MAHASRI – Preparation for the final scientific conference in March 2016

Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative(2006-2015)

http://mahasri.cr.chibau.ac.jp/

"To establish hydro-meteorological prediction system, particularly up to seasonal time-scale, through better scientific understanding of Asian monsoon variability".

Jun Matsumoto

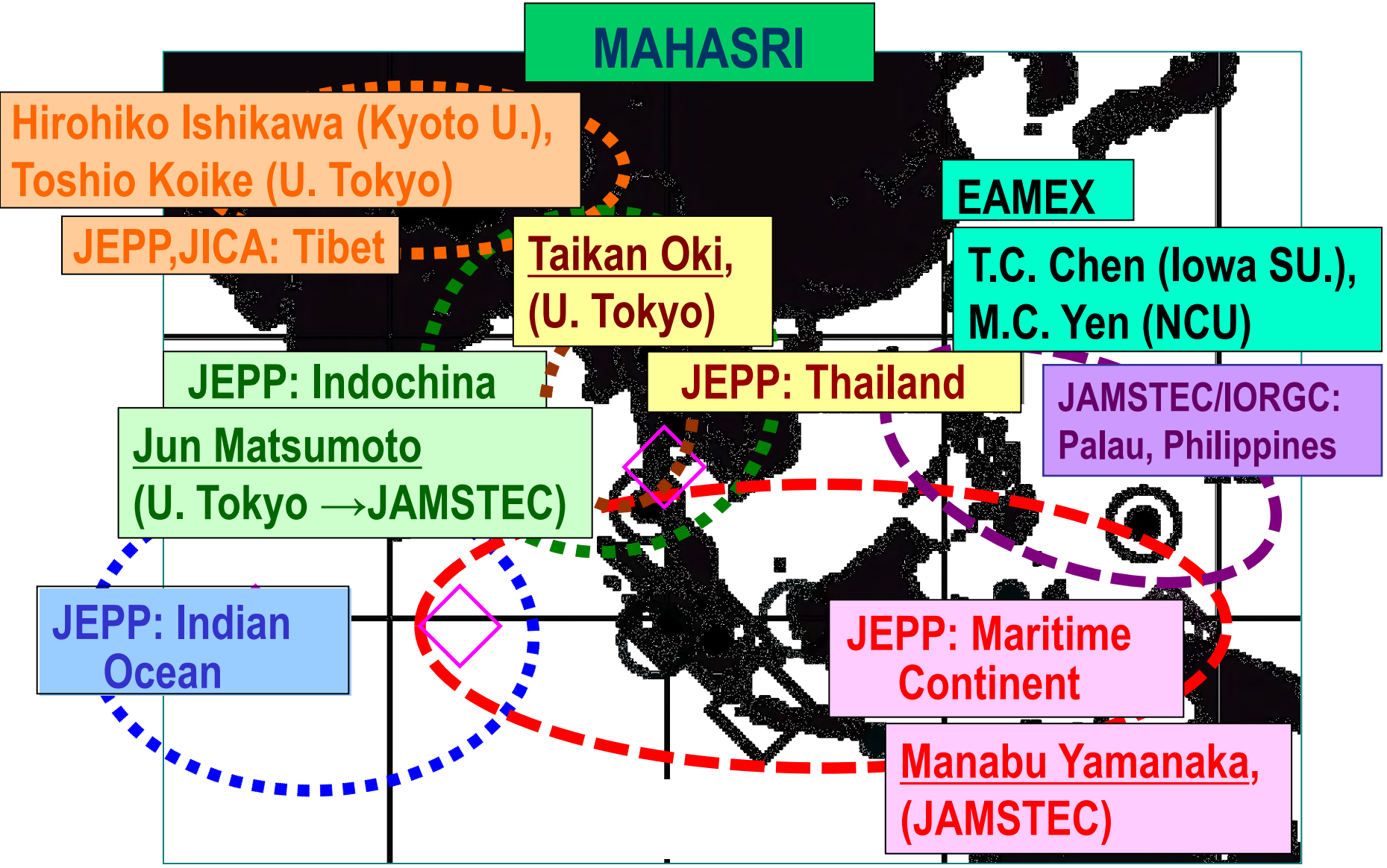
Department of Geography, Tokyo Metropolitan University, JAMSTEC/ DCOP

GHP Meeting, 18 November 2015 at Entebbe, Uganda

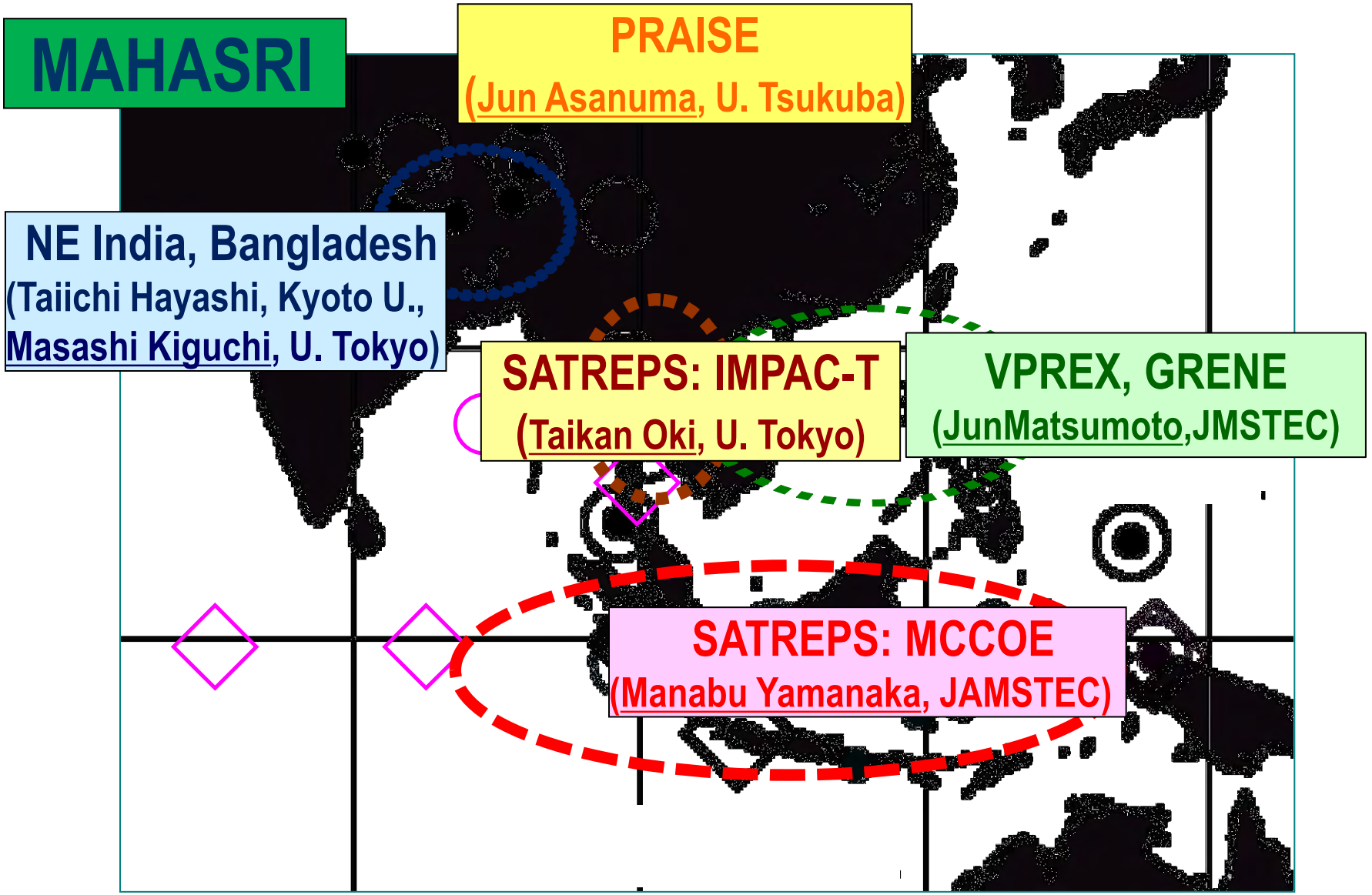
Objectives:

- Determine the predictability and key components of Asian monsoon variability with a time scale up to a season for the development of a hydro-meteorological prediction system.
- Develop a real-time monitoring capability for hydro-meteorological observations.
- Develop an integrated hydro-meteorological database including data rescue.
- Examine and improve the hydro-meteorological models in some specific river basins.

MAHASRI related Projects (JEPP, EAMEX, JAMSTEC) 2006-2010



MAHASRI related Projects for the JPFY2009-2013



SQ1: Observations and Predictions of Precipitation

2011 Thai Flood : IMPAC-T

(Photos provided by T. Sayama, PWRI, Japan)

Predictability of 2011 heavy rainfall in Thailand: Downscaled hindcast

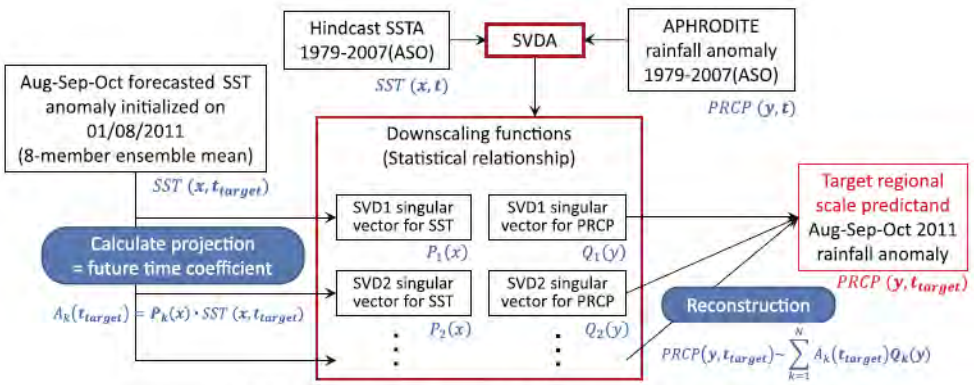


FIG. 1. Flowchart of the downscaling procedure in this paper.

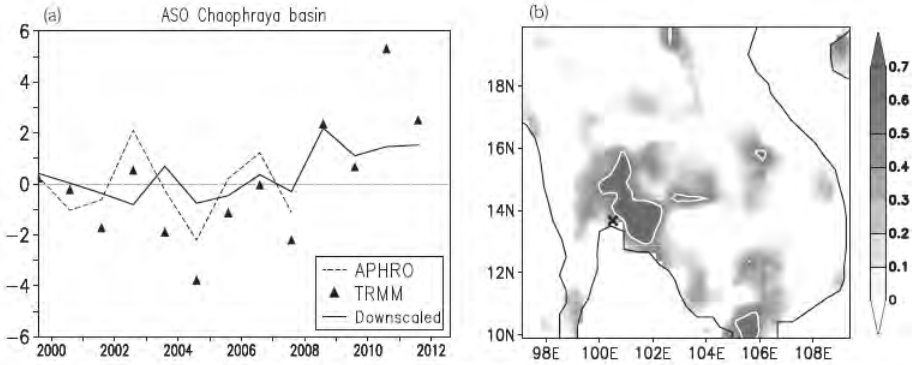


FIG. 7. (a) Time series of rainfall anomalies averaged in 13°–17°N, 100°–101°E. (b) Map of TCC between observed ASO rainfall (TRMM 3B43) and downscaled prediction (1999–2011). The white line shows the 95% confidence level, and the crisscross mark indicates the location of Bangkok.

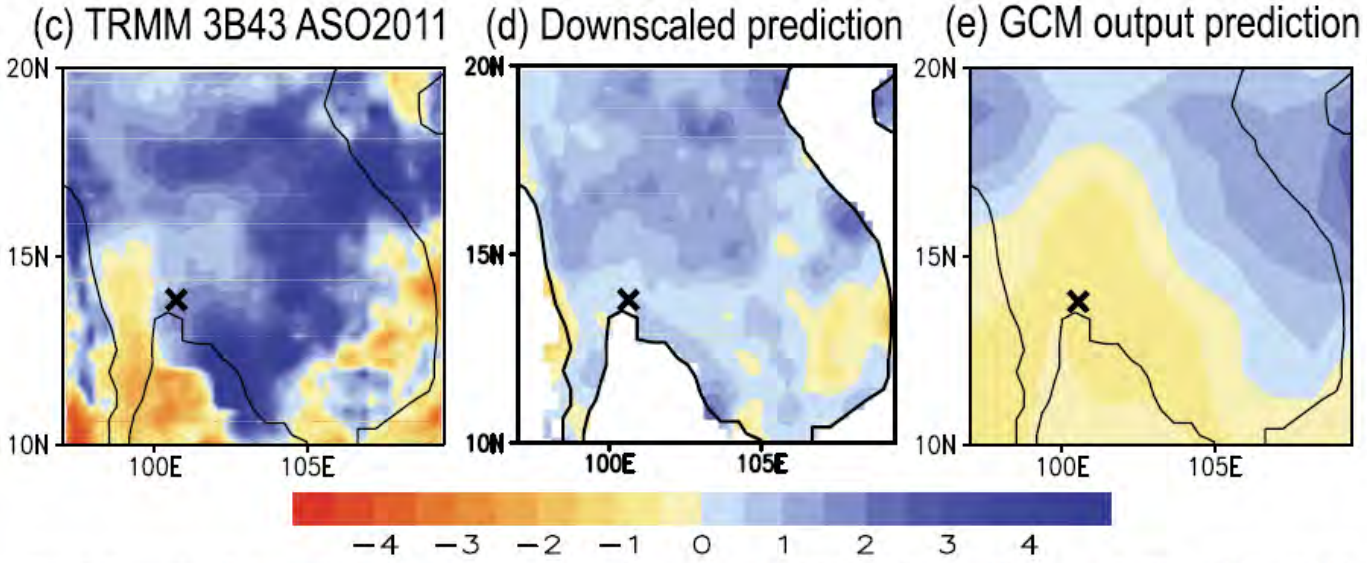
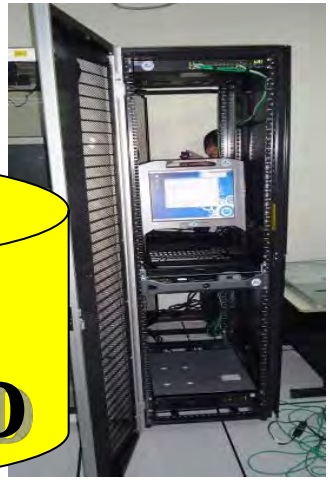


