

MAHASRI and AMY



<http://mahasri.cr.chiba-u.ac.jp/>



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

Jun Matsumoto (Tokyo Metropolitan U., JAMSTEC/RIGC)

3rd CEOP at Melbourne, Australia, August 19, 2009

Objective

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

Meetings in 2008 / 2009

- Sept. 22-24, 2008: EAMEX/MAHASRI WS, Taiwan
- Oct. 20-25, 2008: IMW-IV at Beijing, China, including CLIVAR/AMMP, Pan-WCRP Monsoon Workshop, 5th AMY Workshop
- Nov. 19-21, 2008: Meteorological Society of Japan Fall Annual Meeting at Sendai, Japan (Japanese) Special Session "From GAME to MAHASRI"
- Mar. 5-7, 2009: The 2nd Vietnam-Japan MAHASRI Workshop, at Danang, Vietnam
- May 21, 2009: Japan Society for Planetary and Earth Sciences Annual Meeting at Chiba, Japan (Japanese) Special Session "MAHASRI and iLEAPS"
- Aug. 13, 2009: AOGS6 at Singapore Session AS8 "AMY: A Coordinated Asian Monsoon Experiment", AMY mini-workshop

High lights

- ◉ Coordination with AMY has been going well. New coordination with YOTC has started.
- ◉ AMY-IOP (2008-2009) has been successfully conducting.
- ◉ MAHASRI has come into a new epoch, starting two new projects in Thailand and Indonesia by JICA/JST fund.
- ◉ Interactions among diurnal variations, ISO, monsoon
- ◉ Warming processes, data assimilation over the Tibetan Plateau
- ◉ Long-term data rescue in SE Asia

Hydrometeorological Array for ISV-Monsoon Automonitoring (HARIMAU)



