not limited, to GEOSS activities to better inform decision-makers. The APN believed that through vivid exchange of views and interaction with scientists, researchers and experts dealing with water management issues, the participants discussed interesting and potentially collaborative issues that are summarised in the present report.

The APN will continue to actively seek opportunities for closer collaboration between APN and AWCI and, in addition to the funding provided through APN's annual calls for proposals, APN and AWCI has agreed to the principal of information exchange and mutually beneficial activities for the needs of the region, particularly in the area of capacity building for sustainable development.

For more information on the APN and on the contents of the present report, please contact the APN Secretariat info@apn-gcr.org or visit the APN website www.apn-gcr.org.

WORKSHOP REPORT

1. Opening by Guest Speakers:

1.1 Global Earth Observations (GEO): Mr. Jose Achache, Director of the GEO Secretariat, noted that water is becoming more of a major societal issue. He further mentioned the Importance of regional scale initiatives related to water, particularly in understanding that processes and observational networks at the regional level are substantial for coping with water management issues. Mr Achache noted his full of the scoping workshop highlighting that coordination at the regional scale is very important for successful implementation of GEOSS.

1.2 Asia-Pacific Network for Global Change Research (APN): Mr. Imanari, Executive Manager of the APN Secretariat, welcomed participants to the scoping workshop and outlined the key scientific themes of the APN, noting that water issues and the regional-level implementation of work conducted by AWCI is of major importance to the APN under its scientific theme of "Use of resources (water, food, energy) and pathways for sustainable development". He emphasized that APN has just recently funded an additional 3 projects under AWCI that will begin implementation in June 2008. He looked forward to a successful scoping workshop and the opportunity to exchange ideas and opinions on how APN and GEOSS/AWCI can cooperate in a mutually beneficial manner for the needs of the region.

1.3 Ministry of Education, Sports, Culture, Science and Technology, Japan (MEXT): Ms Naoko Okamura, Director the Office of Earth and Environmental Science and Technology Research and Development Bureau noted the key message (following one of the breakout sessions at the preceding 2nd GEOSS AP International Seminar) that comprehensive understanding of the water cycle and effective management of water resources are paramount to every nation's well-being. She further noted that MEXT's plan for research promotion is in line with this and the water cycle and water management are key issues in this plan, including the promotion of the DIAS framework (kind of "system of systems"). Ms. Okamura noted too that the present scoping workshop is an opportunity to make closer networks to collaborate in addressing important water-related issues in the region.

2. Overview of the APN and AWCI and Objectives of the Workshop:

2.1 APN Overview: Mr. Imanari provided an overview of the APN Overview, noting in particular that the APN is an inter-governmental network of 21 member countries in the Asia-Pacific region. He highlighted the APN's history and background and its key scientific themes and activities, noting that the APN has two main pillars of activities vis-à-vis the ARCP programme and the CAPaBLE programme. Currently, these two pillars are the main mechanisms for receiving funding under the APN via the Annual Calls for Proposals. He highlighted that one of APN's major goals is to strengthen science-policy linkages and enhance discussions between these important groups in the context of global environmental change and sustainable development. He further highlighted that the AWCI, in the most recent round of APN's annual calls for proposals, had successfully been awarded funding in 3 separate projects relating to floods, drought and data integration.

2.2 AWCI Overview: Professor Toshio Koike, Dept. of Civil Engineering, University of Tokyo, provided and an overview of AWCI vis-à-vis a promotion video. The video, among other things, highlighted the objectives of AWCI which is to better understand the mechanism of variability in the Asian water cycle and to improve its predictability, to interpret the information applicable to various water environments in different countries in Asia, and to help mitigate water-related disasters and promote the efficient use of water resources.

2.3 Objectives of the Workshop: Dr. Stevenson highlighted the objectives of the present scoping workshop as understood between APN and AWCI. She noted in particular the background of the

collaborative efforts of APN and AWCI stating that in discussions with MEXT in 2006, it was suggested to APN that Professor Koike be a good contact to discuss collaboration, from a GEOSS perspective, between APN and the AWCI. As such, AWCI was introduced at the APN's 12th Inter-Governmental Meeting in March 2007, where possible collaboration between APN and AWCI was discussed. This was followed by both APN and AWCI's input to the Fourth GEO summit (Cape Town), November 2007, where both organizations were listed in the GEO publication "*The First One Hundred Steps*." Dr. Stevenson highlighted that the present workshop's main objective was to discuss potential future collaborative activities, subject to funding from both sides, between the APN and AWCI.

In the discussion that ensued, the participants agreed that the workshop should aim to build the relationship between APN and AWCI in a public domain (through the observation and representation of other institutions). It was further noted that capacity building activities, communications, including the sharing of information, would be a positive step forward in realizing beneficial APN and AWCI collaboration.

3. APN and AWCI Capacity Building:

3.1 APN Capacity Building: Dr. Stevenson highlighted the APN's activities in the area of capacity building and development noting, in particular, the programme, objectives and outputs to date of the APN's capacity development programme, CAPaBLE. She further emphasized the needs of member countries of the APN throughout the region noting in particular high priority needs stressed. In particular, APN member countries are currently lacking adequate human resources (experts, scientists); research tools and/or models; the capacity to apply research and/or mainstream results into policy processes; research infrastructure (such as laboratory, equipment, etc.); training on the use of appropriate methods/analysis; data access/availability; finding international collaborators/appropriate experts; and much needed assistance or training in writing research proposals.

In response to participants' questions, Dr. Stevenson noted that main obstacles were, in terms of human resources, emigration, shortage, finding well-qualified and well-trained scientists (or training the current personnel through post graduate studies, etc.), no funds to recruit scientists in government research institutions. In addition financial resources, outdated facilities/laboratories, and the unsatisfactory utilization of research results/limited understanding of policy-makers on the importance of the research results were a hindrance. In promoting global environmental research and training for sustainable development, the APN's focus is to approach the obstacles facing the region by conducting local, national and regional-level activities in scientific capacity building (for the public as well as scientists and decision-makers), science-policy interfacing, awareness raising, networking and dissemination.

3.2 AWCI Capacity Building: In three presentations, AWCI representatives (with Dr. Chu Ishida presenting on behalf of Dr. S. Herath of the United Nations University) presented the capacity building framework of the AWCI. The goal of the capacity development programme of the AWCI is to facilitate and develop sustainable mechanisms for Asia-Pacific based countries to use advanced earth observations systems, and associated data and tools for water cycle research and water resources management under the GEOSS framework. The specific objectives are to include downscaling regional and global information to basin scale and to improve accuracy required by operational water management applications through a combination of numerical forecasting and fusion of local observations; identify reliable and efficient tools to convert the available observations and data to useful information for flood management through data transformations, interpolation, classification and estimation algorithms; and convert information to water resources management applications, both for operational use and scenario based assessments for planning purposes.

Currently, there are three current modes for capacity building: 1. country-based capacity building (via roving seminars); 2. training module-based capacity building via intensive workshops (UNU-AIT); and 3. country data plus training module-based vis-à-vis one-country data usage with multiple country participation (for example the IWRM project in Vietnam). It was emphasized that, while there was a solid capacity building framework within the AWCI with political support, lack of financial resources hindered the implementation of the capacity building framework. Examples of current and future-planned activities where also highlighted to give a flavour of the work currently being undertaken and what is needed for future implementation of the AWCI framework.

3.3. Discussion Session: In the discussion that ensued the following points were noted:

- There is a need to deal with water quality and water quantity issues together.
- There is an enormous challenge in combining flood and water quality issues, particularly since more sophisticated models would be needed.
- Main sources of pollution need to be identified and ingested into run-off model(s) by combining with satellite data. If large scale model(s) can provide specific outputs that can be used for water quality, this might present a solution.
- In Bangladesh for the Meghna river, there is some water quality data available for groundwater and surface water that could be provided
- A capacity building project that looks specifically at the problem of scales (local to regional) could be initiated.

4. AWCI Data Management:

Section 4 on AWCI Data Management (which encompassed the 2nd ICG Meeting of AWCI) was an information-sharing section designed to share the recent outputs of AWCI Data Management policies and practices with the participants, including AWCI ICG members, external organizations (see Section 6) and the APN. The presentations are available in Annex 4 of the present proceedings.

Discussion Session: In the discussion that ensued the following points were noted:

- It was suggested that the role of APN in Data Management could be in the area of networking. APN has 21 member countries and may be able to provide suitable names and institutions, particularly in terms of which countries may be good candidates for capacity-building activities related to data management.
- It was noted that there is a wealth of data available that policy makers are not giving sufficient attention, noting in particular that capabilities of forecasters to prepare scenarios of extreme events needed to be developed in order to prepare for the coming decades as opposed to 50-100 years from now. This is what is needed for policy-makers to pay attention.
- In terms of potential collaboration with the APN it was suggested that there may be more focus and prioritisation, i.e. focusing on two or three high priority areas and identifying a small group of those who make decisions and then building from there.
- Setting priorities at this level makes sense, particularly because of lacking financial resources to perform all tasks. This issue, particularly for capacity building needs of AWCI, was discussed at the 1st ICG meeting in Beppu, Japan in November 2007 (an activity that was acknowledged as having been funded by the APN).

5. Cooperative Fields between GEOSS/AWCI and APN: Status Reports and Discussion:

5.1 AWCI Flood Working Group Status Report: Mr. F. Fukami presented his group's status noting in particular the success of the Flood Group in achieving funding from the APN from the 2007 Annual call for proposals. The APN-supported project is focusing on demonstration projects (Viet Nam and Indonesia) in the use of satellite data for flood risk management, building capacity for use of satellite data and flood forecasting systems. Emphasis is placed on the use of existing knowledge and capacities with strong coordination from the group. In a largely prioritised programme, focus areas are rainfall downscaling and forecasting; flood forecasting; database for national data archiving and sharing; flash flood forecasting; risk assessment based on loss estimation; inundation modeling; DEM creation with satellite data; land classification for risk assessment; and satellite data for post-disaster assessment.

Discussion Session: In the discussion that ensued the following points were noted:

- With prioritization being a key question, it was again noted that for the flood group, activities are being prioritized following the conclusion of the AWCI 1st ICG meeting in Beppu in November, 2007.
- AWCI representatives from the countries involved are already from government agencies so there is a strong link to policy in the AWCI activities. These include most national met offices, hydrology services and governmental representatives.
- Specific technology and the capacity to use this technology are needed in order to provide information relevant to decision-makers at the national level.
- One of APN's roles in terms of the contents of the capacity building programme for the flood-related activities would be ways to approach the government level as well as best practices that have been identified by the APN in any of its funded activities.

5.2 AWCI Drought Working Group Status Report: Dr. Azzaya Dolgorsuren highlighted discussions that the Group had held at the former Beppu meeting noting in particular that levels of drought were very different from one country to the next. Furthermore, common understanding of drought was different due to problems with communication. In light of this, common problems and needs were identified incorporating instruments, software, monitoring, sharing data and experiences. The status report also highlighted the success of the drought's group proposal to the APN for funding under the recent call for proposals (2007). The goals of the project funded by the APN are to establish a monitoring network for drought in Asia, for which a working group had already been developed consisting of representatives from participating countries. Remote sensing products are be used for monitoring drought and the main target for the ensuing training courses would be to Check SM data availability and quality (in-situ data collection for years 2006-2007, algorithms for SM estimation, RS data). It was also agreed that participating countries will decide the specific area from where the ground base data will be provided.

Discussion Session: In the discussion that ensued the following were noted:

- End users of the products developed are expected to be met and hydro national services, involving ministers from related areas (agriculture, energy, health, etc.).
- To connect policy-makers, decision-makers and scientists/experts, national-level teams are to be formed. It is hoped that the APN can nominate experts at the national level who could join these teams.
- The USA is currently leading drought monitoring activities at the global level under the GEOSS framework and will cooperate with activities at the national/regional levels.
- Determination of current capabilities at the national level needs to be factored into to ensure the best possible outcomes.

5.3 AWCI Water Quality Group Status Report: Dr. Bilquis Hoque began her presentation by noting that a niche for water quality needs to be found, i.e., because water quality can be associated with both flood and drought it cannot really be treated as an independent group. She noted that water quality can be a major issue under quantitatively normal conditions; however there is a problem in that there is currently no water quality observation mechanism/system in place and no available data for people. In citing a few cases, she noted the health effects of emergency drinking water intervention following flood disasters and the lack of information available on the quality of that water. The second case was in arsenic contamination and the drinking water supply in Bangladesh, noting that under normal conditions there is a lack of knowledge on the presence of arsenic, lack of proper monitoring (even if policy-makers are ready, scientists are not) and no proper information on other pollutants. This combined with no proper technology for arsenic removal was a major problem for certain areas of Bangladesh. There is a strong need to develop proper and affordable mechanisms for water quality monitoring and APN's role could be in advocating/promoting timely water quality monitoring in all countries according to i. situations and needs analysis; ii. research and development of appropriate tools, indicators, technology, and capacity building for sound scientific and appropriate water quality monitoring and observations in normal and disaster-related conditions; and iii. data management and sharing. There is also a need for in-situ data and remote sensing – if a single indicator could be found that would inform counties that the problem exists, it would be straightforward to establish a monitoring network.

Discussion Session: In the discussion that ensued the following were noted:

- There is an enormous amount of water quality data in Bangladesh, however different agencies have these data, the quality of the data is different as are the parameters. This data needs to be collated and analysed before presenting to decision-makers.
- Further problem of data-sharing and data policies of independent agencies needs to be studied.
- Currently available water quality data are not intercomparable because of different standards and this area needs to be addressed. A mechanism is urgently needed for integrated water quality monitoring including all sources of water (surface and subsurface).
- It is the intention of the water quality group to resubmit a proposal to the APN in the 2008 annual calls for proposals.
- Clear action plan is needed that outlines a strategy that is doable, covering the smaller issues first.

5.4 AWCI Climate Change Impacts and Adaptation Status Report: Professor Koike delivered his presentation by first noting that this area was new to AWCI compared with the drought, flood and water quality groups. He noted the background highlighting extreme events in Asia were likely to increase in both frequency and intensity. As such, there is a need to study possible scenarios and prepare an adaptation plan. Tools required will include downscaling system and hydrological models. However, capacity is urgently needed to perform downscaling. He highlighted possible impacts of increased rainfall and noted the need for high-resolution rainfall data input for hydrological models. He noted that in Japan, because of its landscape, downscaling rainfall methodologies are extremely important and climatology of all possible events over the next 20 years needs to be studied. While heavy rainfall can be predicted using climate models, extreme events cannot.

Discussion Session: In the discussion that ensued the following were noted:

- The research techniques for downscaling of future scenarios is ongoing based on statistics
- A Canadian global model (400 Km) exists and, through a series of nesting, can downscale to 9 Km resolution, with a possibility of seeing the outlook 1-year or 2-years in advance. This model might help with the impact assessment.

5.5 AWCI Cross-Cutting Issues Status Report: Dr. S.B. Weerakoon began his presentation by noting that cross-cutting issues could be defined as issues that do not fit in any single category, citing examples of extreme events-related risk issues (flood and drought, dam-breaking, ageing irrigation structures, landslides, etc.); integrated water management issues (competing demands by various sectors, water rights, management of riparian rives and basins, weather forecasting – long/short term, etc.); soil erosion; biodiversity and sustenance of ecosystem; health; information sharing issues (database development at basin and national scale, improvement of data acquisition system, data analysis/presentation tools). In his presentation he highlighted that APN and AWCI could share information on data, technical abilities, practitioners, experts, etc.

Discussion Session: In the discussion that ensued the following were noted:

- Flash flooding could be added to the theme of cross-cutting
- There are so many areas to be covered under this specific theme that it is important to prioritise and focus on hot issues and propose activities in this area for work under the AWCI in the future.

6. International Bodies' Comments: AIT, IF-Net, JAXA, UNU, UNESCO/ICHARM, IGWCO, WCRP/GEWEX/CEOP

International Bodies from AIT, IF-Net, JAXA, UNU, UNESCO/ICHARM, IGWCO, WCRP/GEWEX/CEOP provided short presentations with the aim to share information and recent outputs. The presentations are available in Annex 4 of the present proceedings.

7. Overview and Preparation for the Break-Out Sessions

Participants gathered in four groups of drought, flood, water quality and climate/cross-cutting issues with the aim of discussing potential areas for future collaboration of the APN and AWCI, specifically noting that funding was not the only route for collaboration. In organizing these sessions, participants were asked to focus on 3 areas of: Activities (topics, research/capacity building); Accounting (financing, management, collaboration); and Action (find solution to the questions raised: what kind of activity to be designed and conducted to find the best possible way forward for a sustainable water resources management in the Asia -Pacific region with a dramatically-changing climate).

8. Reports from Break-Out Groups

8.1 Flood group report: In terms of collaborative activities aligning climate and water, the flood group noted as a priority the need for capacity building workshop(s) focusing on 3 areas:

- downscaling technology for rainfall forecasting;
- hydrology modeling technology; and
- output data analysis for risk management (flood mapping, inundation mapping)

It was noted that, while Mode 1 is appropriate for the flood group capacity building, some countries do not have appropriate databases. One proposal for a workshop scheme was considered excellent and the AWCI flood group thought this might be classed as high priority for follow-up. The target would be to hold a "train the trainers" workshop.

For the one-week workshop it was considered that 3 experts could be contacted and assigned to the 3 areas outlined and participants would include two from each. Financial support could be sought from the APN through the CAPaBLE Calls for Proposals, but noting in particular the needed leveraged support from other partners and countries involved, both monetary and in-kind. APN could provide financial

support to bring those people for the workshop but also countries contribute, one-week duration of the workshop.

In terms of action and follow-up, the flood group reported that 3 members of the AWCI would take the lead, with S. Herath coordinating the downscaling and rainfall forecasting, T. Koike coordinating the Hydrological modeling and ICHARM coordinating the flood hazard mapping.

Discussion Session: In the discussion that ensued the following were noted:

- Workshops should limit participation to 30-35 people
- One week may not be sufficient to train in all the areas
- Mode 3 of the AWCI capacity building framework may be more suitable than mode 1

A representative from each group provided, via PowerPoint, the results of their break-out session. These are available in Annex 4.

8.2 Drought group report: The drought group first discussed the meaning of drought for the agriculture, meteorology and hydrology sectors before proceeding with the tasks at hand. The following activities were considered important:

- Drought scoping workshop within the area of climate change that would fit with mode 2 of the AWCI capacity building framework.
- National-level training (fitting modes 2 and 3)
- Development of a drought inventory network (modes 1, 2 and 3)
- "Community-based" international workshops (modes 1 and 2)
- Science-policy linkages for risk management

In terms of action, it was considered that a proposal be submitted to the APN for a drought scoping workshop. In addition, a drought inventory network could be established in cooperation with the University of Tokyo.

Discussion Session: In the discussion that ensued the following were noted:

- Clarification was sought on "community-based" which was noted as appropriate persons drawn from drought communities (would be nominated by APN national representatives) and brought together in an international workshop.

8.3 Water Quality group report: The water quality group noted a number of relevant activities particularly as related to the updated version of the GEO work plan, which discusses water quality issues. It was noted that GEO would be a relevant body to contact in terms of aiding the process of identifying additional funding resources for capacity-building activities needed for the water quality activities under the AWCI framework. Furthermore, following the drought working group report, a similar approach would be adopted in terms of applying for funding to the APN via its annual calls for proposals.

Specific action by the water quality group was to form a consolidated network and, in terms of this, the end May (2008) was considered as a tentative deadline. Specifically, as most of the participants attending the scoping workshop were from different backgrounds, it was agreed that experts in water quality were needed for the network.

8.4 Climate/Cross-Cutting Issues group report: The climate and cross-cutting group, as newly emerged themes under the AWCI, formed as one group and had very active discussions, which initially focused on the fundamental issues being faced at this time. First, in terms of operation mode, monitoring (local, global) and data collection (local, global) were considered to be the building blocks of the groups. This was followed by the needs of researchers via models, climate prediction/forecasting, climate

change impacts and vulnerability sectors before feeding into the needs of policy-makers incorporating various priority sectors at the national and continental levels. Following this introduction, the capacity building and research needs of the region were discussed and, as a result, activities considered important were highlighted:

- Capacity building for data recording, collection and management
- Capacity building and technology transfer of researchers/officials on the operation of downscaling global climatology models/hydro-climatology models to the regional, country and basin scales
- Sharing information and experiences of different countries on the projection of climate change impacts (agriculture, food security, sea-level rise, salinity intrusion, extreme events)
- Sharing experiences among member countries on adaptation policies, strategies, impact coping measures, etc.
- Activities relating to mass awareness

Specific action that was underlined to begin the process of developing such a group under the AWCI framework was in networking and sharing of ideas, particularly among universities and institutions of both developed and developing countries in the region. Funding would need to be sought for research and collaborative activities in addition to national funding that could be secured. Furthermore assessing the ongoing activities of government bodies in allocating funding, was considered a necessary step in developing financial resources.

Discussion Session: In the discussion that ensued the following were noted:

- For climate change adaptation activities, many national governments are willing to contribute funds. In order to do this, some research needs to be undertaken in terms of national-level procedures before submitting appropriate proposals at the national level to bear the cost of adaptation activities.