FIG. 6. Comparison between the hindcast products and the observation in ASO 2011. (a) Observed SST anomaly (ProjD) (K) and OLR anomaly (NOAA OLR) (W m^{-2}), (b) SST (K) and OLR (W m^{-2}) anomaly from CGCM hindcast started from August, (c) precipitation anomaly by TRMM/3B43 satellite observation (mm day^{-1}), (d) downscaled precipitation anomaly based on CGCM hindcast (mm day^{-1}), and (e) predicted rainfall anomaly by the direct output from GCM. Here, climatology for rainfall is defined from 1998 to 2010 because the TRMM/3B43 dataset is available only after 1998.The crisscross marks in (c)–(e) indicate the location of Bangkok.

(Imada, et al., 2015: Mon. Wea. Rev.)

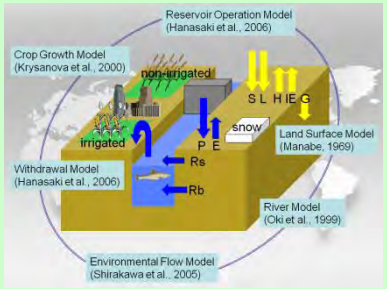
Joining Master Plan Revision with JICA

Data Required



Source Data from RID & TMD

Hydrology Models Developed



H08

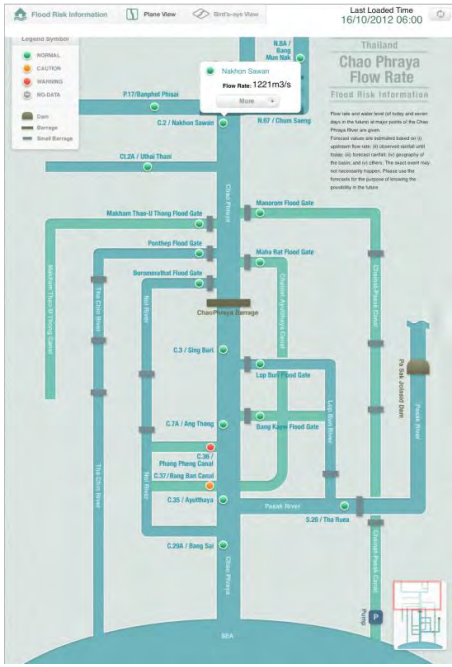
Water Related Information Integration System

Early warning system on the risks of water-related disasters by integrating observations and model

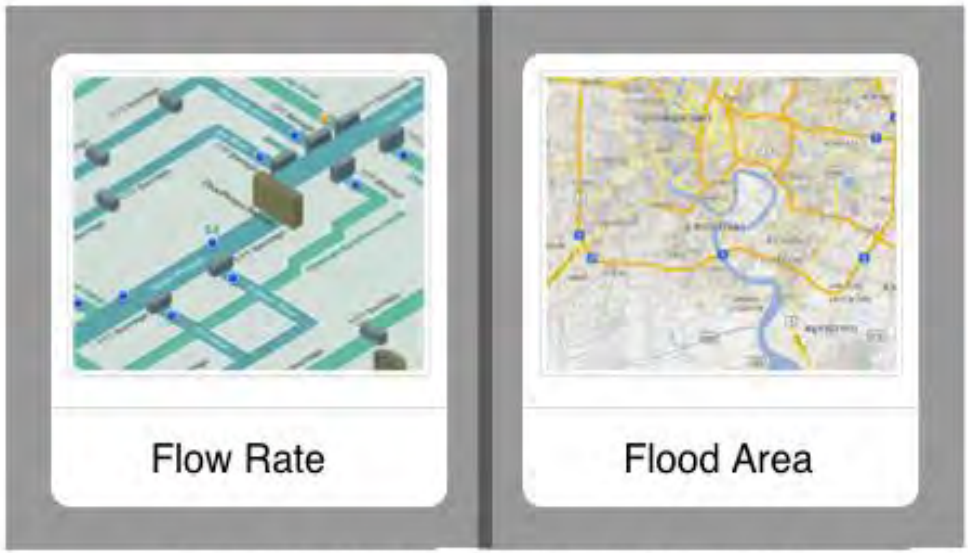
Developing National Strategic Plan in Water Sectors for Adaptation Measures under CC.

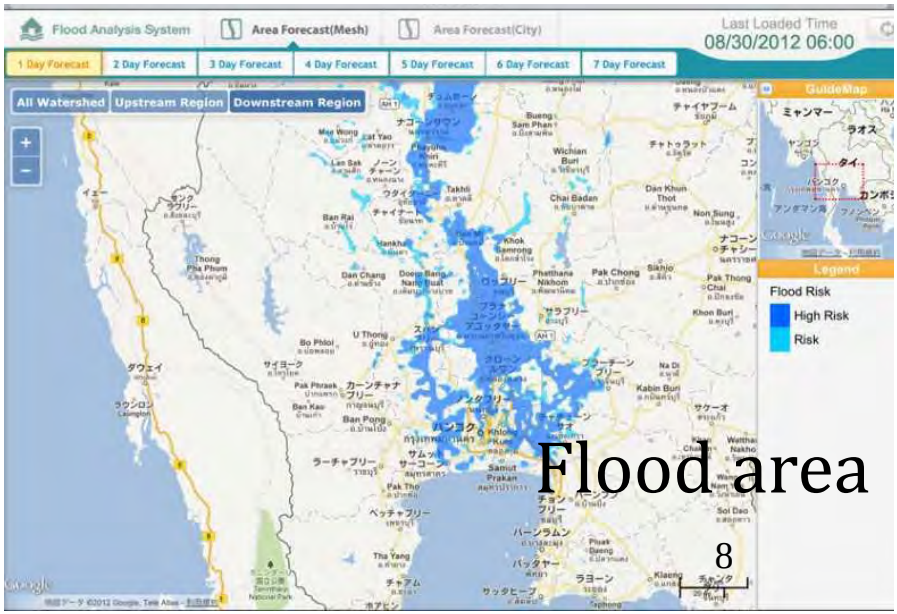
Decision-making support system (DMSS) for adaptation in water-related areas under climate change