Kototabang EAR, BLR, XDR
KU + LAPAN



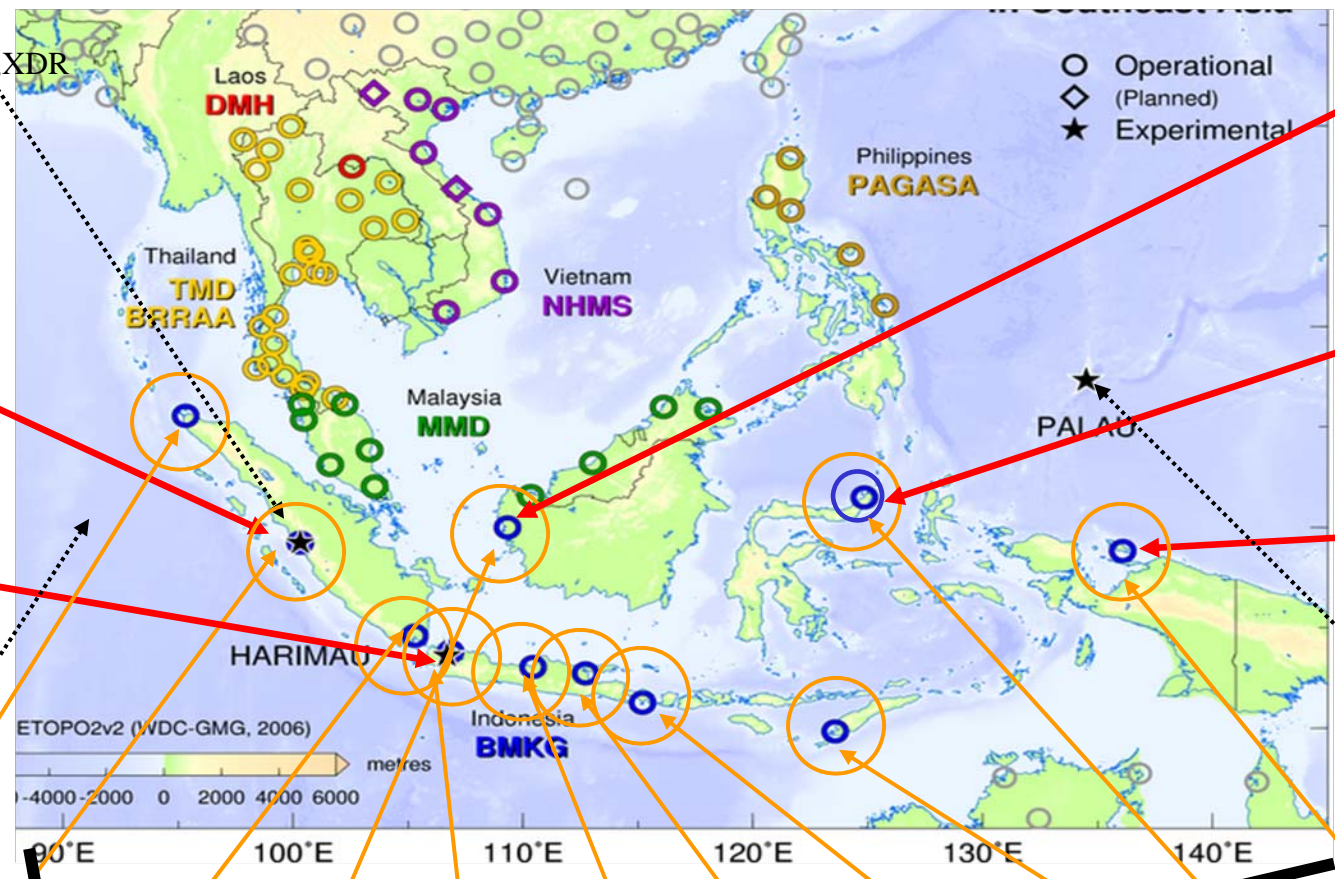
MIA XDR



Serpong CDR



Mirai CDR
JAMSTEC