9. Summary and Way Forward

The APN and the AWCI will continue to seek opportunities for closer collaboration and, in addition to the funding provided through APN's annual calls for proposals, APN and AWCI has agreed to the principal of information exchange and mutually beneficial activities for the needs of the region, particularly in the area of capacity building for sustainable development. Proceedings of the present scoping workshop will be collated and the results discussed with members of the APN at its 14th Inter-Governmental Meeting in Kuala Lumpur, Malaysia in March 2009. Specific action and follow-up will be shared with members of the GEOSS/AWCI in due course.

Annex 1: Agenda

1st APN and GEOSS/AWCI
JOINT SCOPING WORKSHOP
2nd GEOSS/AWCI International Coordination Group (ICG) Meeting
Tokyo, Japan, 16-17, April 2008

Agenda

Wednesday, 16 April 2008:

12:30 –13:30: REGISTRATION

13:30 –14:00 Opening by Guest Speakers

1.1	J. Achache, Director, GEO Secretariat	
1.2	Y. Imanari, Executive Manager, APN Secretariat	
1.3	N. Okamura, MEXT	
1.4	Group Photo	

14:00 –14:25 Overview of the APN & AWCI Objectives of the Workshop

2.1	APN Overview	Y. Imanari (10 min.)
2.2	AWCI Overview	T. Koike (10 min.)
2.3	Workshop Objectives/Expectations	L.. Stevenson (5 min.)

14:25 –15:45 APN and AWCI Capacity Building

3.1	Overview of the APN Capacity Building Programme	L.. Stevenson (15 min.)
3.2	Overview of the AWCI Capacity Building framework	C. Ishida (15 min.)
3.3	Open Discussion for way forward	(50 min.)

15:45 –16:05 BREAK

16:05 –17:20 AWCI DATA Management

4.1	Meta Data Structure	M. Nagai (15 min.)
4.2	Data Management System	M. Kitsuregawa (15 min.)
4.3	System Demo: Meta Data Registration/ Data QC/ Data Integration	Nemoto, Ikoma,Kinutani, Yasukawa,Tamagawa (45 min.)

17:20: ADJOURN

Thursday, 17 April 2008:

9:00 –10:50 Cooperative Fields between GEOSS/AWCI and APN
–Status Reports and Discussions (18min.each)

5.1	Flood	K. Fukami, D. Bae
5.2	Drought	A. Dolgorsuren
5.3	Water quality/ecosystem eradication	B. Hoque
5.4	Impacts of Climate Change and adaptation	T. Koike
5.5	Crosscutting Issues (risk management/ecosystem services, etc)	S. Weerakoon

10:50 -11:10 BREAK

11:10 -12:20 International Bodies' Comments (10min. each)
AIT, IF-Net, JAXA, UNU, UNESCO/ICHARM, IGWCO, WCRP/GEWEX/CEOP

12:20–13:30 LUNCH

13:30 –13:50 Overview and Preparations for the Break-Out Sessions

13:50 –15:20 The "Three A's" Break-Out Session: (1.5 hours)
Four/Five Break-Out Groups, all discussing, essentially, the same thing:
APN/AWCI Collaboration: Aligning 'WATER' and 'CLIMATE'
1. **Activities:** topics, research/capacity building
2. **Accounting:** financing, management, collaboration,

3. **Action:** to find solution to the questions raised: what kind of activity to be designed and conducted to find the best possible way forward for a sustainable water resources management in the Asia - Pacific region with a dramatically-changing climate.

15:20 -15:40 BREAK

15:40 -16:25 Reports from the Break-Out Groups

16:25 -17:00 Open Discussion

17:00 -17:30 Conclusion – Common Understanding of Next Steps

17:30 ADJOURN

18:30 RECEPTION DINNER

Annex 2: List of Acronyms

AIT	Asian Institute for Technology
APN	Asia-Pacific Network for Global Change Research
ARCP	Annual Regional Call for Research Proposals
AWCI	Asian Water Cycle Initiative
CAPaBLE	Scientific Capacity Development and Enhancement for Sustainable Development in Developing Countries
CSIRO	Australia Commonwealth Scientific Research Office
CSTP	Council for Science and Technology Policy, Japan
DIAS	Dynamic Information Architecture System
DIVERSITAS	International Programme for Biodiversity
GEO	Global Earth Observations
GEOSS	Global Earth Observation System of Systems
ICG	International Coordination Group
IEEE	Institute of Electrical and Electronics Engineers
IGWCO	Integrated Global Water Cycle Observations
IF-Net	International Flood Network
INSTI-CSIR	Council for Scientific and Industrial Research
JAMSTEC	Japan Institute for Marine-Earth Science and Technology
JAXA	Japan Aerospace Exploration Agency
KMA	Korea Meteorological Administration
LAPAN	Aerospace Analysis and Information Center, National Institute of Aeronautics and Space
MEXT	Ministry of Education, Culture, Sports, Science and Technology, Japan
MOEJ	Ministry of Environment Japan
NASA	National Aeronautics and Space Administration
NEMC	National Environmental Monitoring Conference
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
RESTEC	Remote Sensing Technology Center of JAPAN
TERI	The Energy and Resources Institute
UNESCO/ICHARM	International Centre for Water Hazard and Risk Management
UNU	United Nations University
WCRP/GEWEX/CEOP	World Climate Research Programme/Global Energy and Water Cycle Experiment/Coordinated Energy and Water Cycle Observations Project

Annex 3: List of Participants

Name	Country	Affiliation	Telephone	E-mail Address
Md. ABDUL QUADIR	BANGLADESH	Ministry of Defence Bangladesh	(88)29111020	-
Erna Sri ADININGSIH	INDONESIA	Aerospace Analysis and Information Center, National Institute of Aeronautics and Space (LAPAN)	(62)2131927982	ernas@cbn.net.id
Bashir AHMAD	PAKISTAN	Water Resources Research Institute	(92)3335487506	bashirad@hotmail.com
Shakil AHMAD	JAPAN	REEL, The University of Tokyo	(81)8032134955	ahmad-s@hydra.t.u-tokyo.ac.jp
Jun ASANUMA	JAPAN	University of Tsukuba	(81)298536704	asanuma@suiri.tsukuba.ac.jp
Sadao AKAHOSHI	JAPAN	CSTP, Cabinet Office, Government of Japan	(81)335819260	sadao.akahoshi@cao.go.jp
Albert ALLOTEY	GHANA	Institute for Scientific and Technological Information (INSTI-CSIR)	(233)208127643	allotey2@yahoo.com
Pervaiz AMIR	PAKISTAN	Asianics Agro Development International	(92)3005055560	p_amir03@yahoo.com
Yutaka ARAKI	JAPAN	The University of Tokyo	(81)9093435754	araki@hydra.t.u-tokyo.ac.jp
Masatoshi AOKI	JAPAN	The University of Tokyo	(81)423675727	aoki.mas@cc.tuat.ac.jp
Uchida ATSUSHI	JAPAN	Mitsubishi Research Institute, Inc.	(81)332770551	a-uchida@mri.co.jp
Deg-Hyo BAE	REPUBLIC OF KOREA	Sejong University	(82)234083814	dhbae@sejong.ac.kr
Hasi BAGAN	JAPAN	The University of Tokyo	(81)54526846	hasi@iis.u-tokyo.ac.jp
Somchai BAIMOUNG	THAILAND	Thai Meteorological Department	(66)23989801	somchaib@tmd.go.th
Asif BHATTI	JAPAN	Kochi University of Technology	(81)887572794	asifmumtaz.bhatti@kochi-tech.ac.jp
Ahmad Jamalluddin BI	MALAYSIA	Ministry of Natural Resources and Environment	(60)389483033	ahmadj@nahrim.gov.my
Souhail BOUSSETTA	JAPAN	The University of Tokyo - EDITORIA	(81)358416109	souhail6@hydra.t.u-tokyo.ac.jp

Name	Country	Affiliation	Telephone	E-mail Address
Ben BURFORD	JAPAN	Remote Sensing Technology Center of JAPAN (RESTEC)	(81)355618409	benb@restec.or.jp
Lalith CHANDRAPALA	SRI LANKA	Department of Meteorology	(94)112694104	lalithch@hotmail.com
G CHHOPEL	BHUTAN	National Environment Commission	(975)2323384	gkchhopel@nec.gov.bt
Karma CHHOPHEL	BHUTAN	Hydro-Met Services Division, DoE, MoEA	(975)2328280	hmsd@druknet.bt
Sooriyaarchchi CHANDRASIRI	SRI LANKA	Dept. of Energy, Government of Sri Lanka	(94)112887424	zafammc@sltnet.lk
Zhang CHENGYI	CHINA	China Meteorological Administration, National Climate Centre	(86)1068407420	-
Douglas CRIPE	SWITZERLAND	GEO Secretariat	(41)227308368	dcripe@geosec.org
Azzaya DOLGORSUREN	MONGOLIA	Institute of Meteorology and Hydrology	(976)11326614	azzaya23@yahoo.com
Noureddine FILALI BOU	MOROCCO	Direction de la Météorologie Nationale	(212)37757646	nour.filali@gmail.com
Hideyuki FUJII	JAPAN	Japan Aerospace Exploration Agency / Earth Observations Research Center (JAXA/EORC)	(81)298682715	fujii.hideyuki@jaxa.jp
Hidetoshi FUJIMORI	JAPAN	Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT)	(81)367344181	fujimori@mext.go.jp
Kazuhiko FUKAMI	JAPAN	Public Work Research Institute (PWRI)	-	-
Kenji FUKUYAMA	JAPAN	Forestry and Forest Products Research Institute	(81)298298212	fukuchan@affrc.go.jp
Hiroaki FURUMAI	JAPAN	The University of Tokyo	-	-
Adam GERRAND	ITALY	UN Food and Agriculture Organisation (FAO)	(39)3406999650	adam.gerrand@fao.org
Akiko GODA	JAPAN	Earth Observation Data Integration and Fusion Research Initiative, University of Tokyo	(81)358416132	goda@hydra.t.u-tokyo.ac.jp
Davaa GOMBO	MONGOLIA	Institute of Meteorology and Hydrology	(976)11312765	watersect@yahoo.com
Shigeko HARUYAMA	JAPAN	The University of Tokyo	(81)424812128	haruyama @k.u-tokyo.ac.jp

Name	Country	Affiliation	Telephone	E-mail Address
S.M. HASSAN	BANGLADESH	Bangladesh Meteorological Department	(88)028113071	smquamrul77@yahoo.com
Andre HELD	AUSTRALIA	CSIRO - Australia	(61)262465718	Alex.Held@csiro.au
Flaviana HILARIO	PHILIPPINES	Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)	(63)29291953	fhilarioph@yahoo.com fhilario@pagasa.dost.gov.ph
Bilqis HOQUE	BANGLADESH	Environment and Population Research Center (EPRC)	(88)28822772	bilqisdhaka@yahoo.com
Tamotsu IGARASHI	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355618775	igarashi.tamotsu@restec.or.jp
Yasushi IKEBE	JAPAN	National Museum Of Emerging Science And Innovation (MIRAIKAN)	(81)335709215	y-ikebe@miraikan.jst.go.jp
Eiji IKOMA	JAPAN	The University of Tokyo	(81)471364303	eikoma@csis.u-tokyo.ac.jp
Yukihiro IMANARI	JAPAN	Asia-Pacific Network for Global Change Research (APN) Secretariat	(81)782308017	yimanari@apn-gcr.org
Yoko INOMATA	JAPAN	Satellite Applications and Promotion Center (SAPC) Japan Aerospace Exploration Agency (JAXA)	(81)335169116	inomata.youko@jaxa.jp
Sumarjo Gatot IRIANTO	INDONESIA	Directorate of Water Management	(62)217823975	gatot_irianto@yahoo.com
Chu ISHIDA	JAPAN	Satellite Applications and Promotion Center Japan Aerospace Exploration Agency (JAXA)	(81)335169100	ishida.chu@jaxa.jp
Iskandar ISKHAQ	JAPAN	Institute of Observational Research for Global Change (IORGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	(81)468679516	iskhaq@jamstec.go.jp
Hiroaki ITO	JAPAN	Space Industry Office	(81)335010973	ito-hiroaki@meti.go.jp
Kazuhisa ITO	JAPAN	Infrastructure Development Institute-Japan	(81)332637920	2bu01@idi.or.jp
Yoshimasa ITO	JAPAN	Infrastructure Development Institute-Japan	(81)332637920	2bu04@idi.or.jp
Nagendra JHA	NEPAL	Survey Department, Government of Nepal	(977)9841298413	nagendra_1961@hotmail.com
Pawan JOSHI	INDIA	TERI University	(91)1124682100	pkjoshi@teri.res.in

Name	Country	Affiliation	Telephone	E-mail Address
Misako KACHI	JAPAN	Japan Aerospace Exploration Agency / Earth Observations Research Center (JAXA/EORC)	(81)298682726	kachi.misako@jaxa.jp
Ichirou KAIHOTSU	JAPAN	Hiroshima University	(81)824246497	kaihotu@hiroshima-u.ac.jp
Jagadishwor KARMACH	NEPAL	Department of Hydrology and Meteorology	(977)14255920	j_karmacharya@yahoo.com
Surinder KAUR	INDIA	India Meteorological Department	(91)24618245	skaurg@yahoo.com
Michio KAWAMIYA	JAPAN	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	(81)457785613	kawamiya@jamstec.go.jp
Takeshi KAWANO	JAPAN	Institute of Observational Research for Global Change (IORGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	(81)468679471	kawanot@jamstec.go.jp
Hiroko KINUTANI	JAPAN	Institute of Industrial Science Kitsuregawa Laboratory	(81)354526098	kinutani@tkl.iis.u-tokyo.ac.jp
Asanobu KITAMOTO	JAPAN	National Institute of Informatics	(81)342122578	kitamoto@nii.ac.jp
Masaru KITSUREGAWA	JAPAN	The University of Tokyo	(81)354526254	kitsure@tkl.iis.u-tokyo.ac.jp
Akio KITOH	JAPAN	Meteorological Research Institute, JMA	(81)298538590	-
Toshio KOIKE	JAPAN	University of Tokyo	(81)358416106	tkoike@hydra.t.u-tokyo.ac.jp
Petra KOUDELOVA	JAPAN	University of Tokyo	(81)358416132	petra@hydra.t.u-tokyo.ac.jp
Takashi KONDO	JAPAN	Mitsubishi Research Institute, Inc.	(81)332770898	kontak@mri.co.jp
Yoshiyuki KUDO	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355618403	y_kudo@restec.or.jp
Rakesh KUMAR	INDIA	National Institute of Hydrology	(91)1332275645	rk18p@yahoo.co.in and rakesh@nih.ernet.in
Shiv KUMAR SHARMA	NEPAL	Ministry of Water Resources	(977)14423310	-
Yukio KURIHARA	JAPAN	Atmospheric Environment Division Global Environment and Marine Department, JMA	(81)3321283414163	yukio.kurihara-a@met.kishou.go.jp

Name	Country	Affiliation	Telephone	E-mail Address
Kaori KUROIWA	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355619775	kuroiwa@restec.or.jp
Andreas LANGNER	JAPAN	The University of Tokyo	(81)9039037246	andi_langner@gmx.de
Richard LAWFORD	CANADA	International GEWEX Project Office	-	lawford@umbc.edu
Yongseob LEE	REPUBLIC OF KOREA	Korea Meteorological Administration (KMA)	(82)221810465	yslee0@kma.go.kr
Yunqing LI	JAPAN	Japan Space Imaging	(81)352042742	yunli@spaceimaging.co.jp
Joesron LOEBIS	INDONESIA	Research Institute for Water Resources	(622)22501083	joesron@melsa.net.id
Hui LU	JAPAN	EDITORIA, The University of Tokyo	(81)358416109	lu@hydra.t.u-tokyo.ac.jp
Angela MALISA	TANZANIA	National Environment Management Council (NEMC)	(255)784703350	aemalisa2003@gmail.com
Makoto MARUYA	JAPAN	Space Systems Division	(81)423333960	maruya@da.jp.nec.com
Jun MATSUMOTO	JAPAN	Tokyo Metropolitan University	(81)426772596	jun@center.tmu.ac.jp
Anthony MILNE	AUSTRALIA	University of New South Wales	(61)294514628	T.Milne@unsw.edu.au
C. MIRZA	JAPAN	The University of Tokyo	(81)358416109	craza@hydra.t.u-tokyo.ac.jp
Seiji MIYAUCHI	JAPAN	Japan Meteorological Agency (JMA)	(81)332128341	seiji.miyauchi@met.kishou.go.jp
Rasmy MOHAMED	JAPAN	River and Environmental Engineering Laboratory, Civil Dept., University of Tokyo	(81)9098116291	rasmy@hydra.t.u-tokyo.ac.jp
Takashi MORIYAMA	JAPAN	Japan Aerospace Exploration Agency (JAXA)	(81)298682490	moriyama.takashi@jaxa.jp
David MORTON	AUSTRALIA	Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO)	(61)262766392	dave.morton@csiro.au
Sergey MYAGKOV	UZBEKISTAN	Asian Water Cycle Initiative (AWCI)	(998)712358329	NIGMI@ALBATROS.UZ
Masahiko NAGAI	JAPAN	The University of Tokyo	(81)471364307	nagaim@iis.u-tokyo.ac.jp

Name	Country	Affiliation	Telephone	E-mail Address
Tsugito NAGANO	JAPAN	Japan Aerospace Exploration Agency / Earth Observations Research Center (JAXA/EORC)	(81)2988682453	nagano.tsugito@jaxa.jp
Kaoru NAKATA	JAPAN	Fisheries Research Agency	(81)452272679	may31@affrc.go.jp
Kimihiko NAKAYAMA	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)298631601	nakayama.kimihiko@restec.or.jp
Toshihiro NEMOTO	JAPAN	Institute of Industrial Science, University of Tokyo	(81)354526256	nemoto@tkl.iis.u-tokyo.ac.jp
Brian NKANDU	ZAMBIA	ZAGIS (Zambia Association for Geographic Information Systems and EIS-Africa)	(260)977965111	briannkandu@yahoo.co.uk
Osamu OCHIAI	SWITZERLAND	GEO Secretariat	(41)227308443	oochiai@geosec.org
Tsuyoshi OGAWA	JAPAN	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	(81)468679207	ogawat@jamsyec.go.jp
Takashi OHKI	JAPAN	Mitsubishi Research Institute, Inc	(81)332770551	t-ohki@mri.co.jp
Tetsu OHTA	JAPAN	The University of Tokyo	(81)358416105	ohta@hydra.t.u-tokyo.ac.jp
Tomoya OKU	JAPAN	Earth Remote Sensing Data Analysis Center	(81)335339312	oku@ersdac.or.jp
Akio ONIYAMA	JAPAN	Pasco Corporation	(81)345703066	akio_oniyama@pasco.co.jp
Masafumi ONO	JAPAN	Earth Observation Data Integration and Fusion Research Initiative, University of Tokyo	(81)354526417	maono@iis.u-tokyo.ac.jp
Makoto ONO	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355618761	onomakot@restec.or.jp
Yoichi OWADA	JAPAN	Cabinet office, Council for Science and Technology Policy	(81)335819261	ozawa.saori@jaxa.jp
Md. Mafizur RAHMAN	BANGLADESH	Bangladesh University of Engineering and Technology	(88)29660306	mafiz@agni.com, mafizur@gmail.com
Md. Mahmudur RAHM	JAPAN	Center for Environmental Remote Sensing (CERES), Chiba University	(81)432903846	mahmud@restaff.chiba-u.jp
Ghulam RASUL	PAKISTAN	Pakistan Meteorological Department, Islamabad	(92)519250369	grmet@yahoo.com

Name	Country	Affiliation	Telephone	E-mail Address
Gary RICHARDS	AUSTRALIA	Department of Climate Change	(91)262741926	gary.richards@climatechange.gov.au
Mohamed ZAFARULLAH	SRI LANKA	Local Government	(94)662234331	zafammc@sltnet.lk
Oliver SAAVEDRA	JAPAN	University of Tokyo	(81)358416107	oliver@hydra.t.u-tokyo.ac.jp
Toshibumi SAKATA	JAPAN	Advanced Earth Science and Technology Organization (AESTO)	(81)355128188	sakata@aesto.or.jp
Lal SAMARAKOON	SRI LANKA	Asian Institute of Technology (AIT)	(66)25245580	lal@ait.ac.th
Patricia Ann SANCHEZ	JAPAN	University of Tokyo	(81)8035950355	patricia@hydra.t.u-tokyo.ac.jp
Nobuo SATO	JAPAN	Japan Meteorological Agency (JMA)	(81)471447185	nsato@met.kishou.go.jp
Tomotaka SEKIYA	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355619819	sekiya@restec.or.jp
Shiv Kumar SHARMA	NEPAL	Ministry of Water Resources, Nepal	(977)83520314	Shiv1301@Yahoo.com
Ryosuke SHIBASAKI	JAPAN	Center for Spatial Information Science, University of Tokyo	(81)471364290	shiba@csis.u-tokyo.ac.jp
Masanobu SHIMADA	JAPAN	Japan Aerospace Exploration Agency (JAXA)	(81)298682474	shimada.masanobu@jaxa.jp
Hironori SHIMAZU	JAPAN	CSTP, Cabinet Office, Government of Japan	(81)335819261	hironori.shimazu@cao.go.jp
Hiroaki SHIRAKAWA	JAPAN	CSTP, Cabinet Office, Government of Japan	(81)335819265	hiroaki.shirakawa@cao.go.jp
Bharat SHRESTHA	NORWAY	Dept. of Plant and Environmental Science Norwegian University of Life Sciences	(47)64965562	bharat.shrestha@umb.no
Linda Anne STEVENSON	JAPAN	Asia-Pacific Network for Global Change Research (APN) Secretariat	(81)782308017	lstevenson@apn-gcr.org
Thada SUKHAPUNNA	THAILAND	Hydrology and Water Management Center for Upper Northern Region	(66)53262683	Thada999@yahoo.com
Akimasa SUMI	JAPAN	IR3S/TIGS, The University of Tokyo	(81)358411539	sumi@ir3s.u-tokyo.ac.jp
Kei SUZUKI	JAPAN	Forestry Science and Technology Institute	(81)332644152	kei@jafta.or.jp