Early flood warning system open to Public



Flow Rate

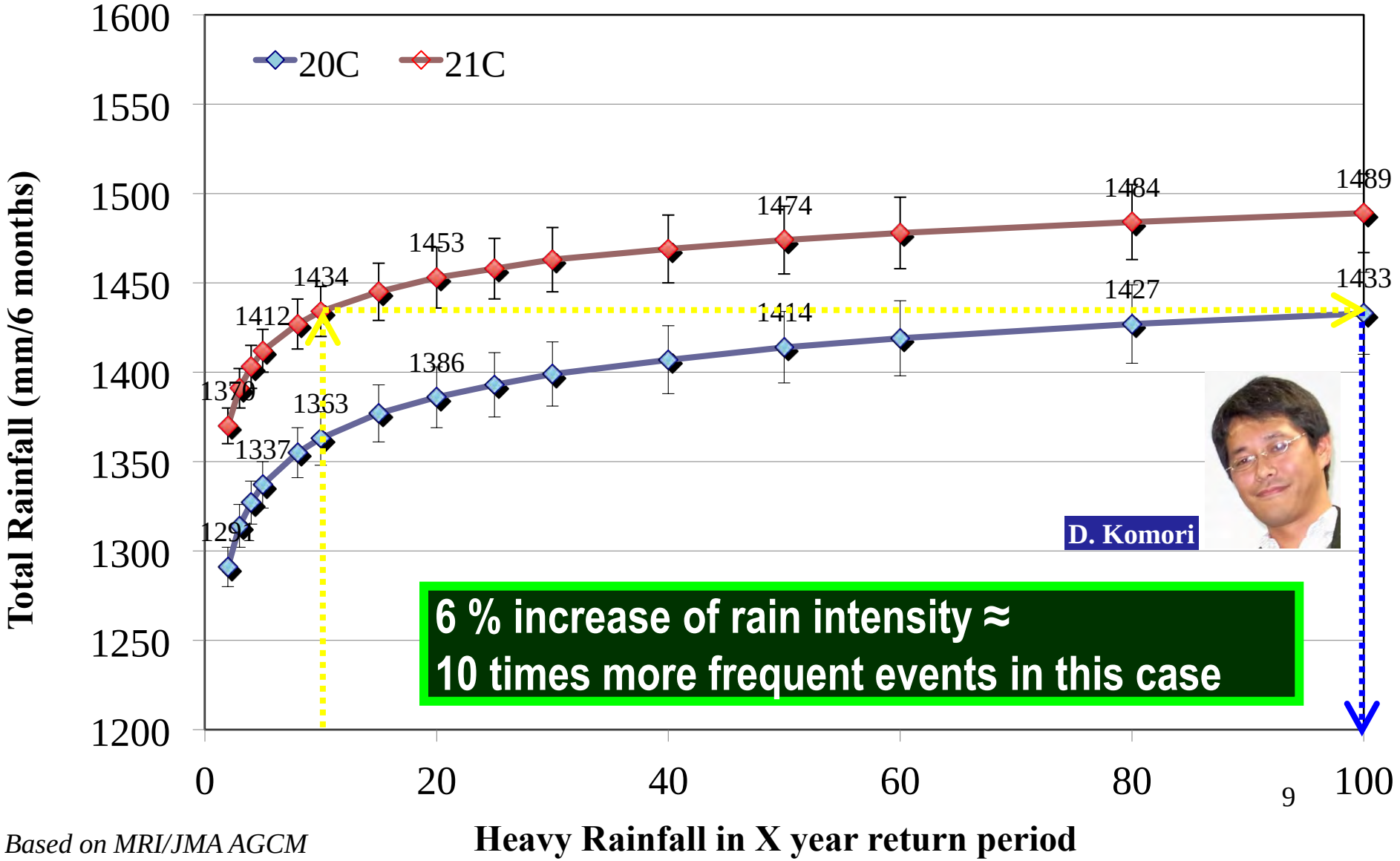




Flood area

SQ3: Changes in extremes

Probability analysis on seasonal rainfall in the upper Chao Phraya river basin



Based on MRI/JMA AGCM

SQ2: Global Water Resource Systems

Global high resolution cropping pattern datasets (SACRA)

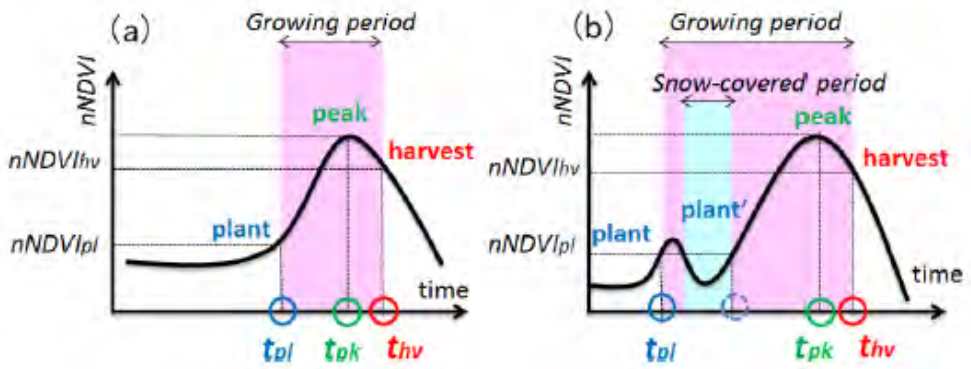


Figure 2. Schematic of identification of planting and harvesting dates in this study. Planting and harvesting dates (t_{pl} and t_{hv}) are identified together with a vegetation index time series and two crop calendar (CC) parameters: $nNDVI_{pl}$ and $nNDVI_{hv}$. Figures **(a)** and **(b)** indicate summer and winter crops, respectively. The two CC parameters are defined for each crop type.

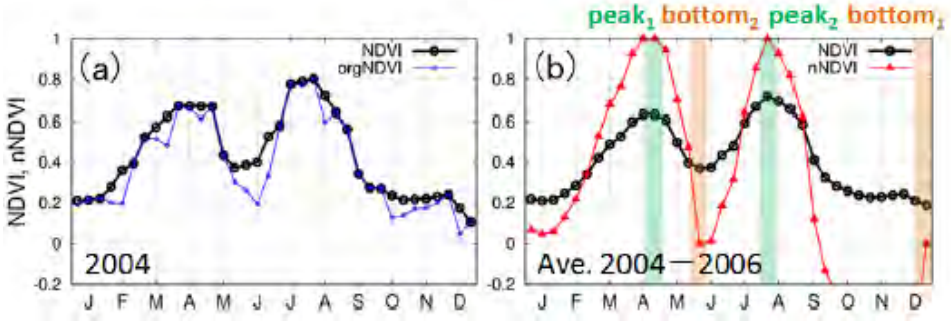


Figure 3. Time series of NDVI at a double-cropping grid in China (116.76° E, 32.60° N). Figure **(a)** represents the original NDVI (blue line) and NDVI with the BISE method (black line) in 2004. Figure **(b)** represents the NDVI (black line) and normalized NDVI (nNDVI; red line) average from 2004 to 2006.