Pontianak WPR



Manado WPR



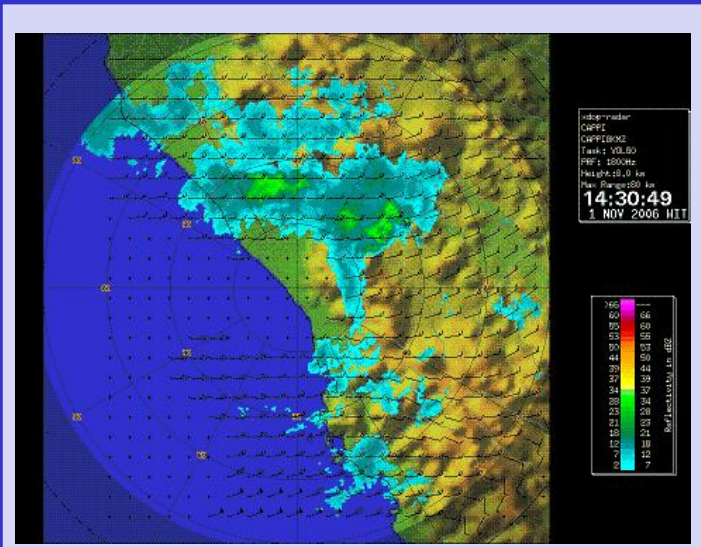
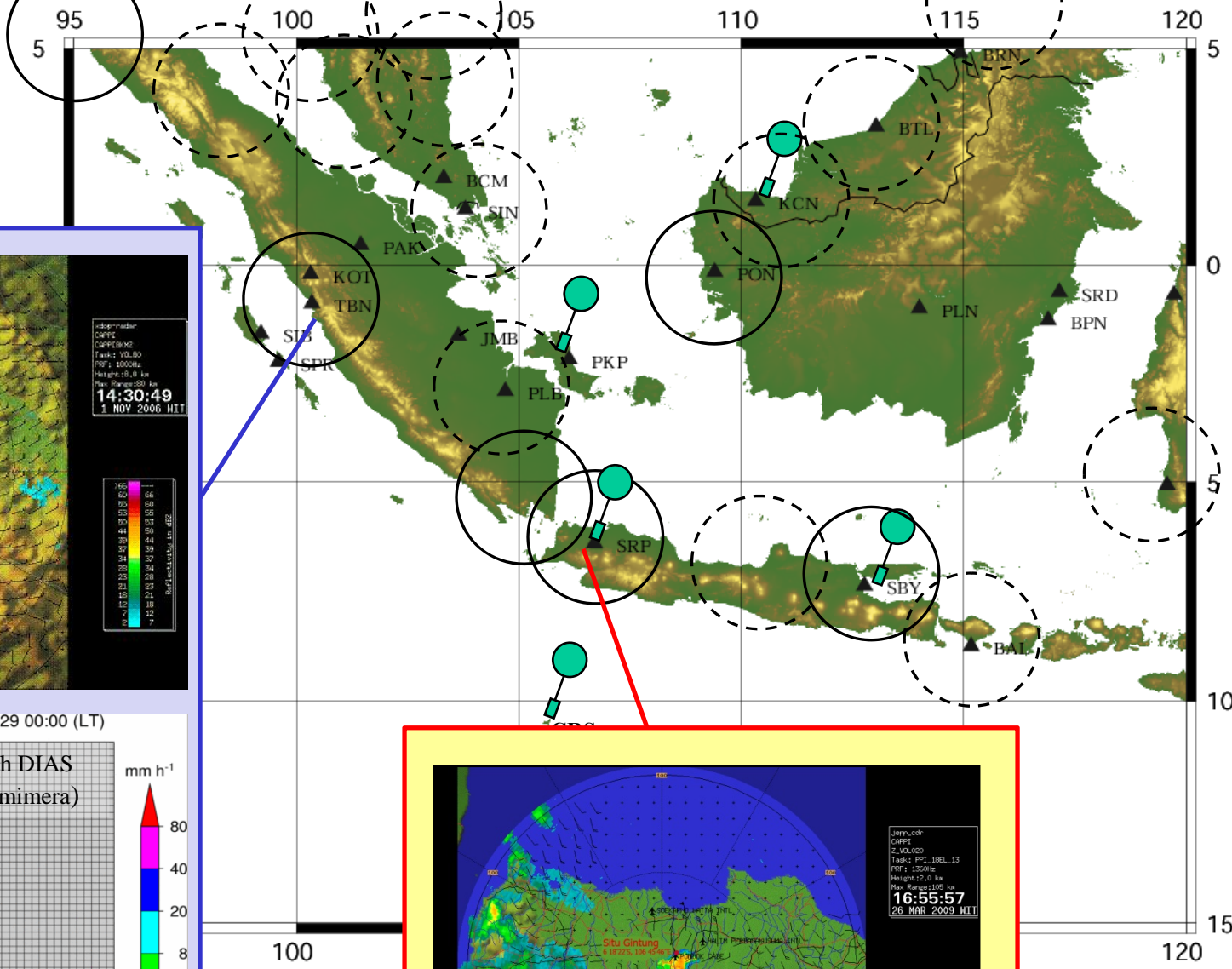
Biak WPR