Name	Country	Affiliation	Telephone	E-mail Address
Na SWARANJITKAUR	INDIA	S R Government College Amritsar	(91)1832421779	drkaurphd@gmail.com
Fadli SYAMSUDIN	INDONESIA	Agency for the Assessment and Application of Technology (BPPT)	(61)213169714	-
Katsunori TAMAGAWA	JAPAN	The University of Tokyo	(81)358416105	tamagawa@hydra.t.u-tokyo.ac.jp
Kenji TANIGUCHI	JAPAN	The University of Tokyo	(81)358416108	taniguti@hydra.t.u-tokyo.ac.jp
Justin TILMAN	JAPAN	National Aeronautics and Space Administration (US Embassy, Tokyo)	(81)332245827	JUSTIN.TILMAN@NASA.GOV
Kenichi TODA	JAPAN	Japan Aerospace Exploration Agency (JAXA)	(81)298682452	toda.kenichi@jaxa.jp
Sap TRAN	VIET NAM	National Hydro-Meteorological Service (NHMS) of Viet Nam	(84)913238122	tvsap@yahoo.com
Kumiko TSUJIMOTO	JAPAN	The University of Tokyo	(81)358416107	tsujimoto@hydra.t.u-tokyo.ac.jp
Kazuo UMEZAWA	JAPAN	Japan Aerospace Exploration Agency (JAXA)	(81)298682486	umezawa.kazuo@jaxa.jp
Aya URAGUCHI	JAPAN	Mitsubishi Research Institute	(81)332770529	uraguchi@mri.co.jp
Khanh VAN	VIET NAM	National Hydro-Meteorological Services (NHMS) Viet Nam	(84)48247834	khanhnhms@hotmail.com
Hansa VATHANANUKIJ	THAILAND	Government Official, Kasetsart University	(66)29428555	hansa.v@ku.ac.th; hans_vat@yahoo.com
Bruno WALTHER	FRANCE	DIVERSITAS	(33)140798046	-
Lei WANG	JAPAN	The University of Tokyo	(81)358416107	wang@hydra.t.u-tokyo.ac.jp
Sumana WEERAKOON	SRI LANKA	University of Peradeniya	(94)812393566	sbweera@pdn.ac.lk
Thomas WIENER	U.S.A.	Institute of Electrical and Electronics Engineers (IEEE)	(1)7037689522	t.wiener@ieee.org
Tetsukazu YAHARA	JAPAN	Kyushu University	(81)9264112622	tyahascb@mbox.nc.kyushu-u.ac.jp
Masaki YASUKAWA	JAPAN	The University of Tokyo	(81)354526256	yasukawa@iis.u-tokyo.ac.jp

Name	Country	Affiliation	Telephone	E-mail Address
Akiyo YATAGAI	JAPAN	Research Institute for Humanity and Nature	(81)757072204	akiyo@chikyu.ac.jp
Takahashi YOSHIAKI	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355618892	taka.y@restec.or.jp
Kazuko MISAWA	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355614547	misawa@restec.or.jp
Tomoko KAWASHIMA	JAPAN	Remote Sensing Technology Center of Japan (RESTEC)	(81)355614528	kawashima_tomoko@restec.or.jp

Annex 4: Workshop Presentations

4.1.1 APN Overview

Asia-Pacific Network for Global Change Research: An Overview

Mr. Yukihiro Imanari
Executive Manager
Asia-Pacific Network
for Global Change Research (APN)
yimanari@apn-gcr.org

Presented at the APN & GEOSS/AWCI Joint Scoping Workshop:
16-17 April 2008, Tokyo, JAPAN

1

What is the APN?

Asia-Pacific Network for Global Change Research

- Inter-governmental Network to foster global change research in the Asia-Pacific region
- Established in '96 as a result of the '90 White House Conference on Science & Economics Research Related to Global Change
- 21 member countries
- Dedicated secretariat in Kobe, Japan since '99
- Major activities
  - Funding research projects (ARCP)
  - Funding capacity building projects (CAPaBLE)
  - Science-policy linkages

2

APN Member Countries

- Australia
- Bangladesh
- Cambodia
- China
- Fiji
- India
- Indonesia
- Japan
- Lao PDR
- Malaysia
- Mongolia
- Nepal
- New Zealand
- Pakistan
- Philippines
- Republic of Korea
- Russian Federation
- Sri Lanka
- Thailand
- United States of America
- Viet Nam

Pacific Island Countries and Singapore are approved countries whose scientists are eligible to receive funding under APN awards.

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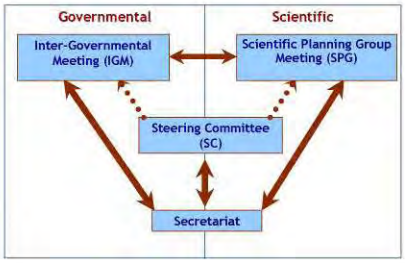
Organisational Structure



4

APN's Mission
(APN Strategic Plan 2005/06 – 2009/10)

The mission of the APN is to enable investigation of change in the Earth's life support systems as it occurs in the Asia-Pacific region to:

- **Identify, explain and predict changes in the context of both natural and anthropogenic forcing,**
- **Assess potential regional and global vulnerability of natural and human systems, and**
- **Contribute, from the science perspective, to the development of policy options for appropriate responses to global change that will also contribute to sustainable development.**

5

APN's Goals
(APN Strategic Plan 2005/06 – 2009/10)

- Goal 1: Supporting regional cooperation in global change research on issues particularly relevant to the region
- Goal 2: Strengthening appropriate interactions among scientists and policy-makers, and providing scientific input to policy decision making and scientific knowledge to the public
- Goal 3: Improving the scientific and technical capabilities of nations in the region
- Goal 4: Cooperating with other global change networks and organisations
- Goal 5: Facilitating the development of research infrastructure and the transfer of know-how and technology

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Financial Resources

The APN is sponsored by the governments of:

- Australia (Department of Environment and Water Resources)
- Japan (Ministry of the Environment and Hyogo Prefecture)
- New Zealand (Ministry for the Environment)
- Republic of Korea (Ministry of Environment)
- United States of America (National Science Foundation, US Climate Change Science Program)

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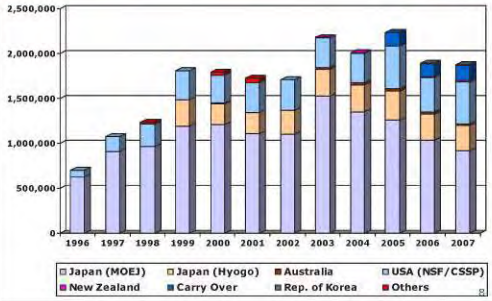
Contributions to the APN (US$)



8

Science Agenda
(APN Strategic Plan 2005/06 – 2009/10)

What do we mean by "Global Change"?

- The set of **natural and human-induced changes in the Earth's physical and biological systems** that, when aggregated, are significant at a global scale
- **Global Change Research** is research regarding global change and its implications for sustainable development in the Asia-Pacific region

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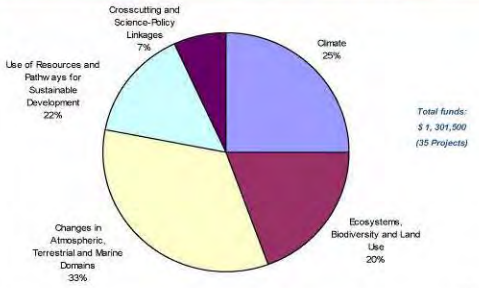
Science Agenda
(APN Strategic Plan 2005/06 – 2009/10)

Key Scientific Themes

1. Climate
2. Ecosystems, Biodiversity and Land Use
3. Changes in Atmospheric, Terrestrial and Marine Domains
4. Use of Resources (food, water, energy, materials) and Pathways for Sustainable Development
5. Crosscutting and Science-Policy Linkages

10

Theme Distribution of ARCP Projects 2006/07 and 2007/08



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The Global Change Community

Scientific Community Programmes

- Earth System Science Partnership
- DIVERSITAS
- International Geosphere-Biosphere Programme
- International Human Dimensions Programme on Global Change Research
- World Climate Research Programme
- Global Change System for Analysis, Research and Training (START)

Regional Networks

- Inter-American Institute for Global Change Research
- Asia-Pacific Network for Global Change Research
- African Network of Earth System Science - Global Change Research in Africa

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Activities of Interest to APN

The ARCP Programme

- New research which addresses knowledge gaps in key areas
- Synthesis and analysis of existing research
- Research planning/scoping activities
- The development of policy products such as integrated assessments, impact assessments, climate models, etc.

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Activities of Interest to APN

Capacity Development (CAPaBLE)

- Scientific Capacity Building for Sustainable Development
- Science-Policy interfacing
- Awareness Raising
- Dissemination

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Calls for Proposals *for funding from April 2009*

Launched late May/Early June on the APN Website

(1) Annual Regional Call for Research Proposals (ARCP)
...for global change research

(2) Scientific Capacity Building and Enhancement for Sustainable Development in Developing Countries (CAPaBLE) Programme
...for capacity development activities

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Publications in 2007/08

The APN produces publications in order to help achieve its goal of "*providing scientific input to policy decision-making and scientific knowledge to the public.*"

- Quarterly Newsletters
- CAPaBLE Publication
- Annual Report 2006/2007
- Project Bulletin Vol. 3
- APN Brochures in 12 languages

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Contact the APN

For more information, please visit:
www.apn-gcr.org

IHD Centre Bldg. 5F
1-5-1 Wakinohama Kaigan Dori
Chuo-ku, Kobe 651-0073, Japan
Tel: +81-78-230-8017
Fax: +81-78-230-8018
Email: info@apn-gcr.org

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4.1.2: Objectives of the Workshop

APN & GEOSS/AWCI Scoping Workshop: Objectives

Dr. Linda Anne Stevenson
Scientific Officer
Asia-Pacific Network
for Global Change Research (APN)
lstevenson@apn-gcr.org

APN & GEOSS/AWCI Scoping Workshop: 16-17 April 2008, Tokyo, JAPAN

1

Background

- **Background:**

1. In discussions with MEXT in 2006, it was suggested to APN that Professor Koike be a good contact to discuss collaboration, from a GEOSS perspective, between APN and the AWCI.
2. AWCI was introduced at the APN's 12th Inter-Governmental Meeting in March 2007, where possible collaboration between APN and AWCI was discussed.
3. This was followed by both APN and AWCI's input to the Fourth GEO summit (Cape Town), November 2007, where both organizations were listed in the publication "*The First One Hundred Steps*."

2

Workshop Objectives

- **Objectives of the workshop:**

1. Conduct a scoping workshop to align water and climate activities
2. To discuss, perhaps plan, future activities subject to funding from both sides, between AWCI and APN related, but not limited to, GEOSS activities

3

Workshop Objectives

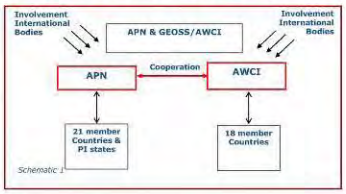
- **Three areas considered important when designing APN/AWCI collaboration:**

1. The importance of developing science and technology/data integration and fusion
2. International cooperation frameworks such as GEOSS - 12 countries in the APN region are members of GEOSS; 18 countries in the APN region are members of the AWCI
3. People/Networks who work together to provide solutions to water issues in the region

4

Workshop Objectives

- **Why involve other institutions?**
  - Agreed that the workshop should aim to build the relationship between APN and AWCI in a public domain (through the observation and representation of other institutions).



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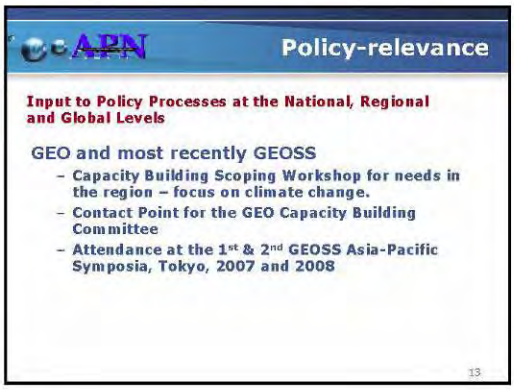
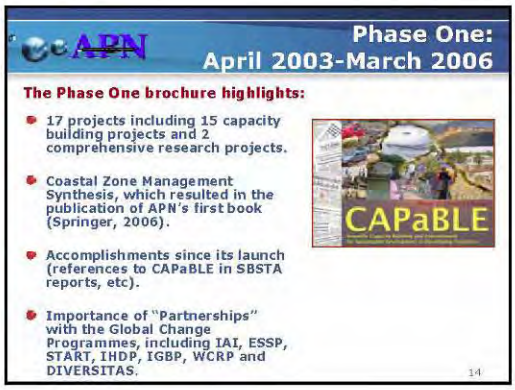
Outcome

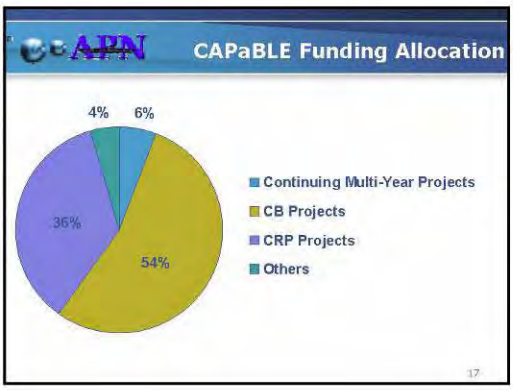
- **Through break-out sessions focussing on**
  - Activities (for themes of climate, crosscutting issues, floods, droughts, water quality)
  - Accounting (financing, co-funding, management)
  - Action (What next?)
- **Find a Common Understanding on the Way Forward**

6

4.2.1: APN Capacity Building







APN's Capacity Development Programme: CAPaBLE

Dr. Linda Anne Stevenson
Scientific Officer
Asia-Pacific Network
for Global Change Research (APN)
lstevenson@apn-gcr.org@apn-gcr.org

Presented at the APN & GEOSS/AWCI Joint Scoping Workshop:
16-17 April 2008, Tokyo, JAPAN

1

What is CAPaBLE?

What is CAPaBLE?

- Programme for Scientific Capacity Building and Enhancement for Sustainable Development in Developing Countries **(CAPaBLE)** Programme
- A concrete initiative introduced by Prime Minister Koizumi through the Ministry of the Environment to realise parts *107 to 114* of the Plan of Implementation for the World Summit on Sustainable Development (WSSD
- Registered as a **WSSD Type II Partnership/Initiative by the Japanese Government in Johannesburg, September 2002.**

2

What is CAPaBLE?

CAPaBLE is a programme that is expected to realize parts 110-114 of the Johannesburg Plan of Implementation (JPOI), particularly PART 111

Part 111 of JPOI

Establish Regular Channels between policy-makers and the scientific community for requesting and receiving science and technology advice for the implementation of Agenda 21 and create and strengthen networks for science and education for sustainable development, at all levels,with the aim of sharing knowledge, experiences and best practices and building scientific capacities particularly in developing countries.

3

CAPaBLE

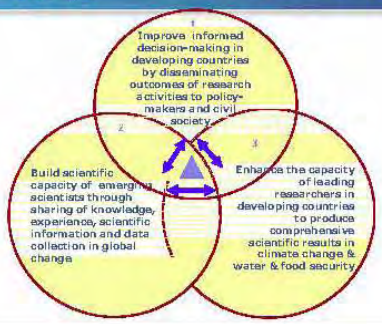
Scientific Capacity Building and Enhancemnt for Sustainable Development in Developing Countries

Introduced in April 2003, the CAPaBLE Programme is now an integral part of APN's activities

CAPaBLE is developing and enhancing scentific & educational capacity in developing countries to improve their decision-making in the target areas related to: global change, dimate change & water and food security that are directly linked to their sustainable development.

4

CAPaBLE Objectives



5

Challenges

Challenges in Climate Change Research

- **Limited research and institutional capacity to conduct climate change research *(56%)***
- **Limited financial resources/inadequate funds *(44%)***
- **Networking and complementation among local research institutions *(28%)***
- **Data availability/sufficiency and reliability *(22%)***
- **Physical attributes of the country: size, topography, etc. (also related to research integration) *(22%)***
- **Integration of research *(17%)***
- **Research results cannot provide sufficient evidence to support climate change-related policy-making *(11%)***

6

Activities of Interest to APN

Capacity Development

- Scientific Capacity Building for Sustainable Development
- Science-Policy interfacing
- Awareness Raising
- Dissemination

7

Projects Conducted

Projects Conducted

In 5 years since the launch of the CAPaBLE Programme:

- **44 projects** have been conducted:
  - 39 of which are capacity building activities and
  - 5 are comprehensive research projects.

8

Comprehensive Research

Phases were introduced for the "comprehensive research/capacity enhancement" element (pillar) of CAPaBLE:

- **Phase I (3 years)** April 2003 to March 2006: Two Comprehensive Research Projects (CRPs) in Climate Change Adaptation and Mitigation. Projects – specifically targeted to Outputs from WGII and WGIII of the IPCC TAR
- **Phase II (3 years)** April 2006 to March 2009: Three Comprehensive Research Projects (CRPs) in the area of Climate Change and Food & Water Security. They are moving into their 3rd and final years.
- **Phase III from 2009:** CAPaBLE call for comprehensive research projects is expected to be launched in June 2008. Themes and Timeline to be finalised

9

Comprehensive Research

Phase II: Comprehensive Research Projects

- **CRP2006-01NMY-Dixit** – Improving Policy Responses to Interactions between Global Environmental Change and **Food Security** across the Indo-Gangetic Plain (IGP)
- **CRP2006-02NMY-Yan** – Integrated Model Development for **Water and Food Security** Assessment and Analysis of the Potential of Mitigation Options and Sustainable Development Opportunities in Temperate Northeast Asia
- **CRP2006-03NMY-Jintrawet** – Climate Change in Southeast Asia and Assessment on **Impacts, Vulnerability and Adaptation on Rice Production and Water Resources**

10

Policy-relevance

Input to Policy Processes at the National, Regional and Global Levels

IPCC

- 2 comprehensive research projects specifically targeted to input into Working Groups II and III of the IPCC 4AR
- GHG Inventories; working closely with the GHG Inventory Office, Japan (NIES)
- 5 citations (currently known) in the IPCC 4th Assessment Report from projects funded under the CAPaBLE programme.