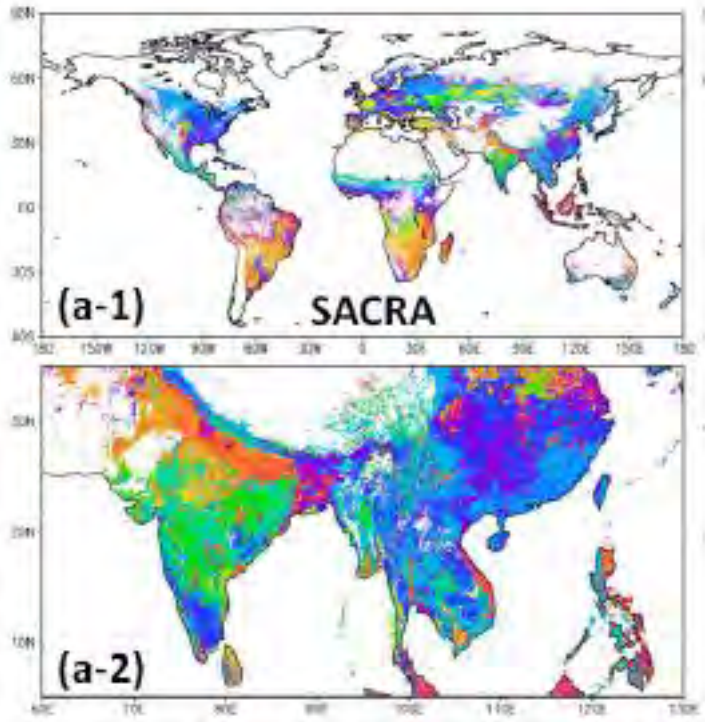


Figure 5. Planting dates of a typical crop in **(a)** SACRA (unit: day of year).

(Kotsuki and Tanaka, 2015: Hydrology and Earth System Sciences)

SQ4: Water and energy cycles

Multi-site real-time data management server system *FluxPro*

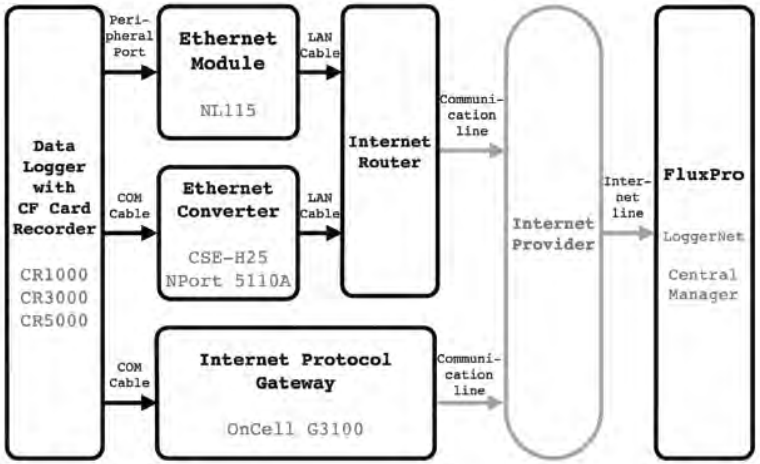


Fig. 1. Schematic of the three telecommunication routes in the gathering system. Boxes to the left and right of the gray arrows are local instruments and the *FluxPro* management server, respectively. The names or titles of devices are given in the bold font; the remaining text gives the name of the component. Black arrows denote a wired lines; gray arrows denote wired or wireless lines (CF: compact flash; COM: communication port; LAN: local area network).

Table 2. List of charts in serving system of *FluxPro* (http://matthew.niaes.affrc.go.jpa/amen).

Tab	Chart	Figure	Program
flux	*week*	2	wfx2er
	epsilon	3	wto2fx
	sigma	4	sig2flx
		5	wsf2zlt
	variability	-	phi2zlt
		-	wsf2zlu
	variation	6	mdvlhfcdf
		-	mdvshfcdf
raw	*series**	7	rdana
	*spectrum**	8	wfsfflux
meteo	*radiation*	9	wradi
	meteorology	10	wtrend
	EC	11	wrange
	windrose	12	windrose
annul	*trend***	13	annflux
	*contour***	14	hryrgrid

*24 panels (hourly data) are presented for one day; **Panels are presented for every measured year.

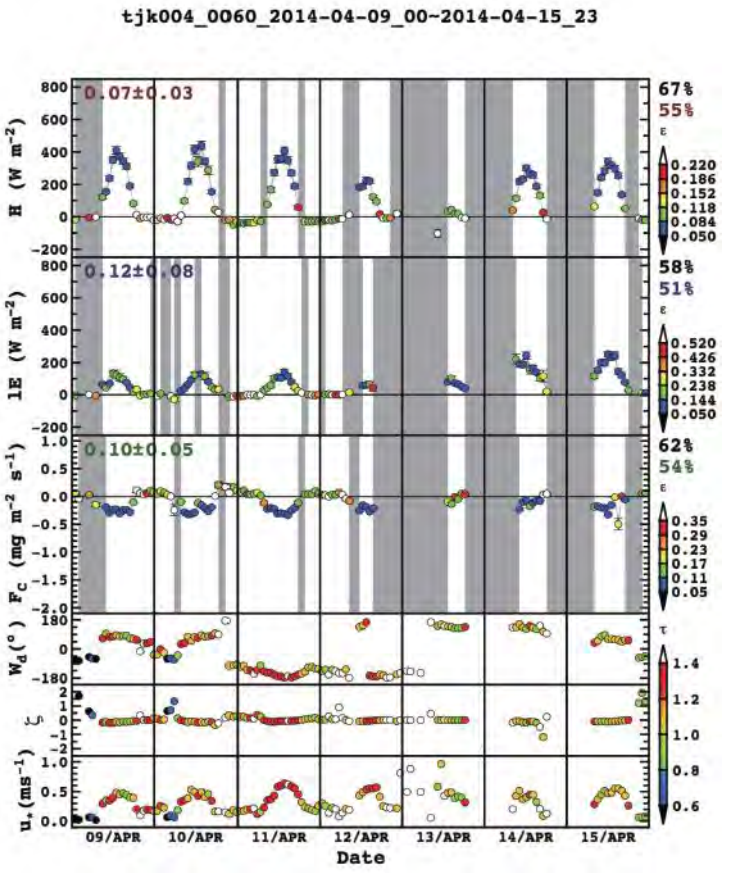


Fig. 2. The chart named *week* in the *flux* cluster of *FluxPro*, showing the temporal trends of H, lE and F_c with 1σ whiskers. Trends of W_d, ζ and u_* are also plotted. Turbulence measurements were taken from 00:00:00 0 Hz on 9 April to 23:59:59 9 Hz on 15 April, 2014 at a tangerine orchard in Jeju, Korea. Title (left to right) gives: site ID_block size (min) of estimated F_c_start year–start month–start day_start hour~end year–end month–end day_end hour. Details are given in 1) of Subsection 2.3.1.