Palau XDR+WPR
JAMSTEC

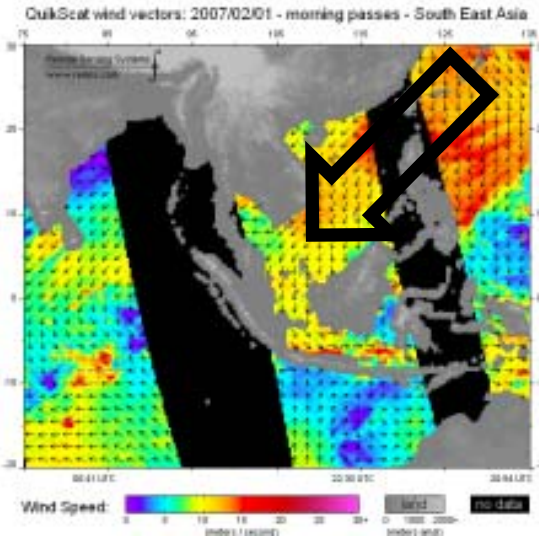
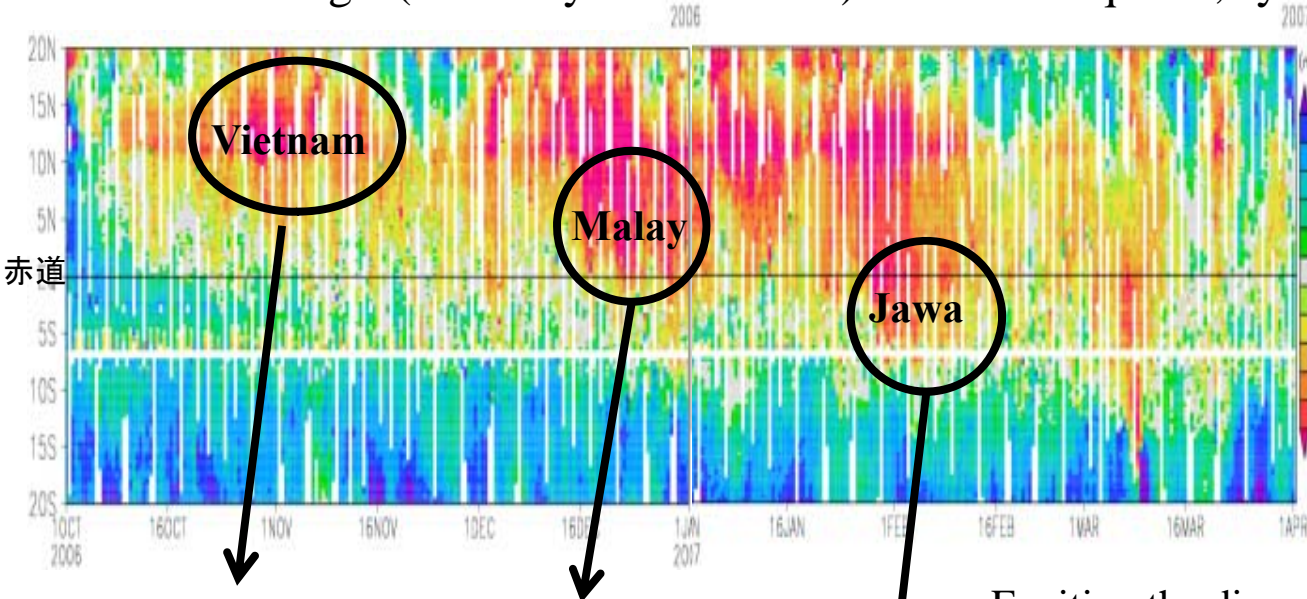


Rainfall monitoring and archiving



SE-Asian floods by cross-equatorial monsoon

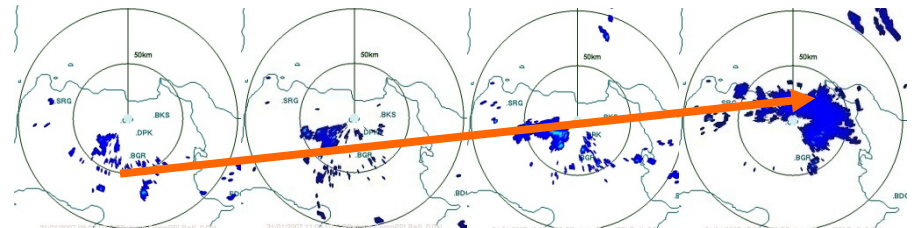
“Cold surge”(northerly from Siberia) across the equator, synchronizing with ISV



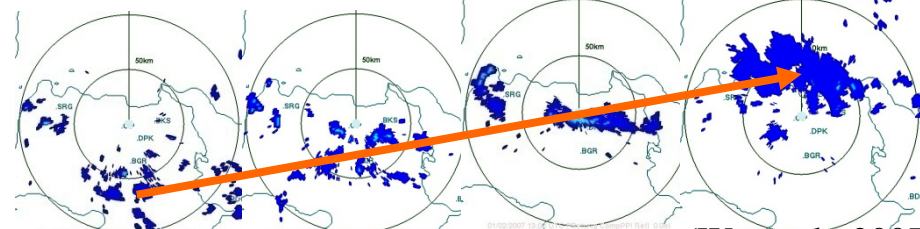
Jakarta flood
(Jan-Feb 2007)
>100 psns killed,
>300 thousand psns
suffered