11

Policy-relevance

Input to Policy Processes at the National, Regional and Global Levels

UNFCCC

- Transfer of Technologies
- GHG Inventories and National Communications
- UNFCCC Workshop on the preparation of national communications from non-Annex I Parties, Manila, Philippines, 26 – 30 April 2004
- 22nd, 24th and 26th Reports of SBSTA specifically mentioning regional networks such as APN.
- COP Side Events
  - COP11/MOP1 Side Event (Joint NIES/APN-CAPaBLE)
  - COP13/MOP3 – 2 official and 2 unofficial side events
- Kyoto Mechanisms on GHG Inventories

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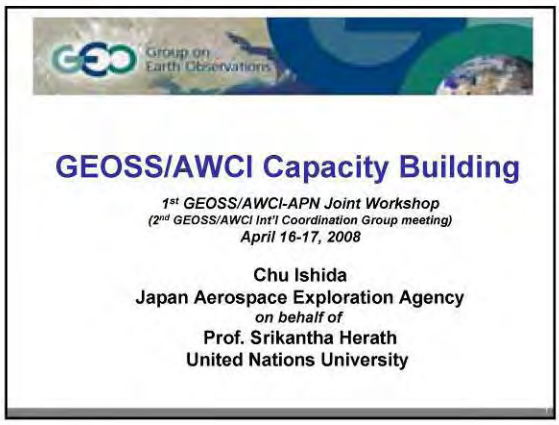
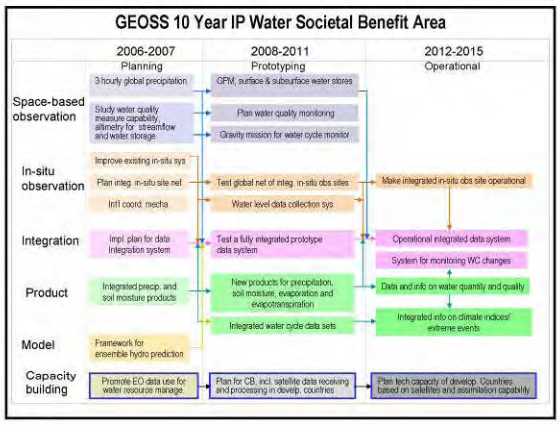
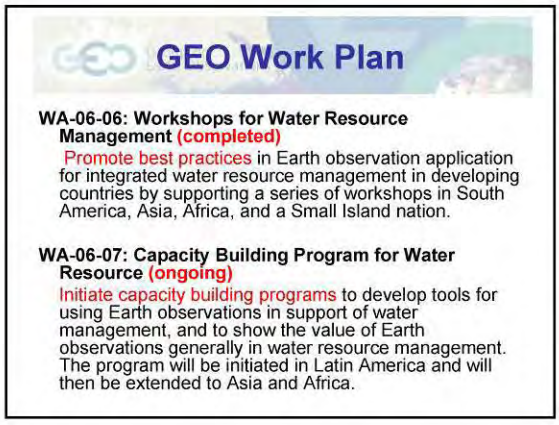
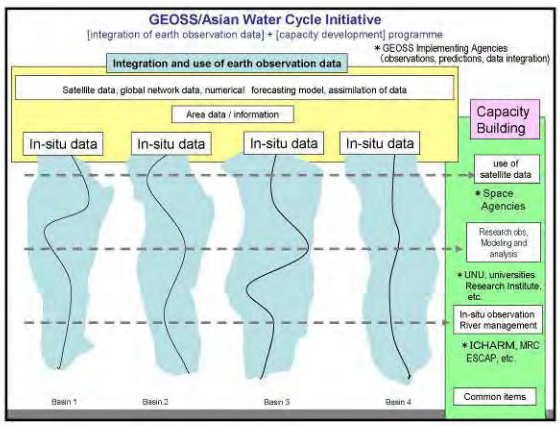
4.2.2 AWCI Capacity Building









AWCI Implementation Plan as discussed in Bali ICG, Sep 2007

1. Objectives
2. Convergence of Observation
   Data Integration and Analysis
   Modeling and Prediction
   Data Policy and Information Sharing
3 Capacity Building
   General Approach (*each WG Priority Area*)
   Targets & Needs
   Resources & Opportunities
   Gap Analysis
   Proposed Capacity Building Programs
4 Country Activities
   Demonstration River Basin
   (1) Background, Targeted Issues and Objectives
   (2) River Basin Characteristics
   (3) Observation Systems and Data
   (4) Models, GIS, Data Integration, Prediction Systems
   (5) Schedule
5. Organization and Management
6. Schedule

3rd Asian Water Cycle Symposium Beppu, Dec 2-4, 2007

- The 3rd Asian Water Cycle Symposium was held with 84 participants from Asian countries and international organizations, in Beppu city, Japan, on Dec 2-4, 2007, in conjunction with the 1st Asia-Pacific Water Summit.
- *Objecitves:*
  - To move forward and implement the baseline idea approved at the 2nd Asian Water Cycle Symposium, Tokyo, 9-10 Jan 2007, and the 1st Int'l coordination Group (ICG) workshop in Bali, 9 September.
  - To develop and adopt a draft implementation plan for the GEOSS/AWCI.
- *Major outcomes:*
  - GEOSS/AWCI Implementation Plan was developed and adopted.
  - The Capacity Building Frame Work for AWCI was developed by Prof. Herath/UNU.
  - Capcity building development priorities and CB pilot project proposals were identified.

AWCI CB Frame Work Goal

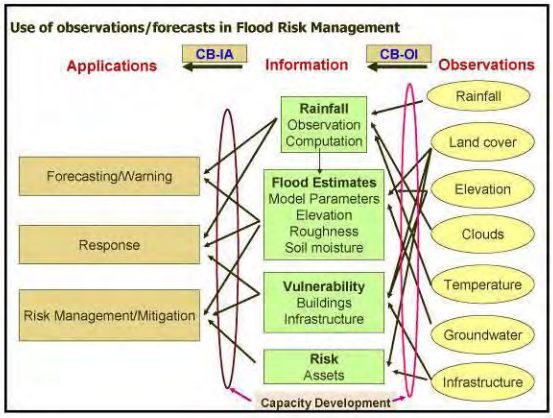
- The goal of the capacity development program of the AWCI is to facilitate and develop sustainable mechanisms for the countries in Asia Pacific to use advanced earth observations systems, associated data and tools for water cycle research and water resources management under GEOSS framework.

Specific Objectives

- Downscaling regional and global information to basin scale and to improve accuracy required by operational water management applications through a combination of numerical forecasting and fusion of local observations.
- Identify reliable and efficient tools to convert the available observations and data to useful information for flood management through data transformations, interpolation, classification and estimation algorithms.
- Conversion of information to water resources management applications, both for operational use and scenario based assessments for planning purposes.

Target groups

- **Researchers / Scientists**
  - **Customizing existing knowledge to suit local conditions supported by global experiences**
- **Professional / Practitioners**
  - **Introducing new methods, tools, standards**
- **Administrative / Local government officers**
  - **Over view of technology and science**



Guidelines - requirements

- Capacity Development on data acquisition and information extraction, including fundamental & advanced technologies for observations and analyses, and on end-user product generation for IWRM and Water Cycle Resesarch is urgently required in almost all of the developing countries in Asia.
- Considering the disparity in existing capabilities among different countries as well as their varied needs, it is recommended to work out capacity development programs based on prior need assessment.
- Incorporating the above mentioned requirements, it is proposed to develop some demonstration projects in conjunction with the framework of AWCI for the evaluation of applicability of earth observations for IWRM.

13

Methodology

- The capacity development activities will be designed and carried out concurrently in support of applications in 17 Asian Basins proposed to be studied within the Asian Water Cycle Initiative for clarification of basin water cycle and the development of appropriate water management practices.

Focus areas

- **Three focus areas have been identified by the AWCI participants.**
  - **Flood**
  - **Drought**
  - **Water quality**
- **By designing a generic template for each problem area, we can plan required capacity development activities.**

Proposed AWCI CB Pilot Projects, Beppu, Dec 2007

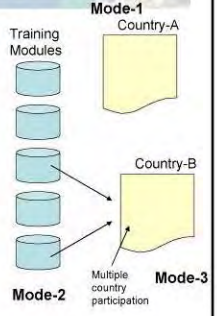
- Flood WG
  - Real time flood forecasting
  - Flood scenario development
- Drought WG
  - Drought monitoring network in Asia
  - Soil moisture monitoring by satellites
- WQ WG
  - WQ monitoring in the Mekong river by Vietnam, Pakistan and Bangladesh
  - Flood water quality monitoring

Expected Outcomes of this WS

- GEOSS/AWCI-APN joint workshop is to further refine the GEOSS/AWCI Implementation Plan and define scoping of AWCI-APN joint activities.
- Pilot project proposals identified at the 3rd AWCS are to be further developed.
- Implementation of the AWCI capacity building development will be discussed.

Modes of CB Pilot Project

- Mode-1: Country based PP (Roving seminar)
  a local catchment + number of training modules within a country
  ex. Flood forecasting training seminar in Indonesia
- Mode-2: Training module based PP
  Modules in intensive workshop
  ex. Training modules at UNU, AIT
- Mode-3: Country data + traning module based PP
  one country data+multiple country participation
  ex. IWRM Pilot in Huong river, Vietnam



Summary

- AWCI CB program has excellent framework, organization, plans, political support (including GEO), but lacks in major financial resources to implement it !
- APN funding is very helpful to continue AWCI ICG activities.
- AWCI ICG members have their own national capacitities.
- It is suggested to initiate the CB program where possible and to seek other funding opportunities to expand it.

4.2.3 Water Quality Monitoring

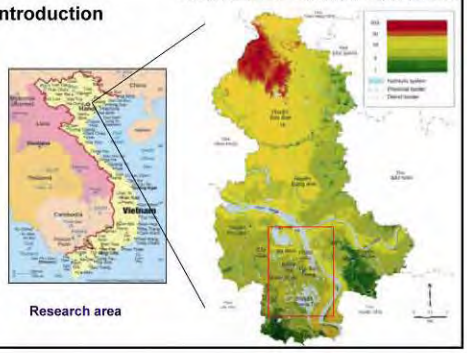
Water Quality Monitoring Plan during inundation period in the downtown of Hanoi city

Hiroaki FURUMAI

Research Center for Water Environment Technology
The University of Tokyo

Presentation slides was prepared by the PhD candidate from Viet Nam, Mr. Pham Van Quan

Introduction



Inundation in Hanoi Downtown area

Inundated points:
- Usually 30 inundation points
- Inundation duration: 2h – 1 day

Drainage capacity: event < 50 mm rainfall
Frequency: 3 - 4 times/year

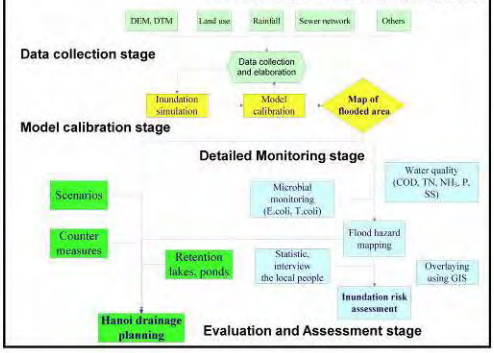
Reasons

- Heavy rainfall in monsoon storm (48h-typhoon rainfall)
- Only 60 % area having sewer, focus on the main street
- Small sewer pipe size, degraded, old sewerage system
- Flat topography (varies from 5-10 m)

Traffic jam due to inundation, June 15 2007.

Objectives

1. Inundation simulation for downtown area, validation results and propose the solutions for other areas where are lack of drainage data.
2. Assessment of Role of lake, pond system contributing to Hanoi drainage function.
3. Inundation Risk and Water Quality Assessments in the downtown of Hanoi using the urban runoff simulation result and monitored water quality.



Water quality in dry season

- **Objectives:**

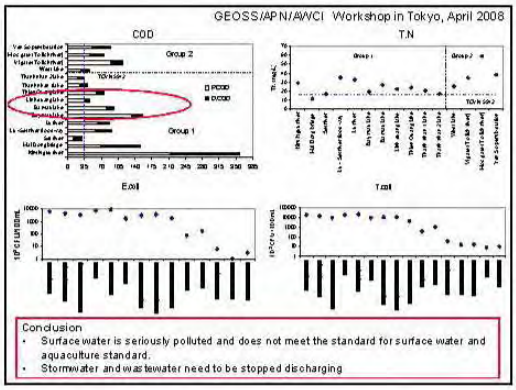
To get overview of surface water pollution in Hanoi in dry weather condition
To assess water quality in sewerage rivers and lakes
To see self-purification process in reducing pollutants

- **Sampling points, 15 points, are divided into 2 group:**

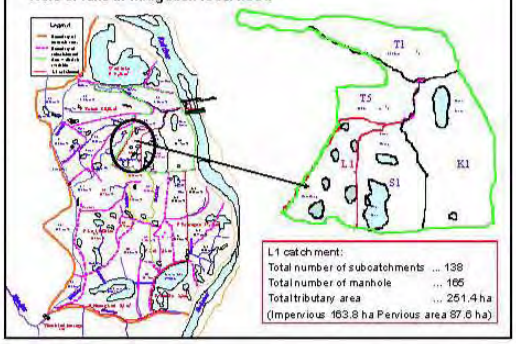
Group 1 (11 points) are in the downtown area where flood usually taking place;
Group 2 (4 points – 12, 13, 14, 15) are belong to To Lich river, the main sewerage river of Hanoi.

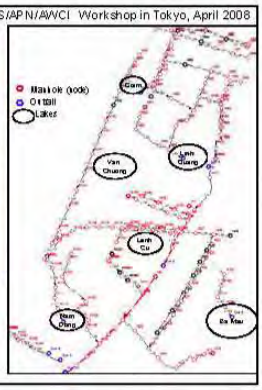
Hanoi surface water monitoring (Mar 2007)

No	Sampling point	t°C	pH	DO	E.coliform (10³MPN/100ml)	T.coliform	COD	DCOD	T.N	Note
1	Kim Ngưu river	23	7.8	4	4300	18400	337.8	143.8	29.2	Group 1
2	Mai Dong bridge	23.5	8	3.5	4100	13500	131.4	82.8	11.1	
3	Set river	24.3	8	3.5	1.3	6	29.7	18.8	17.2	
4	Le - Set bridge way	27.3	7.4	2.3	3300	9100	99.8	33.9	33.4	
5	Lu river	25.2	7.5	2.9	7900	24100	87.5	23.0	31.7	
6	Bay mau lake	24.6	7.5	3.1	80	410	154.3	23.6	19.2	
7	Ba mau lake	24.1	8.1	4.7	140	1020	94.9	17.2	24.9	
8	Linh quang lake	24.4	7.8	2.3	9400	21900	44.9	10.9	22.1	
9	Thien Quang lake	24.4	8.1	4.4	6	385	73.0	14.1	23.7	
10	Thanh nhan 1 lake	27	8.9	9.7	1	14	40.4	13.4	20.4	
11	Thanh nhan 2 lake	23	8.2	7.9	3	19	34.6	14.1	14.9	
12	Wet lake	23	7.4	3	1700	9400	44.9	18.8	24.8	Group 2
13	Vĩ gate (To lich river)	23.7	7.5	2.5	2900	10400	113.4	23.0	34.4	
14	Mo c gate (To lich river)	23.7	7.6	2.7	3400	10300	73.0	28.1	39.2	
15	Yen So pumb station	23.7	7.6	2.4	1900	4300	90.6	40.4	38.3	
Vietnamese standard	TCVN 5942 (surface water)			2			35		14.03	
	TCVN 5945 (wastewater)					10				
	TCVN 4774 (aquaculture water)		4.5-8.5							



Role of lake in mitigation local flood





Objectives:
- To simulate the role of lakes in storage storm water
- To find out the most sensitive areas regarding to inundation
- To select sampling points

Water sampling and field survey plan in Hanoi

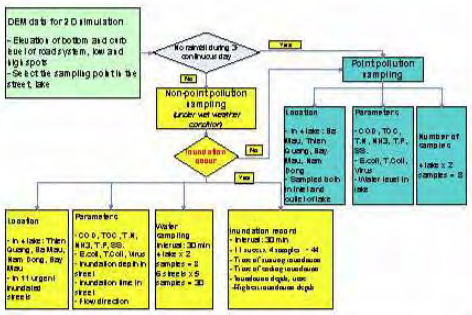
Field survey and Use of Satellite Image data:

1. Collect data for model calibration (Inundation depth, inundation duration, flow rate, storage capacity of lake, pollutant concentration etc)
2. Collect Land-use and DEM data for 2D runoff/inundation simulation
   - land use conditions (Pervious and Impervious etc)
   - elevation and general topography of catchments, road system

Water sampling:

1. Collect water sample from point and non-pollution sources in Hanoi
2. Compare the change of water quality in lake between wet and dry condition.
3. Monitor the transportation of pollutants during the inundation

Field survey and sampling procedure



Point-pollution sampling plan

Objectives:
- Water quality of domestic wastewater monitoring
- Microbial source detection
- Comparison with water quality under wet weather condition.

No. of sampling points: 4 lakes (Ba Mau, Nam Dong, Bay Mau, Thien Quang)
- The outfall of sewerage system could be seen as point source pollution to lakes both in dry weather and in case of rainfall coming but no inundation.
- Sampling points is outfall from sewer (inlet) and outlet of lake , **the main inlet is preferred**. Water sample is taken inside the sewer.

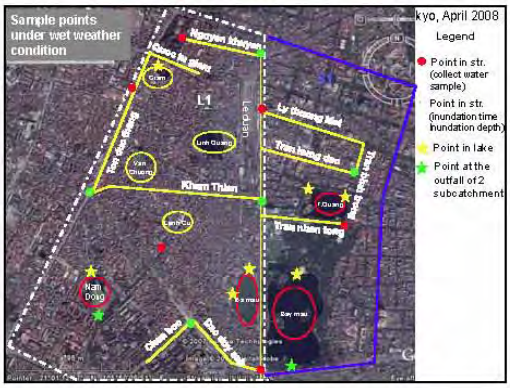
Time and frequency
- 3 day before rainfall come.
- 03 - time sampling

Wet-weather pollution sampling plan

Objectives:
- Water quality in lakes and hotspot inundation areas
- **Pollutant surface runoff during inundation** for model simulation and calibration

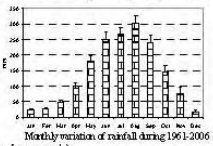
No. of sampling points:
- **4 lakes** (same as in dry weather condition sampling)
- **6 water sampling points on the street** (sampling points located near manhole, lowest point or cross-section of two streets based on the simulation results)
- **5 samplings points for collecting inundation record**

Interval:
- **Several rainfall events**, 1-2 short rainfall event (2-4 hrs shower), 1 long time rainfall event (1-2 days tropical typhoon)
- During short and long rainfall events , samples are taken at **30-min to 1-2 hrs intervals**



Time schedule

- Rainy season in Hanoi
- Frequency: 2 - 3 rainfall events (short and long events)
- Tentative schedule : Aug 02 - Aug 31 , 2007



Monthly variation of rainfall during 1961-2006

Parameters (based on VN standard, objectives of research)
- COD, T.N, NH_4^+, T.P, SS
- T.coli, E.coli, Virus (share with Dr. Katayama group)
- DO, pH, temperature, turbidity, conductivity (by portable equipment, only at the 02 outlet of subcatchments)
- Inundation time, depth, water level in lakes
- Elevation of street, hotspot area.

Preparation
1. Number of participants: 15 staff (maximum)
2. Facilities, equipments:
- Portable meter (02), filter kits for microbial monitoring
- Scale for inundation depth measurement, camera, *elevation measure equipment*, sample bottle (500 mL),rainfall measurement

Location : Focus on L1 and S1catchments. Here is the most urgent inundation area, located in the Downtown of Hanoi, including so many lake and the wastewater mainly from domestic source.

- 4 selected lakes: Ba Mau, Nam Dong, Bay Mau, Thien Quang
- 11 selected streets : Chua Boc, Dao Duy Anh, Le Duan, Kham Thien, Ton Duc Thang, Quoc Tu Giam, Nguyen Khuyen, Ly Thuong Kiet, Tran Hung dao, Tran Nhan Tong, Tran Binh Trong
- Total area: around 3.4 km^2

4.2.4 Water Quality Monitoring – Way Forward

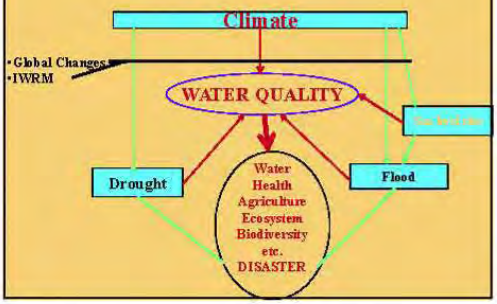
WATER QUALITY: Way Forward

Bilqis Amin Hoque, Ph.D
Co-Chair: International Water Quality Group, AWCI
Member: Bangladesh National Committee
& Capacity Building Committee
Environment and Population Research Center

Structure

- Attempts undertaken between Beppu and now
- Propose and discuss possible capacity building modes

A simplified relationship between water quality and GEOSS interests



We attempted the following:

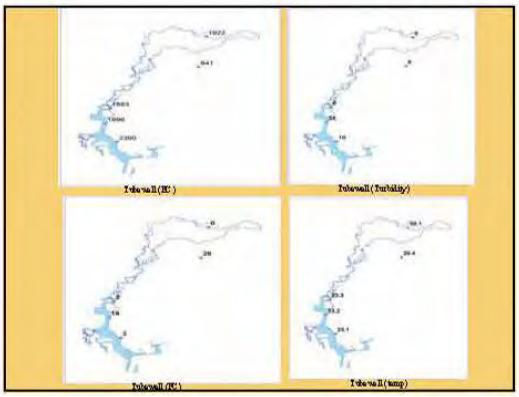
- **Regional:**

1. Prepared a proposal in consultation with AWCI, JAXA, the team members and Tokyo University
1. Exploring funding mechanisms and collaborators
2. Discussing different possibilities
3. Reviewed the CB needs matrix and scopes: WQ??

We attempted the following: (contd.)

- **Country Level:**

1. National committee formed
   - Capacity Building sub-committee placed
2. Initiated in-situ water quality data collection based on govt. and non-govt. collaboration



Capacity Building modes proposing for discussions:

Combination of the following:

- Mode 2: **Training module based CB pilot project.**

Example: ongoing by UNU-AIT for rainfall downscaling, flood inundation and loss assessment

- Mode 3: **Country data (and a demonstration project) and training module based CB pilot project.** ----Like IWRM in Vietnam

4.2.5 Additional Capacity Building Presentation from AIT on Regional Training Workshop for Water Professionals in Asian Countries

Rainfall downscaling, flood modelling and GIS Module
- A Regional Training Workshop for Water Professionals in Asian Countries -

Sponsored by UNU and Supported by UNESCO-IHE, Monash University, Nippon Koei Consultant Engineers and GIC/AIT

Lal Samarakoon
Director, Geoinformatics Centre, AIT

Extreme Flood –What if?