(Kim, W. et al., 2015: Journal of Agricultural Meteorology)

Meetings in 2015

- February 25-28, 2015: The 36thCongress and International Seminar, "Meteorology and Climate", Gauhati University, India.
- March 2, 2015: Indo-Japan Joint Workshop on Natural Disaster and Human Activity in the Northeastern Indian Subcontinent. Cooperating Atmospheric scientists, Geographers and Social scientists for disaster and Human Activities in South Asia, North Eastern Hill University in Shillong, India
- March 4-5, 2015: Asian monsoon Hydroclimate –Review of MAHASRI and Beyond- at Nagoya, Japan
- March 10-12, 2015: The Fourth International Workshop of Climatic Changes and Their Effects on Agriculture in Asian Monsoon Region (GRENE-CAAM Workshop) at Hanoi, Vietnam
- May 24-May 28, 2015: JpGU at Chiba, Japan: International Session "Asian monsoon Hydroclimate"
- August 2-August 7, 2015: AOGS2015 at Singapore "AMY 2015 Session", APHW HS session "Asian monsoon hydroclimate" at Singapore

Asian monsoon Hydroclimate
-Review of MAHASRI and Beyond-

Dates: March 4 and 5, 2015

Venue: Nagoya University IB Building IB013, Japan

Hydrospheric Atmospheric Research Center

Eco-Claimate System Laboratory

Nagoya University

Problems in MAHASRI

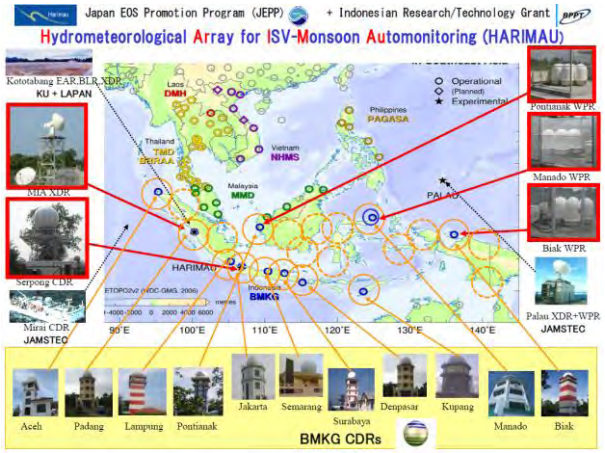
- Lack of central funding
- Lack of stable project office
- Lack of central data center
- Change of young scientist situations in Japan: much more project-based, tentative positions
- Difficulties of observational studies / data acquisition in China
- End of CEOP in 2011
- Death of vice-chair Prof. Satomura in March, 2014
- End of observational water cycle research groups/teams in JAMSTEC since April 2014

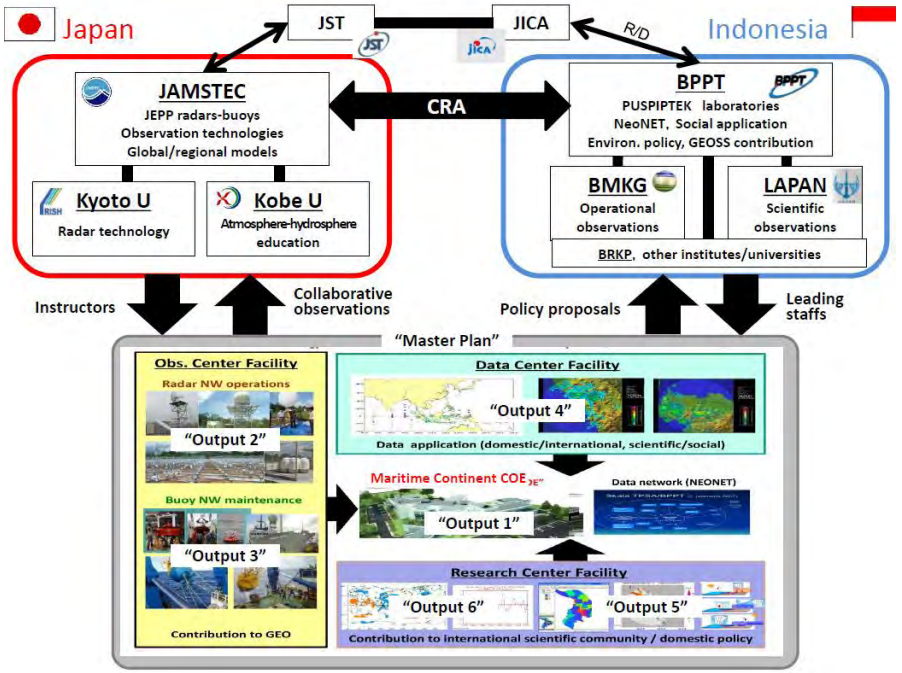
Outcomes / impacts of MAHASRI (1)

- Continuous research collaborations with monsoon Asian operational and research communities since the GAME period strongly stimulate research activities in monsoon Asia.
  - Thailand (TMD, RID, RFD, KU…, IMPAC-T/Univ. Tokyo)
  - Indonesia (BPPT, BMKG, HARIMAU/JAMSTEC)
  - Vietnam (NHMS, HUS, JEPP/JAMSTEC, TMU
  - Philippines (PAGASA, Ateneo U., JAMSTEC)
  - Bangladesh, NE India (BMD, IMD, IIT, NEHU…, Kyoto Univ.)
  - Mongolia (IMH, Tsukuba Univ., Hokkaido Univ.)
- After the huge flood damages in 2011, real-time monitoring system and flood prediction system have been developed in the Chao Phraya River Basin in Thailand.
- Dynamics of autumn/winter extreme rainfalls in Indochina have been extensively investigated, but application to operational weather forecast has to be developed in future.