Exciting the diurnal-cycle precipitating clouds

31 16 LT 31 18 LT 31 20 LT 01 00 LT



01 16 LT 01 19 LT 01 20 LT 02 03 LT

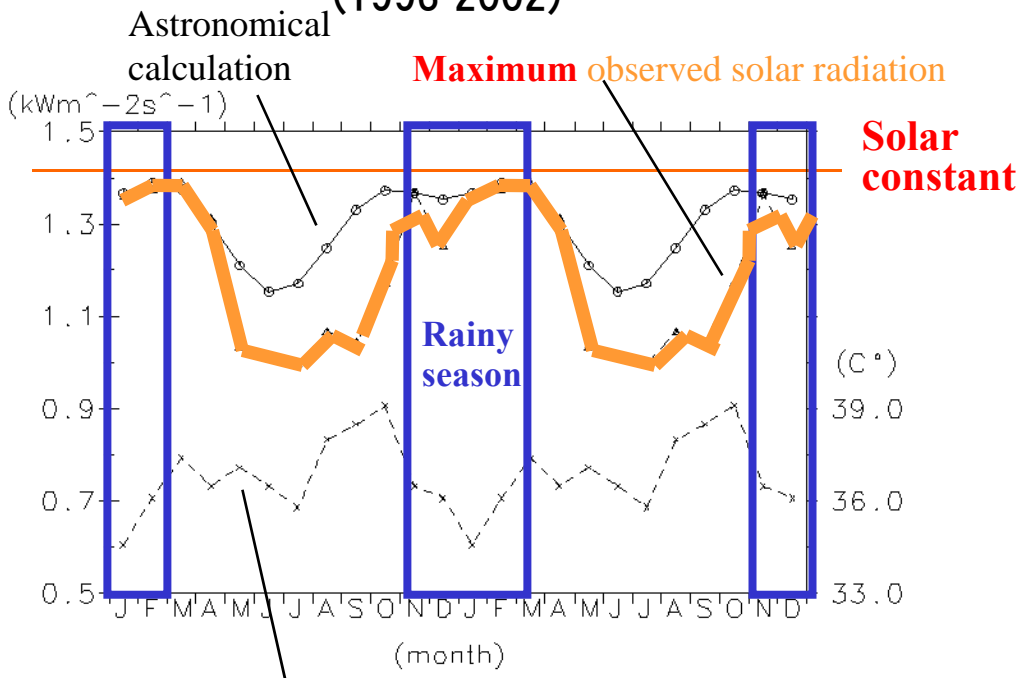


(Wu et al., 2007)