- Informal Discussions in 2002 with Hydro Meteorological organizations officials
- Regional Workshop "Ensuring Flood Security for Sustainable Urbanization in the Asia Pacific Region", 2003
- Topic was decided as: A flood that go beyond the design levels....

Type of Training at GIC/AIT

- ✓Conduct Training Locally (Caravan)
- ✓Structured Training at AIT
- ✓Mini Project Training (JAXA)

Current Training Program

- Phase I (Hands on – 3 weeks)
  - Training on GIS
    - GIS system freely distributed
  - Setting up and application of Rainfall Downscaling and forecasting system (DRF)
  - Setting up Flood inundation modelling and Application (FMS)
- Phase II (Hands on – 3 weeks)
  - Historical extreme events
  - Risk Assessment: Economic losses and people at risk
  - Mitigation measures

Technology behind

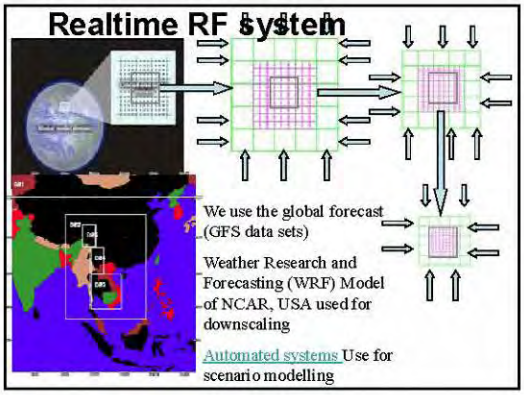
An integrated system consisting of following components:

WRF: A Rainfall prediction model
NKGIAS: A dedicated GIS software for GIS data preparation, manipulation and database
FMS: a physically based surface-river distributed model for flood inundation simulation
Loss estimation model: a distributed model for estimating flood losses using simulated flood parameters and established loss functions

Model set up and results from GIS Links

- The GIS system provides all the functionality required for hydrological modelling
- A special feature of the GIS system is the ability to handle time series data.
- Provisions to link static vocational data to time series GIS data.

Realtime RF system

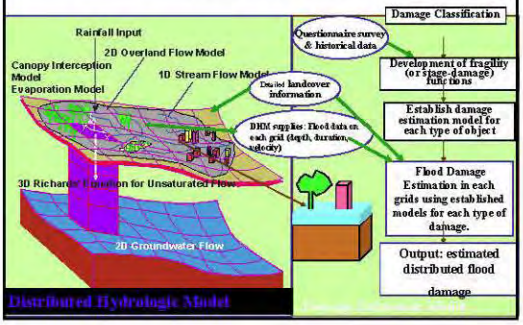


We use the global forecast (GFS data sets)

Weather Research and Forecasting (WRF) Model of NCAR, USA used for downscaling

Automated systems Use for scenario modelling

Inundation Modeling: Damage Assessment and Evacuation



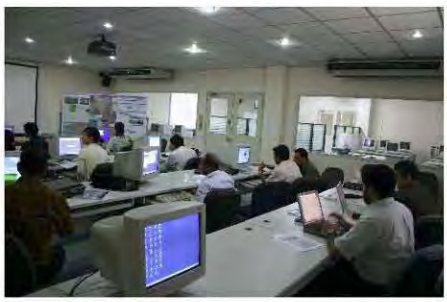
Participants
Expected Future (Trainers)

- China: Tsinhua University, Beijing Municipality
- Nepal: Institute of Engineering, Department of Hydrology and Meteorology
- Philippines: University of Philippines, PAGASA (Hydro meteorological Agency)
- Sri Lanka: University of Peradeniya, Irrigation Department
- Viet Nam: Institute of Hydrology and Meteorology, Department of Storm Control and Dyke Managemet

Experts involved

- Rainfall modeling expert: from UNESCO-IHE, Delft, Netherlands
- Hydrological modeling experts: from United Nations University, Japan and Monash University, Australia
- GIS Experts: from Nippon Koei Co. Ltd., Japan and AIT, Thailand

Participants at Opening Day



Advantage

- Motivation is high as you do your own job
- Adaptation is easy and fast in local condition
- High degree of confidence building
- Use of your won data makes;
  - Easy interpretation of outcome
  - Use of qualitative information
  - Justify the potential of the model
- Convince policy makers is easier

Disadvantages

- Difficulty in accessing data
- Implementation is difficult (Challenging)
- High level of expertise of lecturers
- Long term involvement of lecturers
- Commitment of participants for long term involvement
- Commitment from agencies to provide data

4.2.6 Additional Presentation from University of Tokyo on Integral Capacity Building Modules at AWCI Demonstration basins

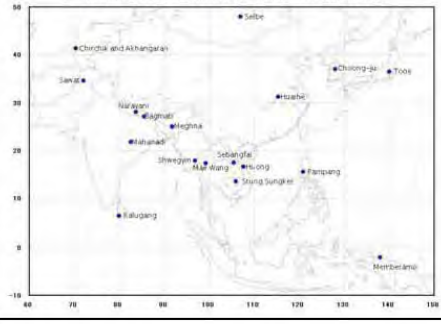
THE UNIVERSITY OF TOKYO

Integral Capacity Building Modules at AWCI Demonstration basins

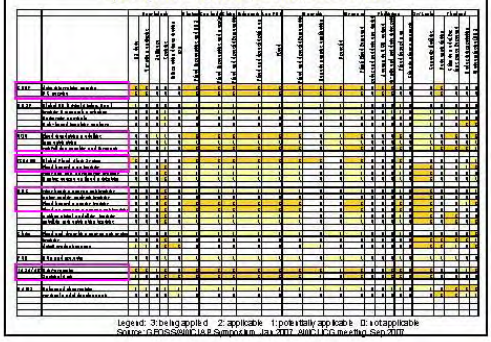
Oliver SAAVEDRA

Earth Observation Data Integration and Fusion Research Initiative (EDITORIA)
Department of Civil Engineering

AWCI Reference Basins



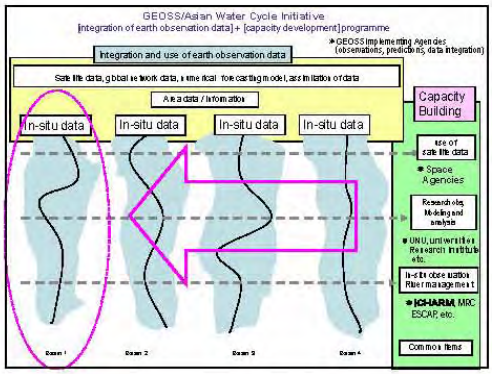
Capacity Building Needs vs. Resources Matrix



Legend: 3:being applied 2:applicable 1:potentially applicable 0:not applicable

Capacity Building Programs

1) Country level capacity building targeting local audience
2) Specific Training Modules provided by Agencies/Institutions to experts/scientists
3) Integrated capacity at each AWCI demonstration basin targeting international participants



Integrated Capacity Building

Objective: To show the applicability of available data/information/models/algorithms/systems at AWCI demonstration basins in order to overcome water issues

Modules from resource organizations:

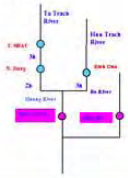
- Data Integration, quality control (CEOP, Tokyo U.)
- Global flood alert system, hazard mapping (ICHARM)
- Satellite Data, Mini-projects, Sentinel Asia (JAXA)
- Flood hazard mapping, emergency manage.(MRC)
- Floods inundation modeling, rainfall downscaling (UNU)
- Flood simulation, dam operation (University of Tokyo)
- Radar rainfall, real-time forecast (Senjong University)

Pilot Project Proposal

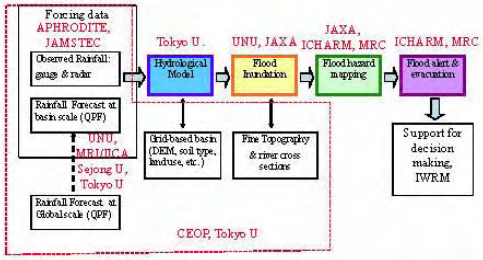
Huong river basin, Vietnam

– Main Capacity Building requirements:

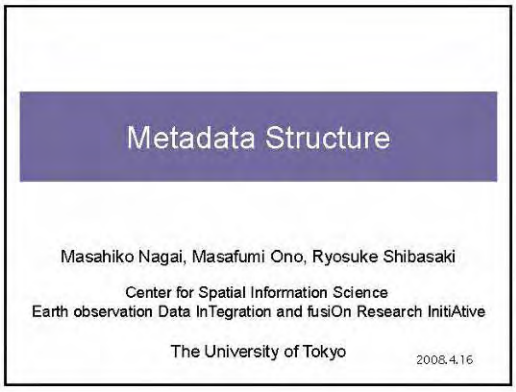
- Rainfall Downscaling and Forecast
- Flood Inundation Modeling
- Flood alert system and management

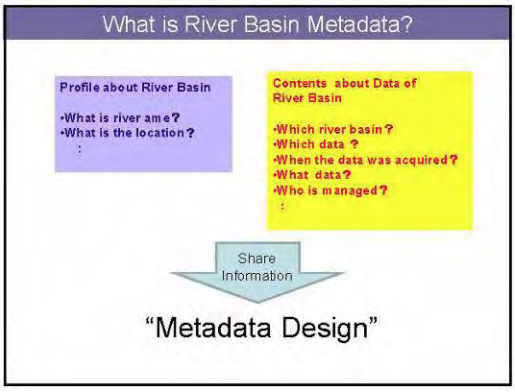


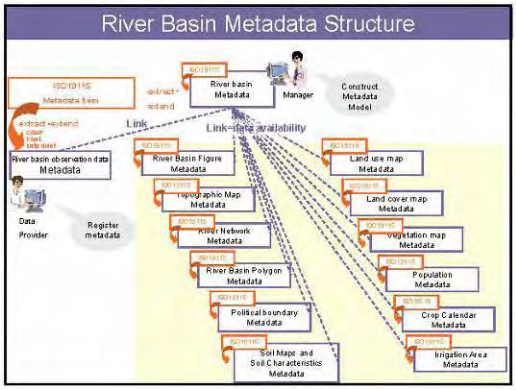
Location of CB Training Modules

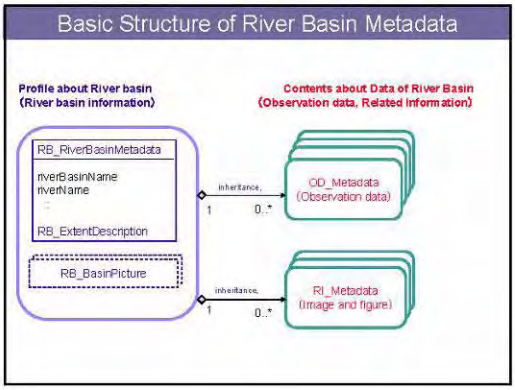


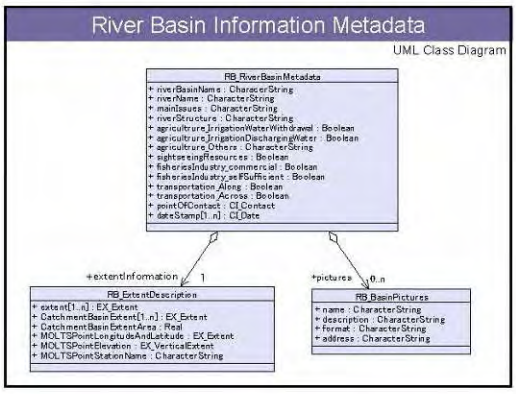
Presentation 4.3.1: Meta Data Structure

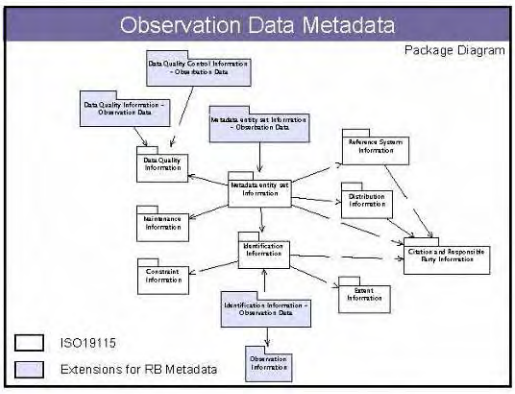




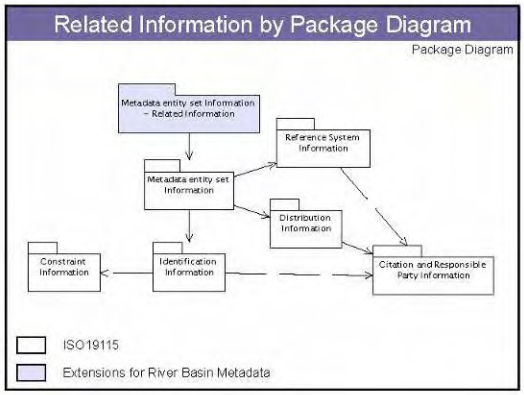


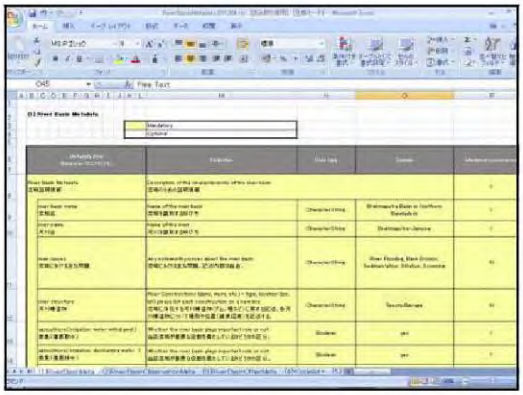




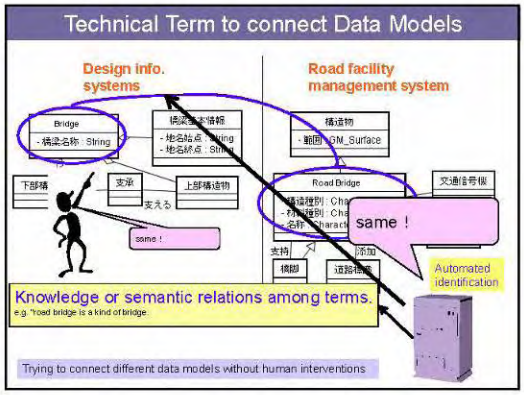


Related Information by Package Diagram

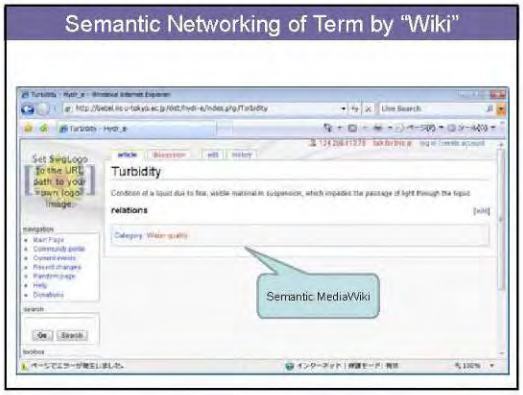




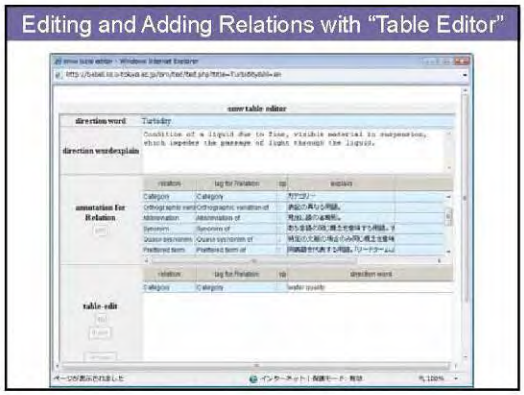
Technical Term to connect Data Models



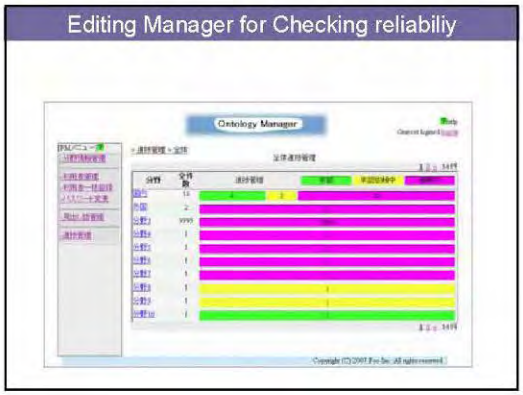
Semantic Networking of Term by "Wiki"



Editing and Adding Relations with "Table Editor"

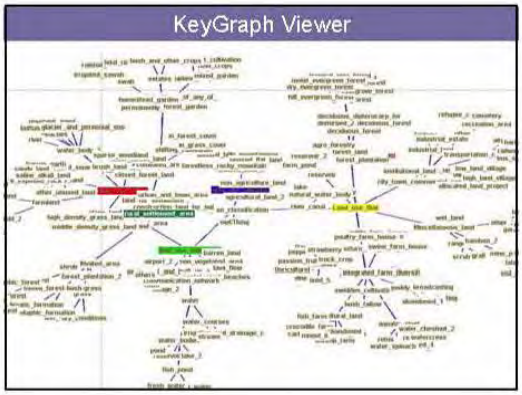


Editing Manager for Checking reliabiliy

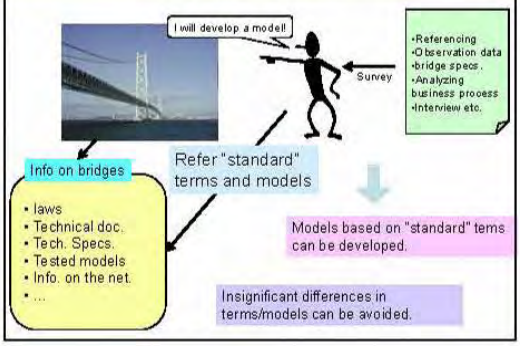


Reverse Dictionary

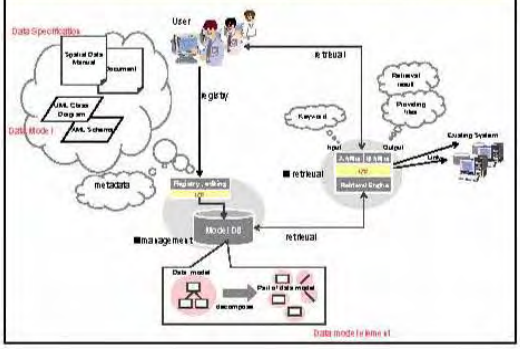
KeyGraph Viewer



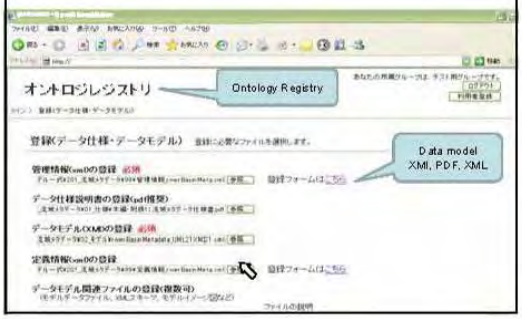
Serching existing Data Models

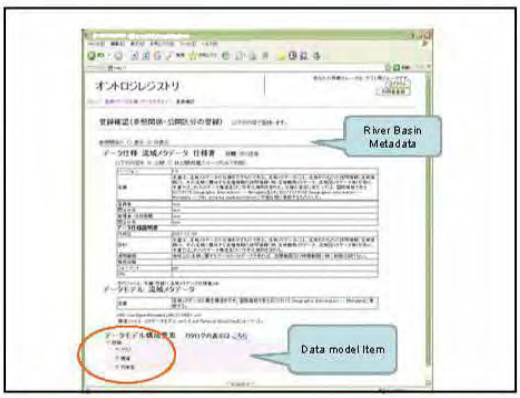


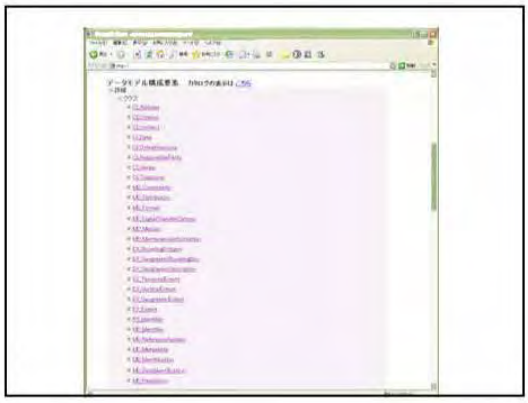
Data Model Registry System Architecture

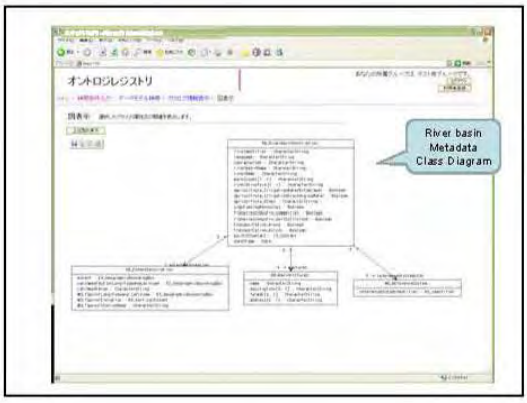


Development of Data Model Registry system

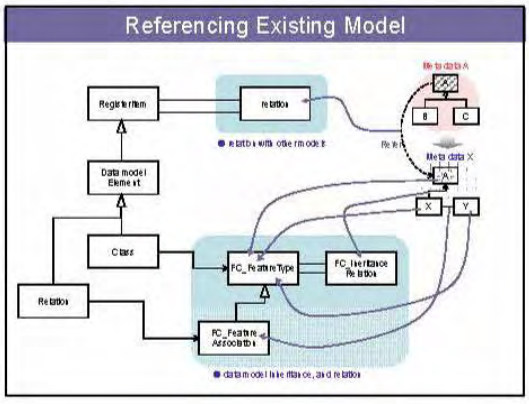







River basin
Metadata
Class Diagram


Add relation


Referencing Existing Model
Register Item
Relation
Meta data A
B
C
Meta data X
Data model Element
Class
FC_FeatureType
FC_InstanceRelation
Relation
FC_FeatureAssociation

Summary

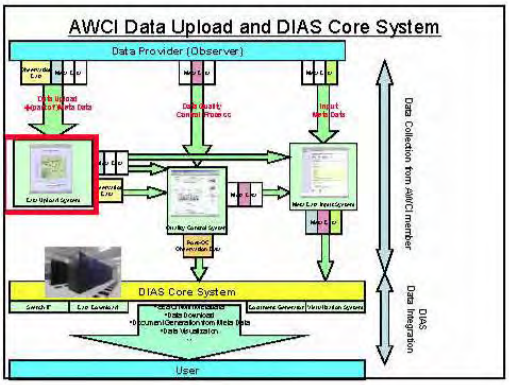
- Design Metadata for River Basin Observation data
  - Profile about River Basin
  - Contents about Data of River Basin
- Collect Technical Term for Sharing Information
  - Semantic Media Wiki
  - Reverse Dictionary
  - KeyGraph Viewer
- Develop Data Model Registry System
  - Referencing existing Data Models
  - To keep record of relation among Data Models

4.3.2: System Demo: AWCI Observation Data Upload System

AWCI Observation Data Upload System

Eiji Ikoma
Katsunori Tamagawa, Hiroko Kinutani,
Tetsu Ohta, Toshio Koike, Masaru Kitsuregawa

The University of Tokyo



AWCI Data Upload System

- Observers can upload observation data and input some Metadata on Web Interface consisted of 4 steps.
- Easy Operation and Quick Response.
- This system has some function which reduce the complicatedness of upload process

Login Page

- Username and Password are required.
- Each observation site manager has it own (unique) username and password.