Outcomes / impacts of MAHASRI (2)

- Collaboration with AMY community:
  - In-situ observation datasets in DIAS (Data Integration and Analysis System) in the Univ. Tokyo
  - AMY Re-analysis by MRI (Meteorological Research Institute)
- Local research developing efforts:
  - MCCOE, NEO-NET (Indonesia)



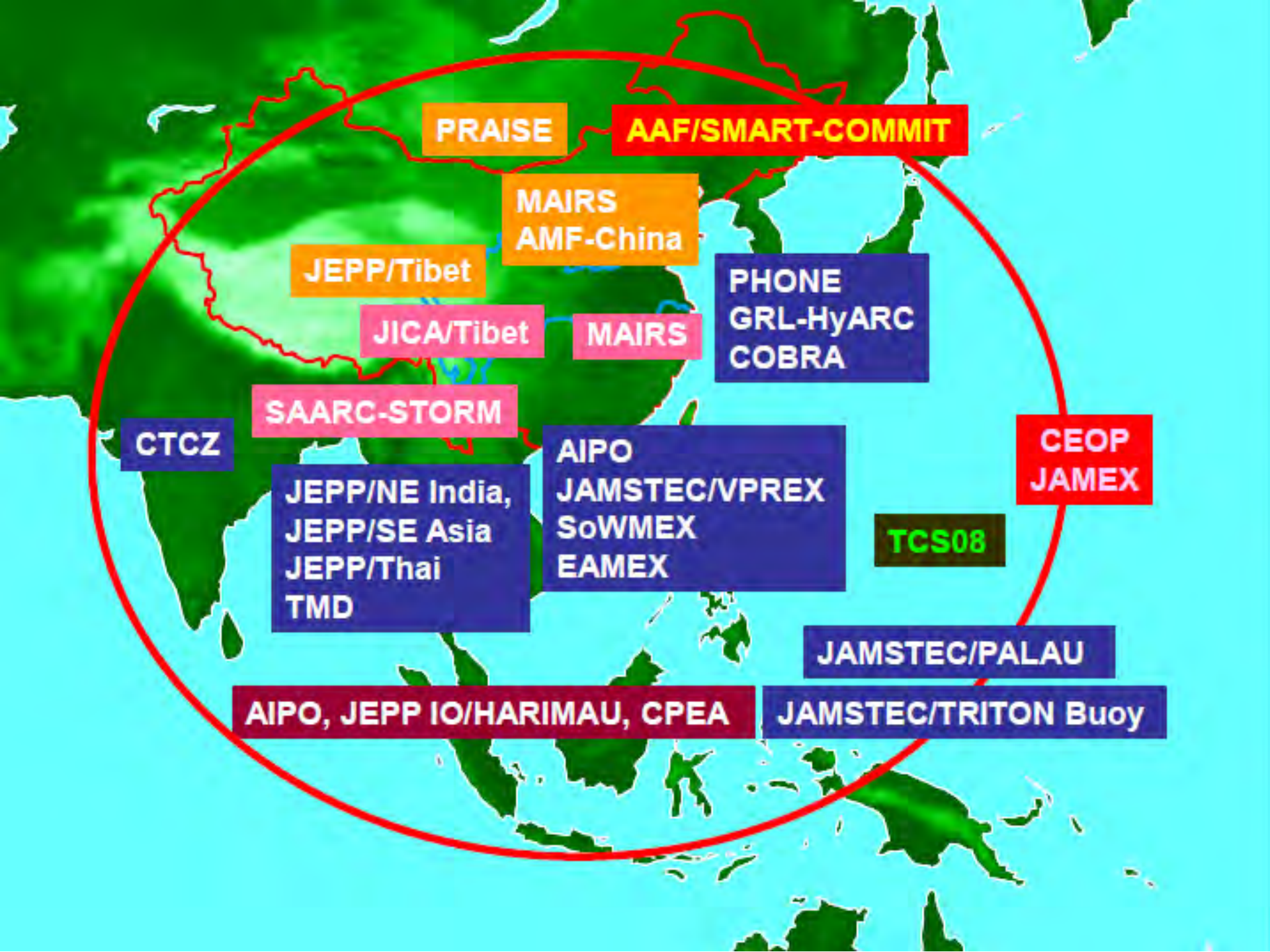


- Education / capacity building:
  - Co-authored papers with local scientists (for Prof. Jun Matsumoto)
    - 1996-2005 (GAME): 5 / 22 (23%)
    - 2006-2015 (MAHASRI): 26 / 60 (43%) 4 PhD students in TMU

AMY (Asian Monsoon Years 2007-2012)

Overarching Goal:
"To improve Asian Monsoon prediction for societal benefits through improving understanding of the variability and predictability of the Asian-Australian monsoon system"

http://www.wcrp-amy.org/


PRAISE
AAF/SMART-COMMIT
MAIRS
AMF-China
JEPP/Tibet
PHONE
GRL-HyARC
COBRA
JICA/Tibet
MAIRS
SAARC-STORM
CTCZ
AIPO
JAMSTEC/VPREX
SoWMEX
EAMEX
CEOP
JAMEX
JEPP/NE India,
JEPP/SE Asia
JEPP/Thai
TMD
TCS08
JAMSTEC/PALAU
AIPO, JEPP IO/HARIMAU, CPEA
JAMSTEC/TRITON Buoy

GEWEX/AMY In-situ data Management status

Asian Monsoon Years (AMY 2007-2012)

Data Management status table for each projects

	Project Name	Observation Region	# of Sta.	Obs. Type	Data Period	Upload Status	QC Status	Meta Status	Open to Public
1	TRITON buoy	North Pacific Ocean	18	Ocean	2008 - 2010	O	O	O	O
2	MAHASRI-Vietnam	Vietnam	3	AWS	2009 - 2010	O	O		
3	PRAISE	Mongolia	1	AWS, Flux	2008 - 2010	O	O	O	
4	AIPO	Northern South China Sea	5	Sonde(Ocean)	2007 - 2010	O	–		
5	EAMEX	Taiwan	25	AWS	2008-2010	O	O		
	EAMEX_UpperAir	Taiwan	8	Sonde	2008 - 2010	O	–		
6	JEPP-Thai	Thailand	14	AWS	2008 - 2010	O	O		
7	HARIMAU	Indonesia	5	AWS, Sonde	2008 - 2010	O	O	O	O
	HARIMAU-WP	Indonesia	4	WindProfiler	2008 - 2010	O	–	O	O
8	MAHASRI-AMY	Indonesia	2	Sonde, WP	2009, 2008-2010	O	–	O	O
9	JEPP-NEIndia-Bangladesh	Bangladesh	30	Rain	2008 - 2010	O	O		–
10	Palau-AMY	Palau	1	Sonde	2008, 2010	O	–	O	O
11	VPREX-AMY_DaNang	Vietnam	1	Sonde	2010	O	–		
12	VPREX-AMY_Mactan	Philippines	1	Sonde	2010	O	–	O	O
13	CTCZ-Pilot	Bay of Bengal	1	Sonde(Over Ocean)	2009/07 - 2009/08	O	–	O	O
14	TMD Upper Air	Thailand	5	Sonde	2008 - 2010	O	–		
15	COBRA project	Japan	1	Sonde	2008 - 2009	O	–	O	O
16	SoWMEX	Taiwan area and northern boundary of South China	12	Sounding	2008/05 - 2008/06	O	–		
17	SAARC_STORM_UpperAir	Bangladesh, India	12	Sonde	2010	O	–		
18	AMF-China	China	1	AWS, Sonde	2008/05 - 2008/12	O	O		
19	JICA-Tibet	China	79	PBL, Lake, AWS	2007 - 2009	O	O		
	JICA-Tibet_UpperAir	China	42	WP, GPS, Sonde	2007 - 2009	O	–		
20	GRL-HyARC	Japan	1	Sonde	2010	O	–	O	O
21	PHONE	East China Sea area	2	Sonde	2008 - 2010	O	–		

http://dias-dss.tkl.iis.u-tokyo.ac.jp/ddc/search?lang=er

DIAS Data Catalog

Asian Monsoon Years (AMY 2007-2012)