Mechanism of Seasonal and Diurnal Cycles

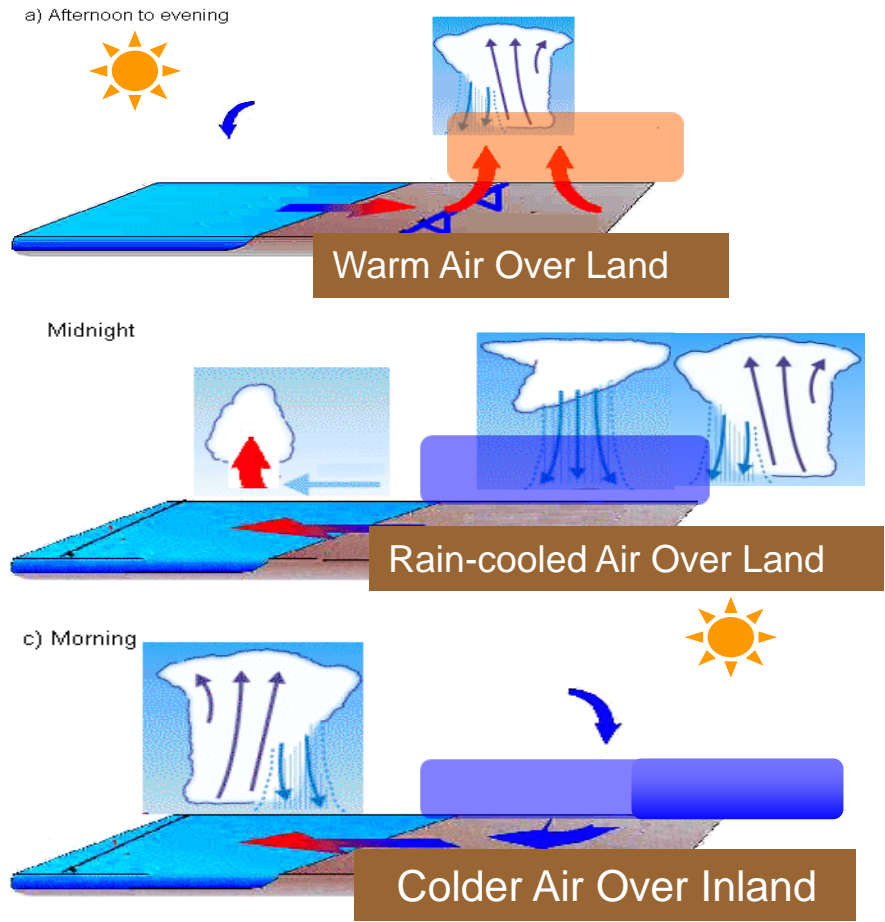
**Strong solar radiation
in the morning of
“rainy season”**

**Solar radiation at Serpong 11-13LT
(1993-2002)**



(Araki et al., 2007)

**Sea-Land Breeze circulation
with cloud “sprinkler” effect**



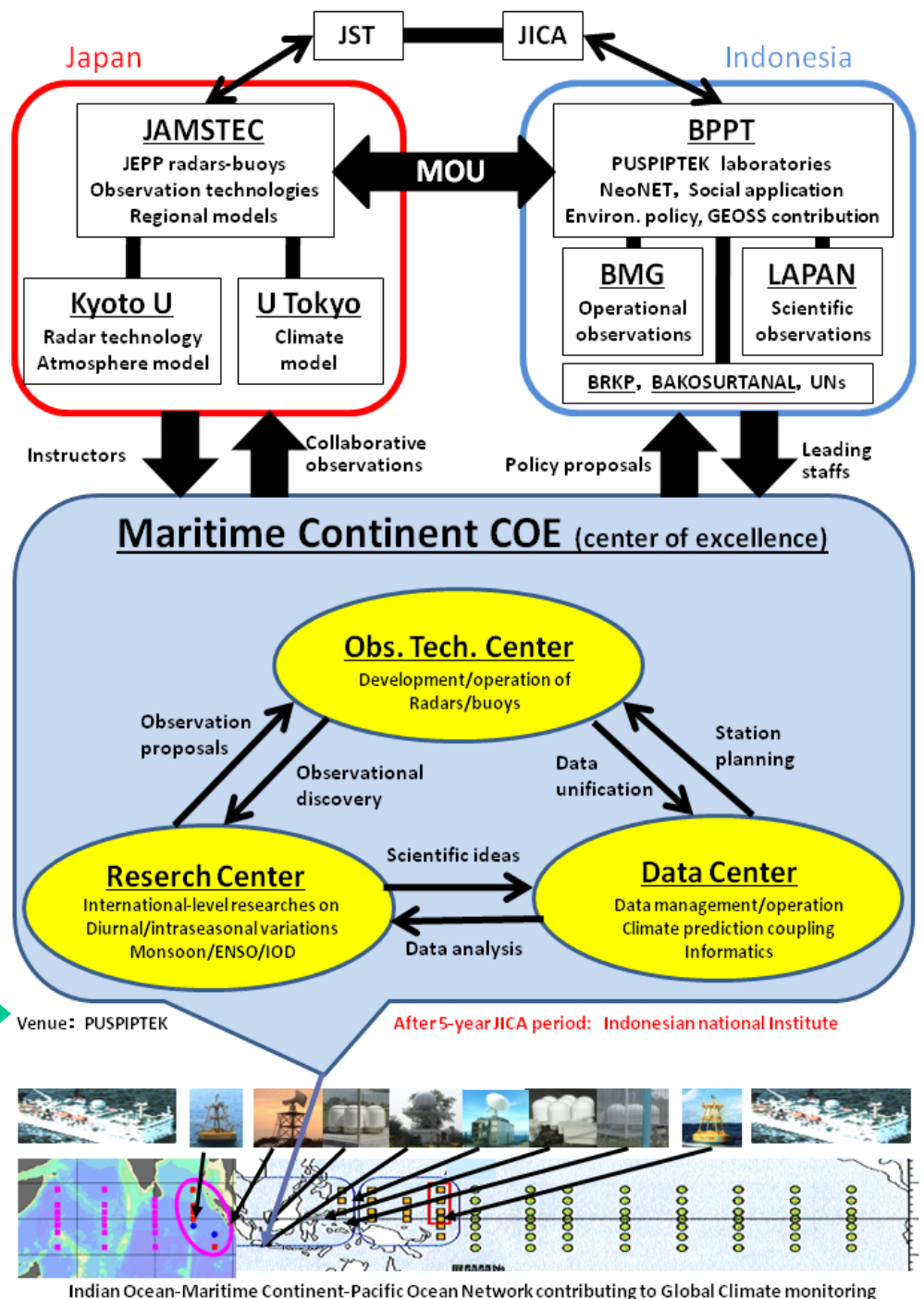
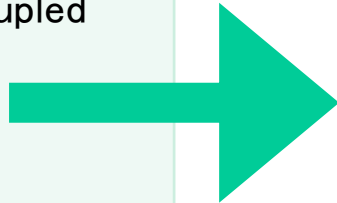
(Wu, Yamanaka & Matsumoto., 2008)