STEP1

- Observation Point(Map/List)
- Time Period
- Data Interval
- Timezone
- Description (optional)
- Num. of observed elements

STEP2

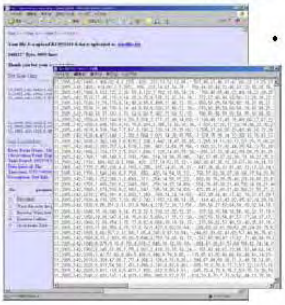
- Observation Data
  - Choose from pulldown menu
- Sensor height
- Orientation(op.)
- Unit
- Missing value
- Description(op.)

1. Copy from No.1 to all
2. Unit = Input Automatically when you choose observation data
3. Copy from former inputted data
4. Modify the num of observation data
5. Upload from prepared csv file

STEP3

- Upload observation Data(File).
- Confirmation of metada inputted at STEP1,2.

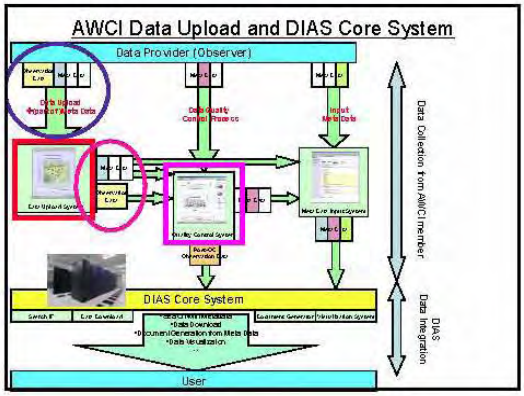
STEP 4



- **Confirmation of**
  - local path of uploaded file
  - contents of the file (first/last 3lines and all lines when you require)
  - All metadata inputted at STEP1,2,3

After STEP 4

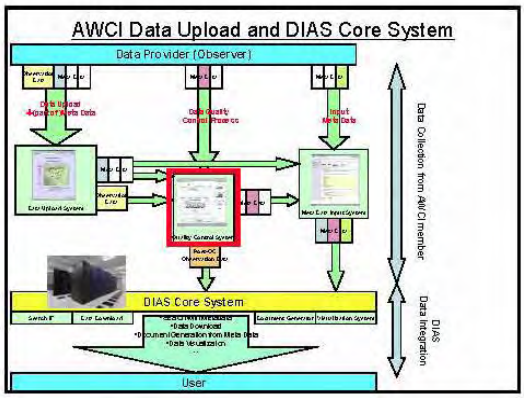
- Our system send the confirmation message to observer by e-mail.
- Inputted metadata are stored in our Upload system –– Observer can use at next time.
- Observation data is loaded to Quality Control System
- Inputted Metadata is sent to “MetaData Input system” and “QC system”



Data Quality Control(QC) System

Eiji Ikoma
Katsunori Tamagawa, Tetsu Ohta,
Kenji Taniguchi, Toshio Koike, Masaru Kitsuregawa

The University of Tokyo



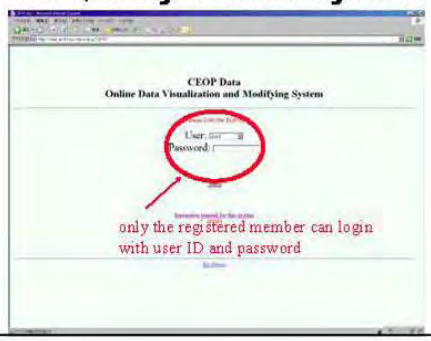
Our QC System

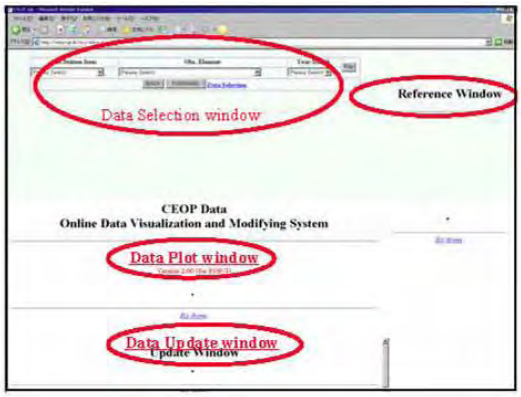
- First version of our QC System was developed for CEOP Data in 2004 with Prof. Koike's Group.
- Ver.1(2004-2005) for → Ver.2(2005-2006) → Ver.3(2007-)
- 13site(Ver.1)→ 25site(Ver.2)→Ver.3
- We are preparing QC-V3 system for AWCI Data Manegement.

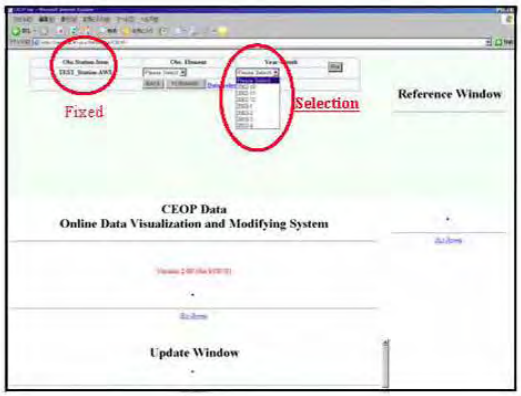
Features of our QC system

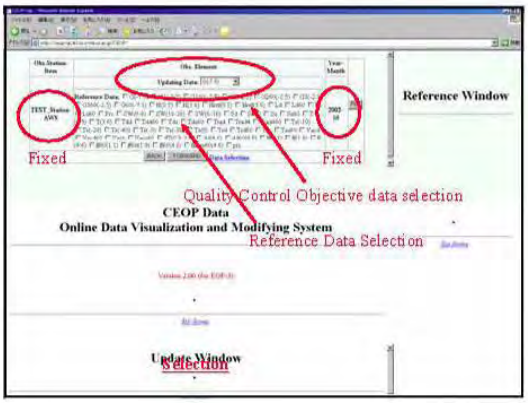
- Web-based UI (required only Web browser)
- Easy-to-use and light operation
- Data management mechanism for each user authority
- Post-QC Data download support system
- Progress Management system for Data Manager

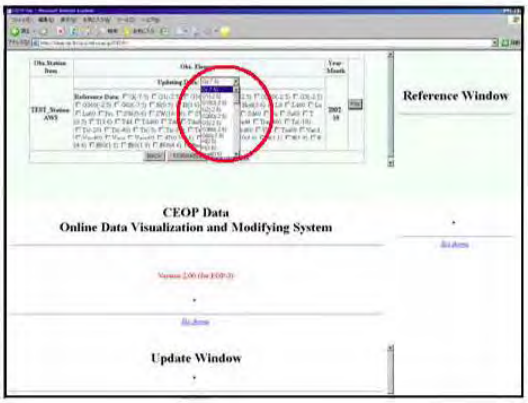
The Quality Control System

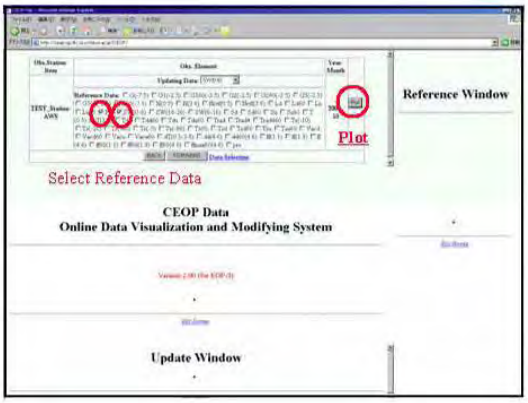


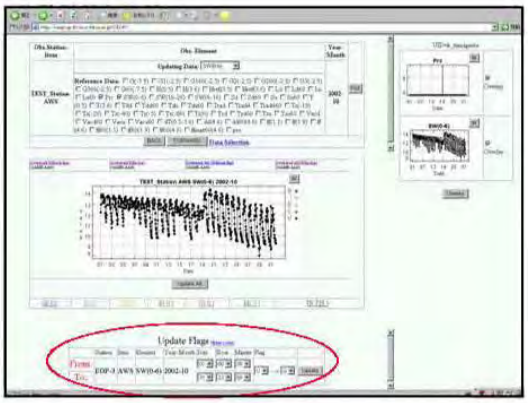


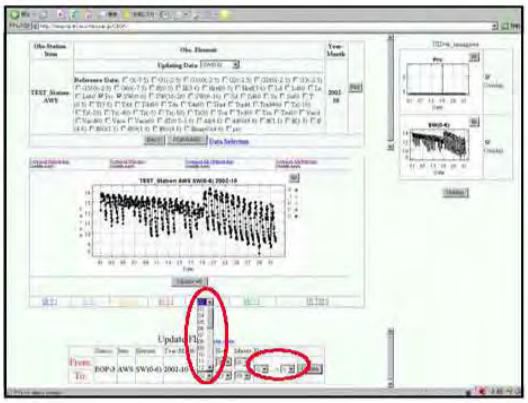


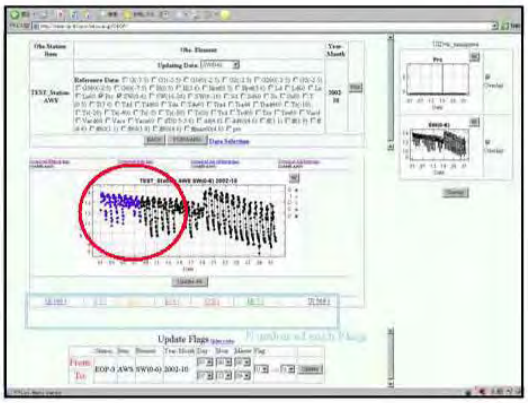

Reference Window
Fixed
Fixed
Quality Control Objective data selection
CEOP Data
Online Data Visualization and Modifying System
Reference Data Selection
Update Window
Selection

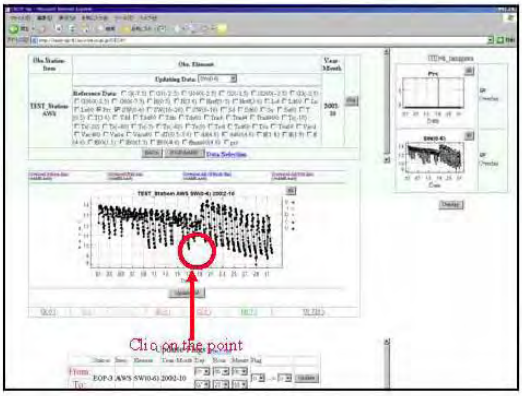

Reference Window
CEOP Data
Online Data Visualization and Modifying System
Update Window

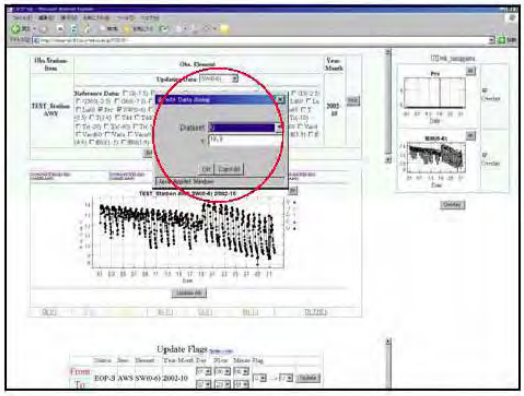

Reference Window
Plot
Select Reference Data
CEOP Data
Online Data Visualization and Modifying System
Update Window

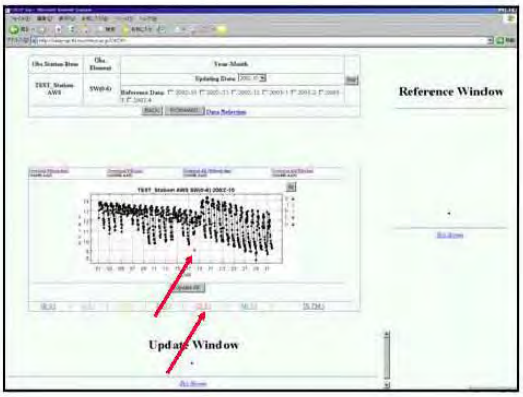

Update Flags

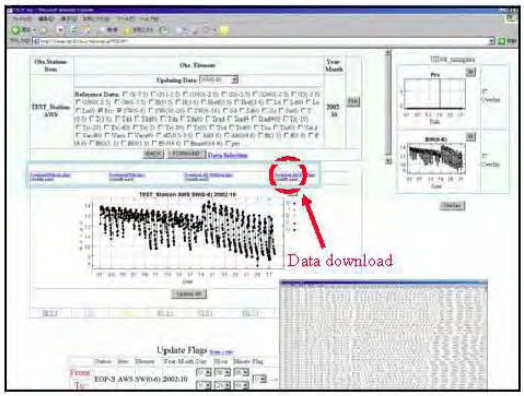


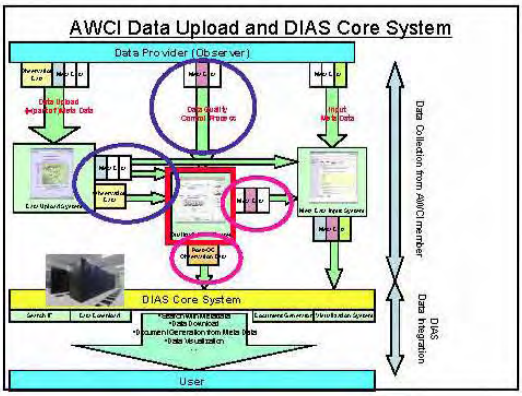

Update Flags


Click on the point




Reference Window
Update Window

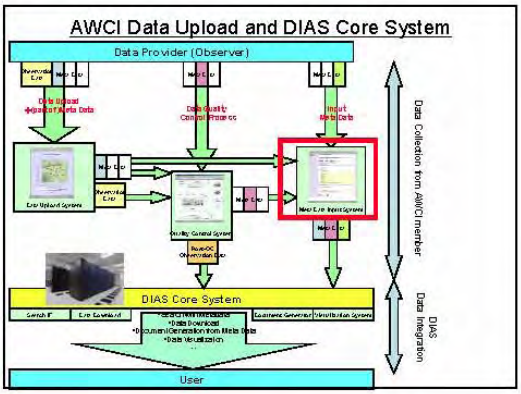

Data download


AWCI Data Upload and DIAS Core System
Data Provider (Observer)
DIAS Core System
User
Data Collection from AWCI member
DIAS Integration

4.3.3: AWCI Observation Data Metadata Input System

AWCI Observation Data Metadata Input System

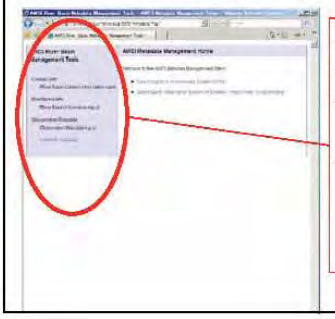
Hiroko Kinutani
Eiji Ikoma, Katsunori Tamagawa
Tetsu Ohta, Masaru Kitsuregawa



AWCI Metadata Input System

- Observers can input metadata information related to observation data on Web Interface.
- This metadata is defined as an extension of ISO19115, ISO19139 metadata standards.
- This system operation is easier than other metadata input system.

Top Page



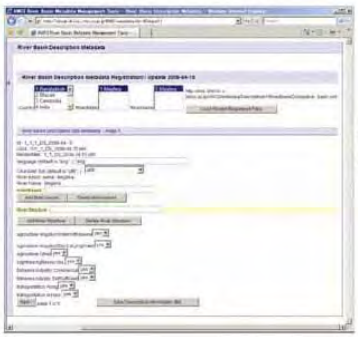
Input Menu
- Contact Info.
- River Basin Description
- River Basin Observation data

Contact Info. Input

- Contact Info. is often required to input.
- Name, Address, etc.
- Once input, Use many times

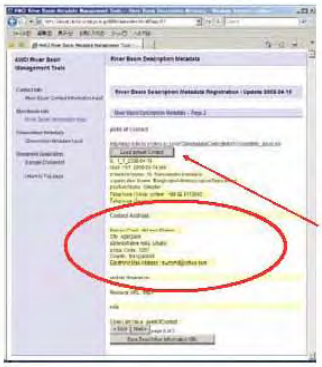
Contact Info. submit

- Can view metadata as XML



Description
Input

- Load Recent saved File
- Load Contact Info.



Description
Input

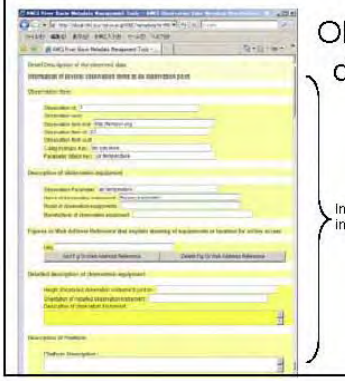
When you push this button, default contact info. is automatically loaded.

Description
Input

When the URI of a picture is entered.
The picture is displayed.

Observation data input

- We need Observation Point, Observation Begin Date, Observation End Datte
- Your inputted metadata using data upload tool can load here.
- Default Contact Info. , Longitude , Latitude can load automatically.



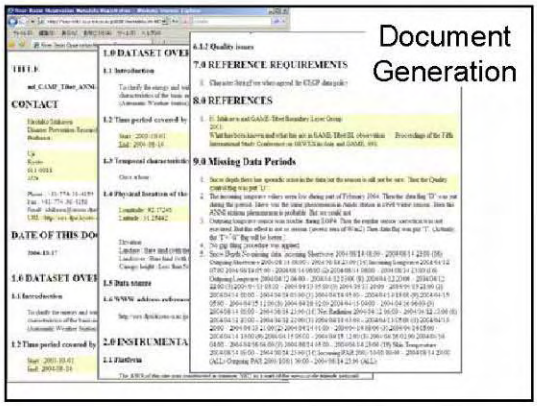
Observation data input

In this area, you will input about observation item.