DIAS Data Integration & Analysis System データ統合・解析システム

データ俯瞰・検索システム (β)

A Search and Discovery System for DIAS Datasets

Home How to use About

Search conditions Keyword (title): AMY

Results 1 - 9 of 9 hits

Data are available from DIAS System

- AMY Project TRITON buoy dataset
- AMY Project HARIMAU sonde/AWS dataset
  - GCMD Science Keywords : Atmosphere
- AMY Project VPREX-AMY_Mactan dataset
  - GCMD Platforms : Balloons / Rockets
  - GEOSS SBAs : Climate, Water, Weather
  - GCMD Science Keywords : Atmosphere
- AMY Project Palau-AMY dataset
  - GCMD Platforms : Balloons / Rockets
  - GEOSS SBAs : Climate, Water, Weather
  - GCMD Science Keywords : Atmosphere
- AMY Project CTCZ-Pilot dataset
- AMY Project MAHASRI-AMY dataset
  - GCMD Science Keywords : Atmosphere
- AMY Project GRL-HyARC radiosonde dataset
  - GCMD Platforms : Balloons / Rockets
  - GEOSS SBAs : Weather
  - GCMD Science Keywords : Atmosphere
- AMY Project HARIMAU-WPR dataset
- AMY Project COBRA radiosonde dataset
  - GCMD Platforms : Balloons / Rockets
  - GEOSS SBAs : Weather
  - GCMD Science Keywords : Atmosphere

[1-9]

AMY Re-analysis by JMA/MRI Outline

- Reanalysis calculation by MRI/JMA, just started.
- Target Period : Jan2008 – Dec 2010
- Coverage : Global

  Horizontal resolution ~ 20km (Original plan: 60 km)

  Temporal resolution ~ 3hour
- Distribution : By internet (for AMY data provider, via HDD)
- Expecting release for AMY community: Spring of 2016, for the world: Spring of 2018

(By Dr. Hirotaka Kamahori, MRI Japan)

How to end MAHASRI?

- End date: March 31, 2016
- March 2-4, 2016: International Science Conference on MAHASRI
  →March 5: ISSC meeting → Plan succeeding project

Sunset in the Manila Bay on March 27, 2007

The International Science Conference on MAHASRI

2-4 March 2016
The International Science Conference on
MAHASRI

AHASRI
GEWEX

Tokyo Metropolitan University, JAPAN

The International Science Conference (ISC) on MAHASRI (Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative) will be held at the International House in Tokyo Metropolitan University, Tokyo, Japan for the period 2-4 March 2016. MAHASRI has been conducted as one of the Regional Hydroclimatology Projects (RHPs) of the GEWEX (Global Energy and Water Exchanges Project) Hydroclimatology Panel (GHP) under the World Climate Research Programme (WCRP).

The MAHASRI-ISC will be hosted by the Research Center for Climatology, Tokyo Metropolitan University (TMU) as its kick-off International Conference. The "Research Center for Climatology" (RCC) is established in July 2015 as the eighth research center in TMU and is directed by Professor Jun Matsumoto, chairperson of MAHASRI. Distinguished groups exploring new frontiers of science and unique groups conducting special research reflecting the missions of TMU are designated as Research Centers to expand their research activity. In this workshop the research achievements, impacts, and future prospects of MAHASRI and related projects will be presented. We welcome any person who are interested in Asian monsoon hydroclimate.

First Announcement

http://tmu-rao.jp/events/1817/

International Scientific Committee

Chair: Jun Matsumoto (Tokyo Metropolitan University)

Vice Chair: Taikan Oki (The University of Tokyo)

Members:

Atsushi Higuchi (Chiba University)

Fadli Syamsudin (Agency for the Assessment and Application of Technology)

Fredlin Tangang (Universiti Kebangsaan Malaysia)

Gemma T. Narisma (Ateneo de Manila University)

Hatsuki Fujinami (Nagoya University)

Johnny C.L. Chan (City University of Hong Kong)

Shinjiro Kanae (Tokyo Institute of Technology)

Thanh Ngo-Duc (Hanoi University of Science)

Tsing-Chang (Mike) Chen (Iowa State University)

http://tmu-rao.jp/events/1817/

Local Organizing Committee

Chair: Jun Matsumoto

Members: Hiroshi Takahashi, Jun-Ichi Hamada

Secretariats: Hiroshi Kunimasa, Mio Tanahashi, Tomoko Motokado

Important dead line dates

Overseas participant registration: 15 December 2015

Abstract submission: 15 January 2016

Japanese participant without presentation and hotel reservation:
31 January 2016

http://tmu-rao.jp/events/1817/

Sponsors (tentative)

- Tokyo Metropolitan University
- Institute for Space-Earth Environmental Research (ISEE), Nagoya University
- Institute of Industrial Science, The University of Tokyo
- Tokyo Institute of Technology
- Strategic R&D Area Project "Strategic Research on Global Mitigation and Local Adaptation to Climate Change (S-14)" of the Environment Research and Technology Development Fund supported by the Ministry of Environment, Japan

Special Sessions (tentative)

- From IMPAC-T to ADAP-T: Taikan Oki (The University of Tokyo)
- Urban climate changes in Jakarta: Manabu Kanda (Tokyo Institute of Technology)

http://tmu-rao.jp/events/1817/

Topics

- Energy and water cycles
- Multiple interactions from diurnal to seasonal variations in precipitation
- Land-ocean-atmosphere interactions
- Heavy precipitation and extremes
- Long-term data rescue and monsoon variability
- Monsoon changes associated with human activities
- Urban climate in mega-city
- Utilization of satellite remote sensing technique for atmospheric, hydrological and oceanographic processes
- High resolution climate modeling
- Macro- and meso-scale hydrological modeling
- Prediction of rainfall and water resources
- Past and future climate changes, impact and adaptation

http://tmu-rao.jp/events/1817/

Invited / Keynote speakers (tentative)

- GHP: Jan Polchur or Jason Evans
- MPAC-T: Taikan Oki
- HARIMAU: Manabu D. Yamanaka
- EAMEX: T.C. (Mike) Chen
- CORDEX SE Asia: Fredlin Tangang
- TRMM: Yukari Takayabu

Future plan

- Capability for severe weather/climate prediction/preparation in Southeast Asian countries is not enough. Better to target specific river basins:
  - Thailand (Chao Phraya)
  - Indonesia (Jakartha?)
  - Vietnam (Red river)
  - Philippines (Manila?)
  - Bangladesh, NE India (Ganges, Brahmaputra, Meghna)

The END

Thank you!

Sunset in the Manila Bay on March 27, 2007