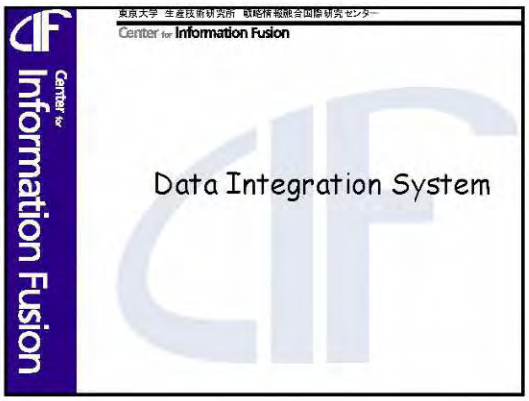
Observation data input

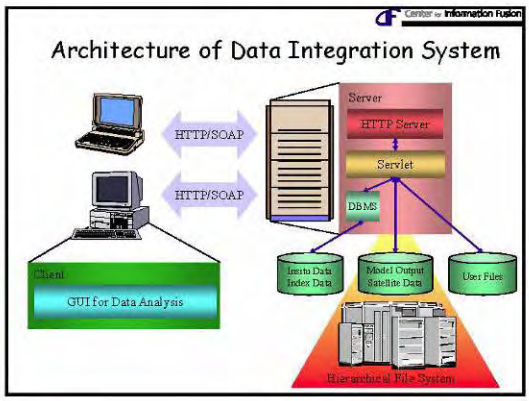
When the input process is finished, the metadata XML file is stored at the displayed URL.
You can always see this file.

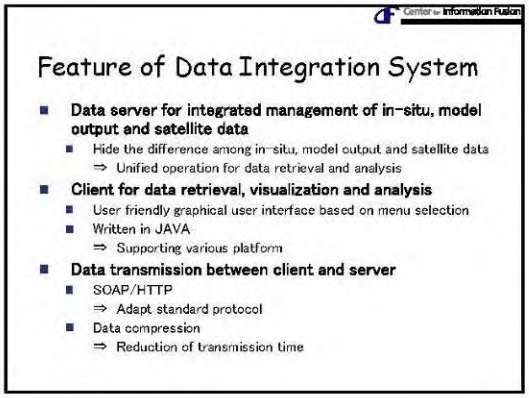
We will provide the smart display tool near future.

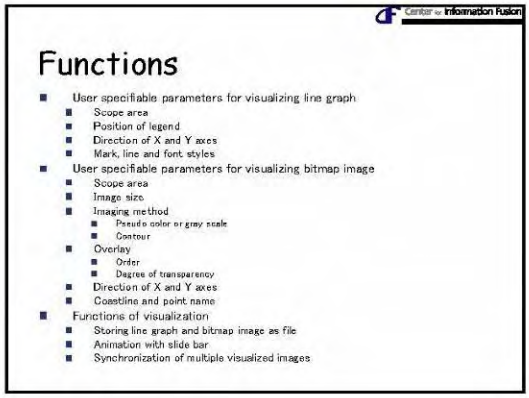

Document
Generation

4.3.4 Data Integration System









4.4.1: AWCI Flood Group Status Report

Asian Water Cycle Initiative (AWCI)
Flood Management WG
- Seeds for discussion -

Kazu FUKAMI (ICHARM)
Srikantha HERATH (UNU)

16-17 April, 2008, Nihon-Kagaku-Miraikan, Tokyo, Japan

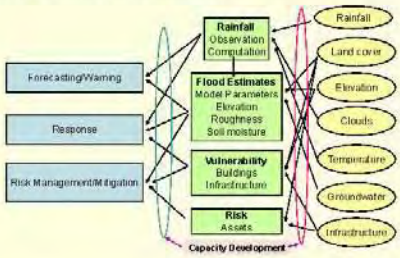
Activities of Flood Management WG

- 1st WG at the GEOSS Symposium on Integrated Observation for Sustainable Development in the Asia-Pacific Region, January 11-12, 2007, Tokyo, Japan - establishment of Flood Management WG
- Preparation of Generic template for demonstration projects in GEO on use of satellite information for flood risk Management (Prof. Herath)
- Proposal to 2007 Annual Regional Call for Proposals (ARCP) , APN (Asia-Pacific Network for Global Change Research)
  → Approved!!
- Questionnaire to member countries for their needs and resources (through Prof. Koike)
- Identification and prioritization of capacity-building requirements

Templates for demonstration projects in Flood WG

- Real-time flood forecasting
  - This includes estimating/forecasting rainfall, estimating and forecasting flood flow, inundation forecasting, operational aspects of food control such as reservoir operations.
- Flood scenario development
  - Various flood scenario to be developed for planning and mitigation purposes. This includes flood risk for different return periods, vulnerability assessment, damage estimation, flood insurance, evacuation guidance, evaluation of mitigation measures, etc.

Generic template for demonstration projects in GEO on use of satellite information for flood risk Management (Prof. Herath)



Proposal to 2007 Annual Regional Call for Proposals (ARCP) , APN

With in the context of the APN support the flood research project will address following specific 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.

Summary of discussions in Flood WG of AWCI (as of December 2, 2007)

Co-chairs:
Kazu FUKAMI (ICHARM)
& Srikantha HERATH (UNU)

Common understanding to start the discussion of AWCI Flood WG (1/2)

- The discussion is not focused on funding proposals but is for identifying the required common items for capacity building to realize the demonstration projects.
- "Demonstration Project" is a pilot project to make a successful showcase to upgrade conventional flood & water-resource management making the best use of GEOSS data products coupled with in-situ data. This is not a pure science. We should consider the sustainability of the achievements of the demonstration project as well.

Common understanding to start the discussion of AWCI Flood WG (2/2)

- It will not be possible to adopt a common model for the demonstration projects, because we don't have any conclusive achievements to identify the best one for any operational system in each country to be implemented in near future. We can share the achievements of demonstration projects through our existing agreements on common data format, data policy, etc.
- It is important to enhance international cooperation for demonstration projects under the GEOSS-AWCI framework.

Items to be discussed

- To identify what kind of items of capacity building are common to implement the demonstration project.
- To identify the priority among the above items.

Requirements for capacity building

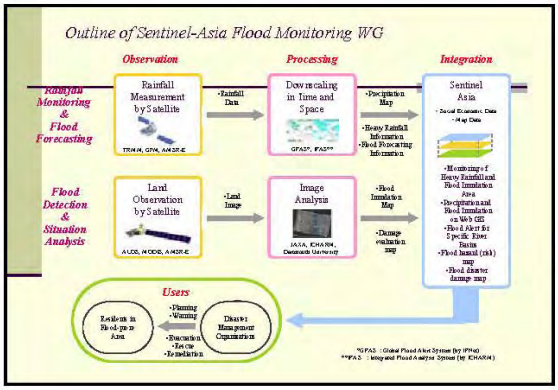
Databse for national data archiving and sharing
Rainfall downscaling and forecast with numerical models, radar & satellite
Inundation modeling
Flood forecasting
Flash flood forecasting
Risk assessment based on loss estimation
Satellite data for post-disaster assessment
DEM creation with satellite data
Land classification for risk assessment

Result on voting for priority (15 votes)

Item No.		1st weight order	1	2nd order	2	3rd order	3	4th order	4	5th order	5	Total score	Priority order	
1	Databse for national data archiving and sharing	4	1	2	1							32	3	
2	Rainfall downscaling and forecast with numerical models, radar & satellite	8	4	1	1	1						57	1	
3	Inundation modeling		1	1	1	1	2			2		18	6	ICHARM
4	flood forecasting	1	3	2	2	2	2			1		38.5	2	
5	flash flood		3	1	2	2	1			1		29	4	ICHARM
6	risk assessment based on loss estimation	2			1	1		2	2			19.5	5	
7	satellite data for post-disaster assessment	1		1			1	1	2	1		14	8	
8	DEM creation with satellite data		1	2		1		2	1			17.5	7	
9	Land classification for risk assessment			2	1		1	1	1	2		15.5	9	

Supplementary comments

- In the GEO minsterial meeting at Cape Town, JAXA and NASA just announced new high-quality DEM products for the entire world with 30m grid, based on TERRA-ASTER data.
- DEM data are important as well for many other items such as database, flood forecasting, flood hazard mapping, etc.



http://www.internationalfloodnetwork.org/

Development of Integrated Flood Analysis System (IFAS)

A computer software package specifically for flood runoff analyses with GUI using ground-based and satellite-based rainfall data

Being developed by *a* joint research (FY2005-2007) at ICHARM/PWRI, Infrastructure Development Institute (IDI/IF-Net), and nine major civil-engineering consulting companies

Training of applications of GFAS & IFAS (IFNet-IDI & ICHARM)

- ICHARM could prepare materials for capacity building on the points:
  - How to get satellite-based precipitation data & globally-available GIS databases such as topography, land use, soil, geology, etc.
  - How to analyse the satellite-based and GIS databases for hydrologic and flood-runoff modeling and analyses, with IFAS
  - How to build a flood-runoff model in a basin and how to make simulations, with IFAS
  - How to archive the data and outputs
  - How to utilize them for flood forecasting & warning, and flood disaster mitigation

4.4.2: AWCI Drought Group Status Report

Problems

- Different level
- Understanding is different
- Communication (language)
- Instruments
- Technical facility, PC etc
- Methodology
- Methods for data processing and etc
- Software and programs

Needs

- Understanding should be same (Drought &etc)
- Data sharing
- Working skills & experiences
- Sharing of experiences
- Sharing information, research output, software and programs (WaterGAP & other) and etc.

Goals of APN project

- Build a drought monitoring network in Asia under AWCI
- Remote sensing products will be used for the soil moisture monitoring
  - In-Situ observation of soil temperature/moisture, precipitation and air temperature are necessary
  - Data collecting group
  - Remote sensing technical supporting group
- Distribution of technique and knowledge we get in this group

Build a drought monitoring network in Asia

- Japan
- China
- Mongolia
- India
- Pakistan
- Nepal
- Thailand
- Philippines
- Vietnam

Developing of Drought working group for 2008-2009. Representatives related countries

- Japan (Dr. I. Kaihotsu, Hiroshima University)
- China (Dr. Ailikun, Institute of Atmospheric Sciences, Chinese Academy of Sciences)
- Mongolia (Dr. Azzaya Dolgorsuren, Institute of Meteorology and Hydrology)
- India ( ),
- Pakistan (Dr. Bashir Ahmad, National Agricultural research Center)
- Nepal (Dr. Madan Shrestha, Nepal Academy of Science and Technology)
- Thailand (Dr. Lai Samaralcoon, Asian Institute of Technology)
- Philippines (Dr. Flaviana Hilario, Philippine Atmospheric, Geophysical and Astronomical Services Administration)
- Vietnam (Dr. Duong Van Khanh, National Hydro-meteorological Services of MONRE VIETNAM)
- Bangladesh (Dr. M. RAHMAN, Bangladesh University of Engineering and Technology)

Remote sensing products will be used for soil moisture monitoring

- Learning how to use remote sensing data and products
- Training
- Check SM data availability and quality control
- In-Situ data (soil temperature and moisture, precipitation and air temperature in key area of each country) for 2006-2008
- Need methods or algorithms for SM estimation.

RS data needed

- ALOS. AMSR, ASTER, others?
- Prof. Koike will provide the RS soil moisture dataset retrieval by Tokyo University

Ground based data

- Japan: ?
- China: Shanxi Province, 188 stations, STSM per 10 days
- India:
- Mongolia: Mandalgovi, 5 stations, STSM per 10 days
- Pakistan:
- Nepal:
- Thailand:
- Philippines:
- Vietnam: Binh Thuan Province: (10034'13"N - 11037'30"N,10702'30" E- 10805'30"E)
- 3 Surface Stations (Phan Thiet, 11056' - 108006', Phu Quy: 10036' - 108056', La Gi, 10047' - 107046'); P, T, R, RH, 4 times/day ; 1 Soil Temp station (Phan Thiet: 11056' - 108006'), 4 times/day ; no soil moisture
- Bangladesh: 33 surface stations, P,T,RH, R, 3 hour; 12 Temp stations, 12hour; 9 soil moisture, per 7 days

The representatives will choose a specific area in their country

- air temperature: 4 times/day
- pressure: 4 times/day
- precipitation: daily
- relative humidity: 4 times/day
- soil temperature: ?? day; ?? depth (according to observation)
- soil moisture: ?? day; ??depth (according to observation)

Data preparation period

- Every country representative should provide the ground observing data for Jan 1-Dec 31, 2006.
- The RS data will be provided to the scientific group members and country representatives (if needed) will be provided in the same time

Establishing of scientific supporting team

- Prof. I. Kaihotsu, Hiroshima University, Japan
- Dr. Jun WEN, Cold and Arid Regions Environment and Engineering Research Institute, Chinese Academy of Sciences
- Dr. Krishna Murty, Indian Space Research Organization (ISRO)
- Dr. Lai Samarakoon, Asian Institute of Technology, Thailand

The responsibility of the scientific supporting team is to discuss and choose what kinds of RS data set can be used in the retrieval the soil moisture, and they will give advices on the algorithms and methodology to each county. And they will scope for the research improvement

Relation with other groups

- CEOP
- GEOSS/AWCI
- GEOSS global drought monitoring system
- Others

Distributing of techniques and knowledge

We need:

- Training courses
- Workshops
- Drought monitoring system
- To study relationship between Vegetation and Soil moisture

Conclusion

- Training is necessary
- Sharing data, information, research outputs and etc
- Improve observations and data quality control
- Learning technology, methodology, models, research methods and etc
- Drought monitoring system

Modes

- Mode-1: Country based CB pilot project (Roving seminar) In this case data of a local catchment will be used and a number of training modules will be conducted to cover different phases of the process (for ex. Dem generation, land cover classification, and rainfall, hydrologic and flood inundation forecasting), mainly targeting local audience. International workshop on the use of satellite information in flood risk management, being proposed in July in Indonesia, is a good example of such a country based CB pilot project.
- Mode-2: Training module based CB pilot project. In this approach a training module or modules will be conducted in an intensive workshop for multi-county participants bringing their own country data. A five country program currently being carried out at AIT by UNU on rainfall downscaling, flood inundation and loss assessment is an example of this mode.
- Mode-3: Country data and traning module based CB pilot project. In this mode, one country data are used, but participant from different countries will participate in the training covering a demonstration project addressing one or more processes/phenomena Pilot project on IWRM for the Huong river in Vietnam is a good example of this mode. Current program on hydrological forecasting carried out by UT is an example of this mode.

4.4.3: AWCI Water Quality Group Status Report

Water quality monitoring for sustainable development in developing countries

Bilqis Amin Hoque, Ph.D

Co-Chair: Water Quality Group, AWCI
Member: Bangladesh National Committee, GEO
&
Director of Research, Environment and Population Research Center

Scopes for GEOSS, AWCI and APN towards sustainable development in developing countries through water quality observation/monitoring

- Discuss 2 different cases/situations from Bangladesh
- Share GEOSS-AWCI perspectives
- Strategic recommendation

GEOSS:

- Will meet the need for all nations to benefit from access to timely, quantitative, and high-quality long-term global data and information as a basis for sound decision making

Case 1: Water quality, emergency drinking water and health in Cyclone Sidre

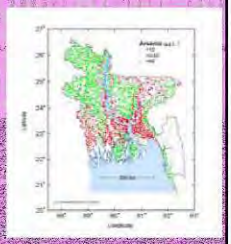
Health effects of emergency drinking water (relief) intervention

Intervention communities	Relative Risks of diarrhea prevalence among children
(i)No int.	1.0
(ii)A Community	0.23 (0.07- 0.72)
(iii)B Community	0.45 (0.19-1.03)

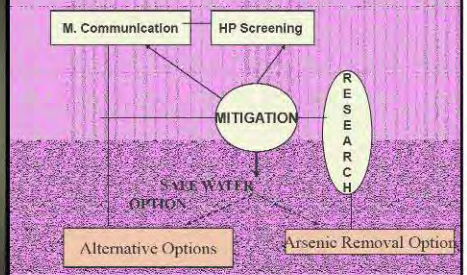
Case 2: Arsenic contamination and drinking water supply in Bangladesh

UN's Decade for drinking water supply helped but the lack of monitoring:

- Safe Water Supply in 1999:
  - Rural: 97%
  - Urban: 99%
- Detected As in 1993
- 61 out of 64 districts
- 28- 60 M. people



Immediate Response



Case 2: 2003

- National Arsenic Mitigation Policy and IP launched:
  - Regular monitoring
  - Time-line and response prioritized
  - Research recommended
  - Technological options recommended
    - Recommended alternative options
    - Research arsenic removal options

Case 2 (contd.): Current Status

- Risks for microbiological contamination increased, in addition to the arsenic risks?
- Access to safe drinking water extremely slow/limited
- Lack of appropriate technologies
- No regular monitoring
- Govt./Political Leader/NGO/Donor response poor

Conclusions from Bangladesh

- Lack of WQ monitoring hampered sustainable development
- No regular WQ monitoring yet:
  - ✓ exposure risks?
  - ✓ impacts on the water resources?
  - ✓ cannot afford it?
- Limited research
- Limited scopes for evidence based policy revision and/or formulation

Identified WQ issues by the GEOSS-AWCI countries

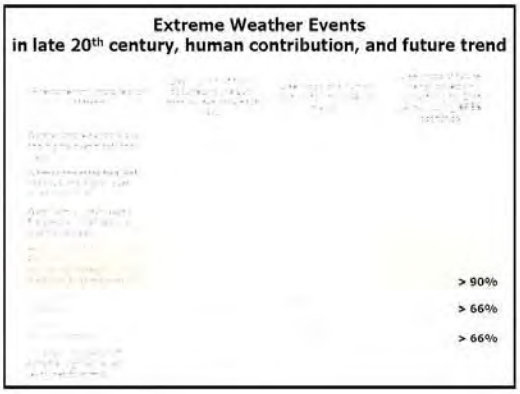
1. National WQ monitoring & institutions (inadequate and irregular)
2. Recognition of water quality
3. Public awareness and education
4. Infrastructure strengthening: monitoring, mapping, coordination and collaboration among Go and NGO
5. Incorporation of WQ in different sectors of water related issues (floods and droughts can exacerbate pollution and water quality needs to be considered in mitigation, IWRM, etc.)
6. Access to satellite and in-situ data by the stakeholders in country and in the region; creating a regional database
7. Funding for water quality related activities

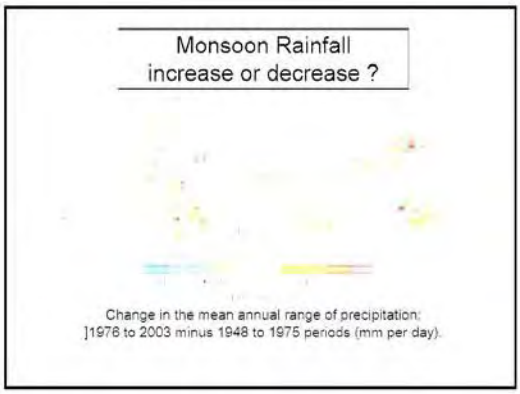
To GEOSS-APN:

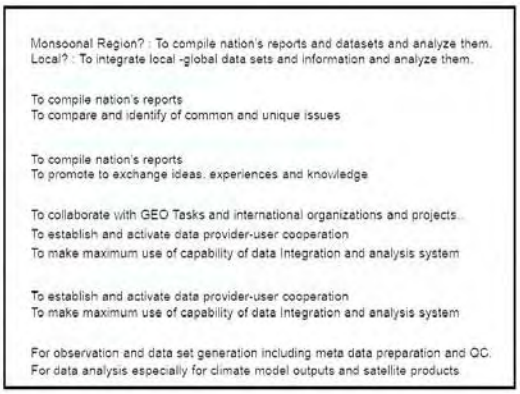
FOR EVIDENCE BASED POLICY AND DECISION MAKING

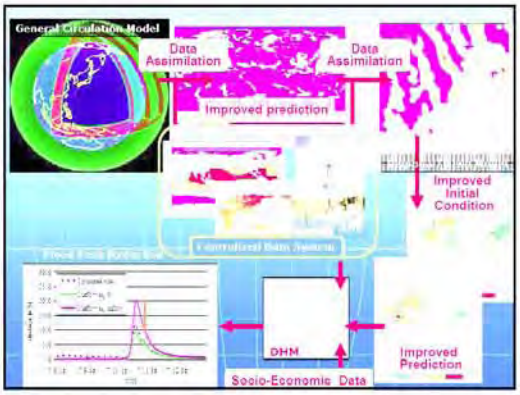
- Effective advocacy/promotion for **timely** WQ monitoring in all countries
- Situations and needs analysis
- Research and development of appropriate tools, indicators, technology, capacity building, … for sound scientific, appropriate WQ monitoring observation in normal and disaster conditions
- Data management and sharing

4.4.4: AWCI Climate Impacts and Adaptation Status Report

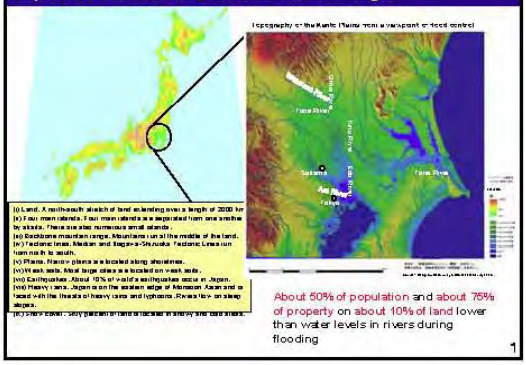








Japan is vulnerable to climate change.

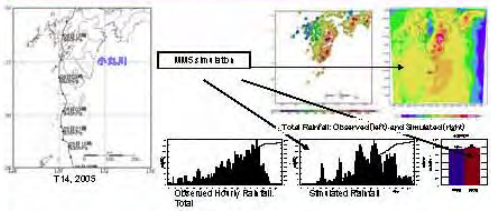


About 50% of population and about 75% of property on about 10% of land lower than water levels in rivers during flooding

1

Possible Heavy Rainfall by Typhoon

Considering the increase of intensity of Typhoon reported from observations and model predictions, possible floods can be simulated by shifting the meteorological field to a targeted area.



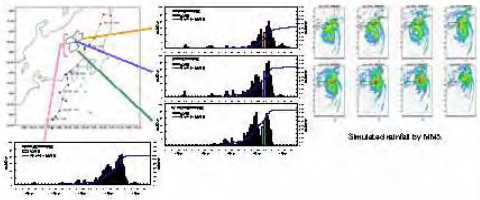
T14, 2005

Observed Hourly Rainfall Total

Simulated Rainfall

Possible Heavy Rainfall by Typhoon

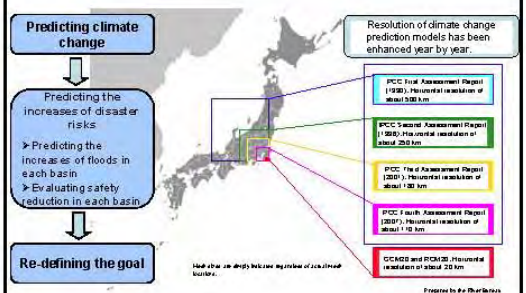
Down-scaling of the JMA/RSM-GPV by MM5 associated with the meteorological field shift to north by 1 degree and to east by 8 degree virtually.



Simulated rainfall by MM5.

Under the current climate condition, the rainfall could be larger than the historically maximum rainfall.

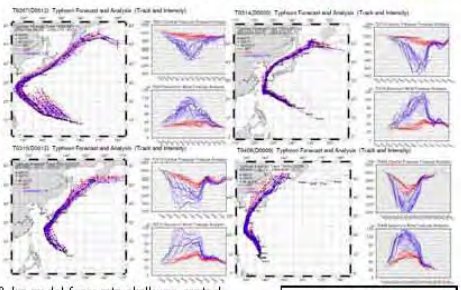
How to study adaptation measures



2

Typhoon track and intensity: 60km vs 20km

JMA

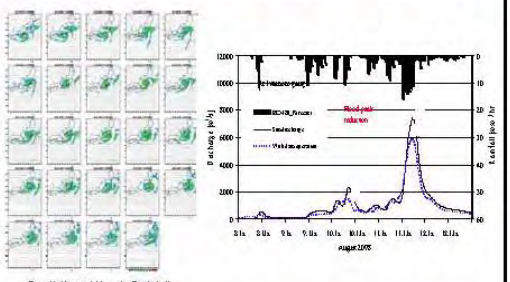


60-km model forecasts shallower central pressures and weaker maximum winds. 20-km model represents typhoon development closer to the observations.

60km mesh model

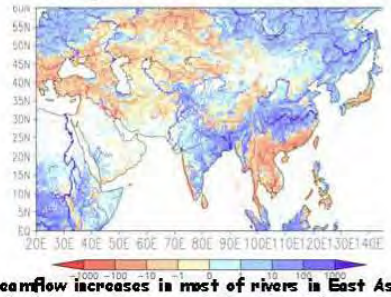
20km mesh model

A Result of Prediction, 8-12, Aug., 2098 by Using Down-scaling



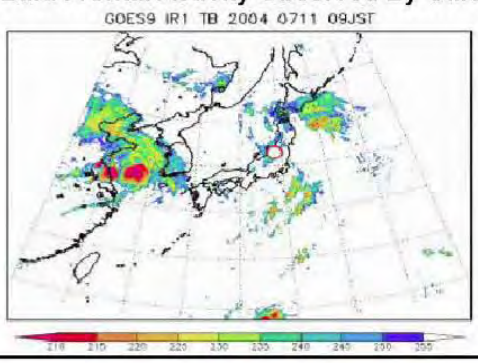
Prediction of Hourly Rainfall

Changes in annual streamflow

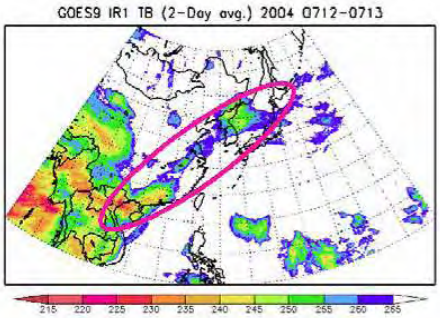


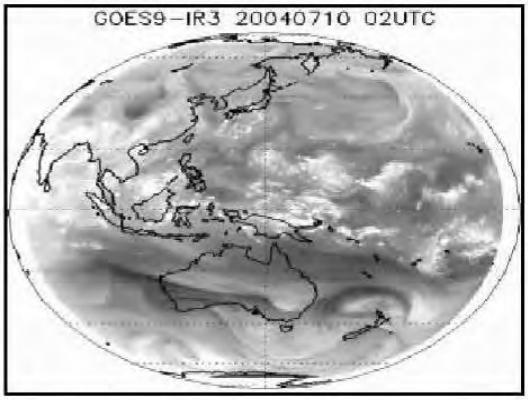
Streamflow increases in most of rivers in East Asia and South Asia, but decreases in Southeast Asia, western Asia and the Mediterranean region

Baiu Frontal Activity Observed By GMS



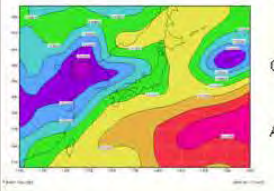
Temporally Overplayed Image





Targeting Meteorological Field

The Case of Heavy Rainfall in 2004



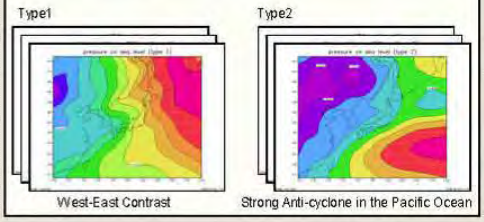
Water Vapor Tongue

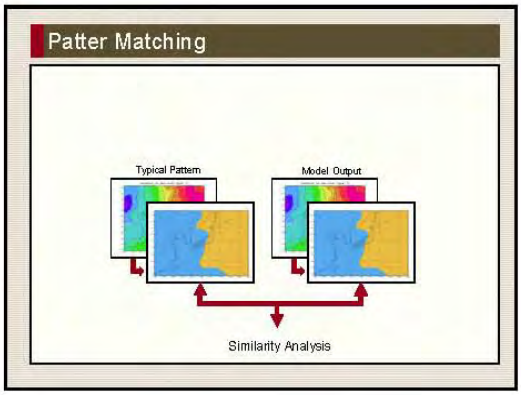
Convergence

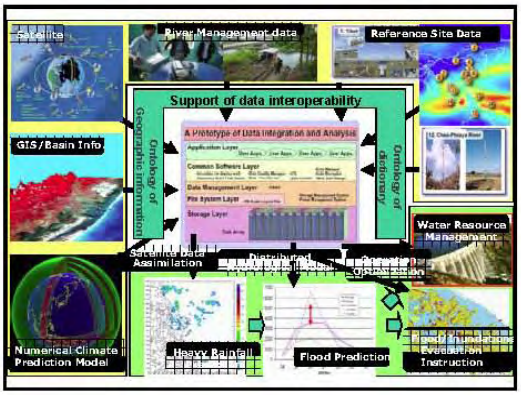
Air Pressure Field

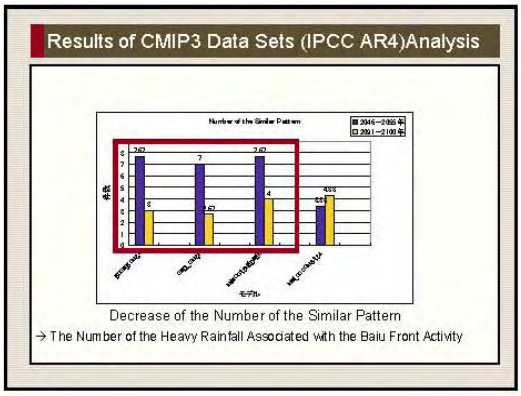
Typical Pattern

Typical Atmospheric Field Pattern by Referring to the Top 1000 Heavy Rainfall Observed by Rain Gauge Network from 1979 to 2004

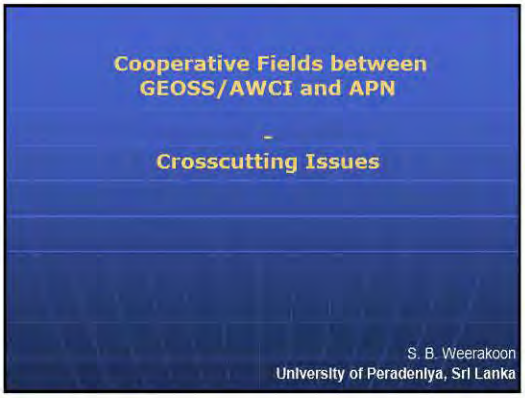


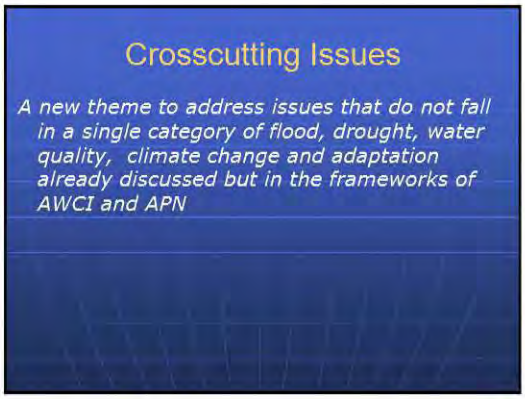

Patter Matching
Typical Pattern
Model Output
Similarity Analysis

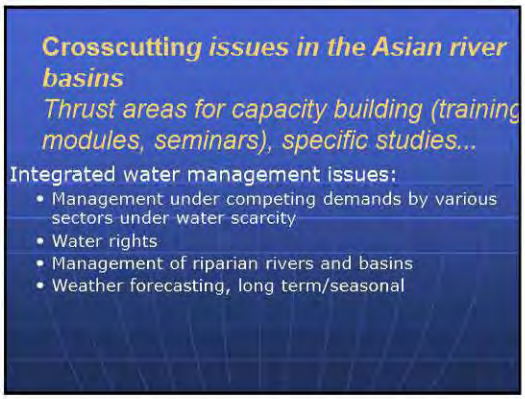

Satellite
River Management data
Reference Site Data
Support of data interoperability
A Prototype of Data Integration and Analysis
GIS/Basin Info
Ontology of Geographic Information
Ontology of dictionary
Water Resource Management
Numerical Climate Prediction Model
Heavy Rainfall
Flood Prediction
Evacuation Instruction

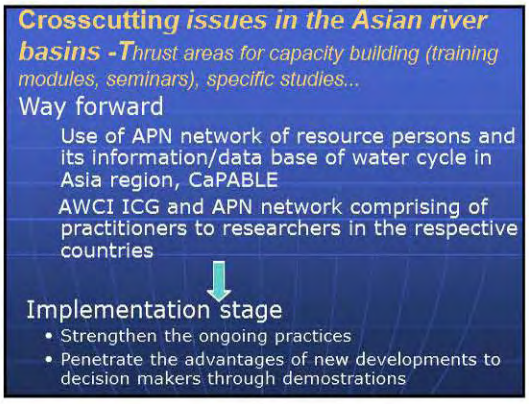

Results of CMIP3 Data Sets (IPCC AR4)Analysis
Decrease of the Number of the Similar Pattern
→ The Number of the Heavy Rainfall Associated with the Baiu Front Activity

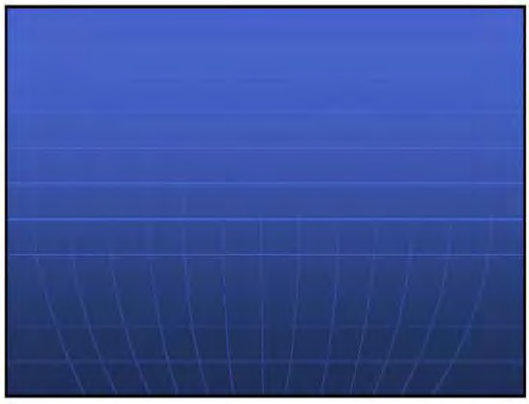
4.4.5: AWCI Cross-Cutting Issues Status Report





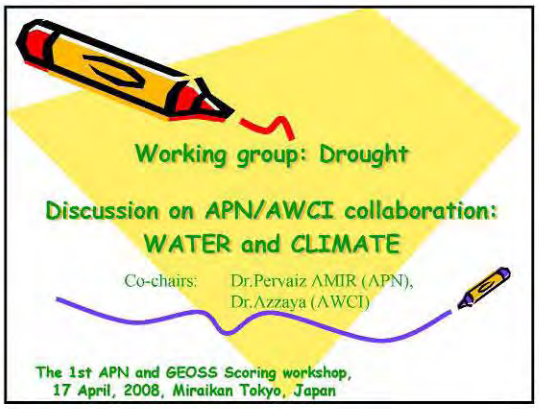


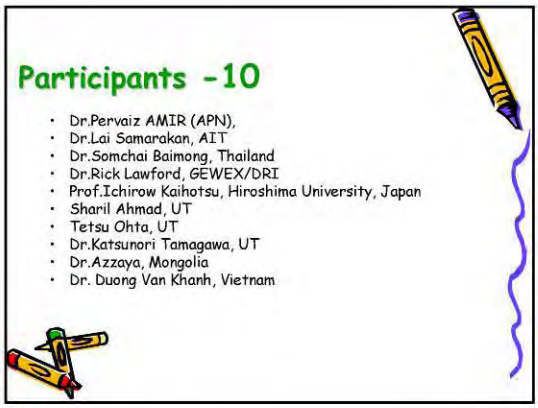

Crosscutting issues in the Asian river basins -Thrust areas for capacity building (training modules, seminars), specific studies...
Way forward
Use of APN network of resource persons and its information/data base of water cycle in Asia region, CaPABLE
AWCI ICG and APN network comprising of practitioners to researchers in the respective countries
Implementation stage
• Strengthen the ongoing practices
• Penetrate the advantages of new developments to decision makers through demostrations

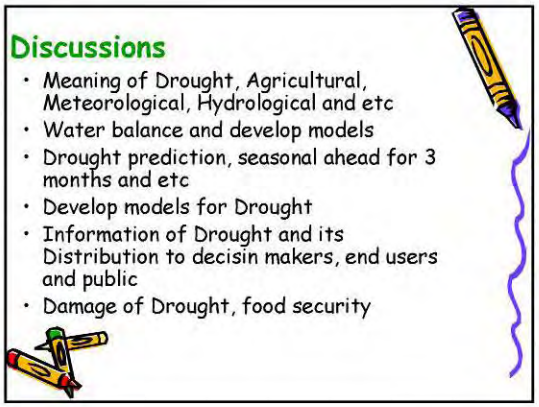


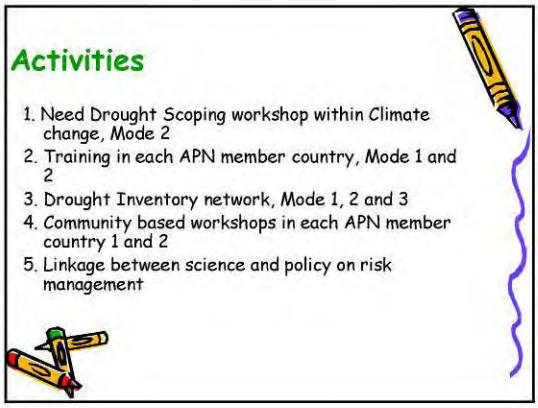
Annex 5: Break-Out Session Presentations

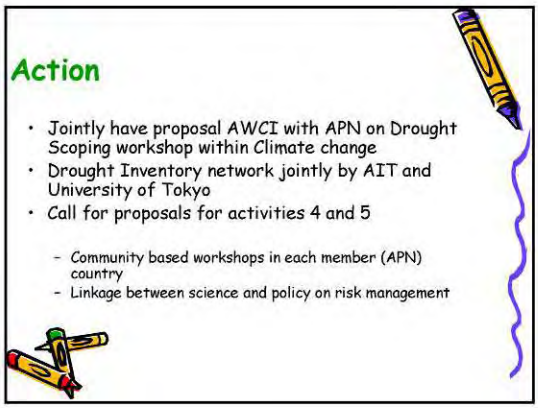
5.1 Drought Break-Out Report











5.2 Water Quality

APN/ AWCI Scoping workshop: Aligning Water and Climate: Theme: Water Quality / Ecosystem

Participant: 7
Bilqis (Bangladesh)
Jagadish (Nepal)
Dugdim (GEO)
Saphien (vietnam)
G. Kenna (Bhutan)
Puna (AWCI)
Reshv (Pakistan)

Activities

- GEO work plan update bring water quality issue forward
- GEO helpss in identifying funding source including capacity building in searching for fund
- AWCI include water qty. modeling with flood group among country having interest (Mode 3 IWRM)
- Water Qty group to submit proposal to APN under CAPABLE

Accounting:

- Submit proposal for capable fund

Action:

- Network formation / regular contact with the participants

5.3 Impacts of Climate Change & Adaptation

Impacts of Climate Change and Adaptation

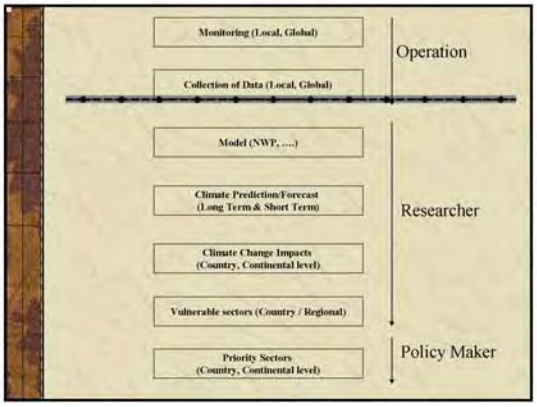
Aligning Water and Climate

Session Chair: Md. Mafizur Rahman
Professor
Dept. of Civil Engineering
BUET, Dhaka

12 Participants

First jointGEOSS/AWCI/APN Scoping workshop
16th ~17th April, 2008, Miraikan, Tokyo, Japan

Newly Emerged Group Discussion on fundamental issues



Capacity Building Needs

Asia Pacific Initiative
Regional Initiative
Country Initiative

→ Operation Personnel, Researcher, Policy Maker, Local Administrator, Affected Population

Climatological Model (Not weather prediction Model)
Climatological Scenario development
Resolution of data collected
Hydrological Model

Scientific Research Needs

Vulnerability Assessment
Risk Mapping
Hazard Mapping
Impact of climate change on different Sectors
Impact on coastal areas
Impact on drought zones

Activities

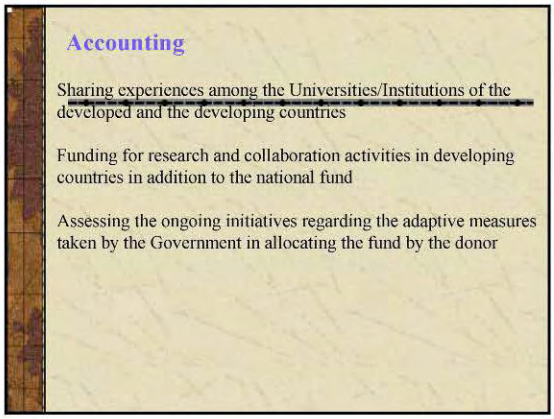
•Capacity building of data recording, collection and management: equipment, official, field level worker

•Capacity building and Technology Transfer of the researchers/Official on operation of
Downscaling of Global Climatological Models =>
Hydro-climatological model => Regional scale=> Country level
⇒Basin level

•Sharing information and experiences of different countries on projection of possible impacts on various countries due to climate changes (Agriculture, Food security,
Sea level rise, salinity intrusion, extreme events,….)

•Sharing experiences among member countries on the adaptation policies, strategies, measures in coping the impacts

•Activities relating to mass awareness


Accounting
Sharing experiences among the Universities/Institutions of the developed and the developing countries
Funding for research and collaboration activities in developing countries in addition to the national fund
Assessing the ongoing initiatives regarding the adaptive measures taken by the Government in allocating the fund by the donor

1st Joint APN and GEOSS/AWCI Scoping Workshop: Group Photograph

Professor Toshio Koike (AWCI)
giving an introduction

Professor Jose Achache (GEO)
giving some opening remarks

Mr. Yukihiro Imanari (APN)
giving some opening remarks

Ms. Naoko Okamura (MEXT)
giving some opening remarks

Dr. Pervaiz AMIR (APN representative)
during discussion session.

Dr. Erna Sri Adiningsih (APN SPG
Member for Indonesia) during
discussion session

Asia-Pacific Network for Global Change Research (APN)
APN Secretariat
5F, IHD Centre Building
1-5-1 Wakinohama Kaigan Dori
Chou-Ku, Kobe 651-0073
JAPAN
Tel: (+81) 078-230-8017
Fax: (+81) 078-230-8018
Email: info@apn-gcr.org
Website: www.apn-gcr.org