Post-HARIMAU viewpoints

- Already done until FY2008
- 2006: PUSPIPTEK lab. building HARIMAU Workshop
 - 2007: GEOSS EA selected at Cape Town GEOS
 - 2008: IOMICS Workshop NeoNET comm. office



- FY2009 and after
- HARIMAU-NeoNET coupled
 - JST-JICA proposal
 - GEOSS-AP 2010 in Bali
 - HARIMAU Symposium



**Decision-making
support system
for the adaptation
in water-related
areas under
climate change**

**Taikan OKI
IIS, Univ. of Tokyo**

**S&T Cooperation with
Developing Countries on
Global Issues**





Target of the project



Climate Change is the major security issue for human beings for both developing and developed countries.

Human Activity is one of the major factors threatening the sustainable development of the world particularly by the demographic & economic growths in Asia and Africa.

Earth observation considering climate change

Natural-anthropogenic model for Hydrology and Water Resources Assessments

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

Developing the National Strategic Plan in Water Sectors for the Adaptation Measures under Climate Change

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



Research Framework (Thai-Japan)



Chulalongkorn Univ.
チュラロンコン大学

Khonkaen University
コンケン大学

Thai Meteorology Dept.
タイ気象局

King Mongkut's IT Thonburi
キングモンクット工科大学

Royal Forest Dept.
タイ王立森林局

Royal Irrigation Dept.
タイ王立灌漑局

Thammasart Univ.
タマサート大学

Mahanakorn Univ. of Tech.
マハナコーン工科大学

ChiangMai Univ.
チェンマイ大学

Kasetsert University / カセサート大学

Inst. of Industrial Sci., the Univ. of Tokyo / 東京大学生産研

Kyoto Univ. / 京都大

Univ. of Tokyo / 東京大

National Inst. for Agro-
Environmental Sciences
農業環境技術研究所

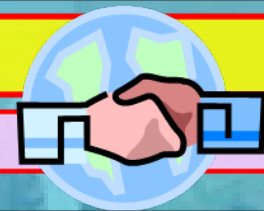
Tohoku Univ. / 東北大

Tokyo Inst. Tech. / 東工大

Hokkaido Univ. / 北大

Kyoto Univ. / 京都大

National Inst. for
Environmental Studies
国立環境研



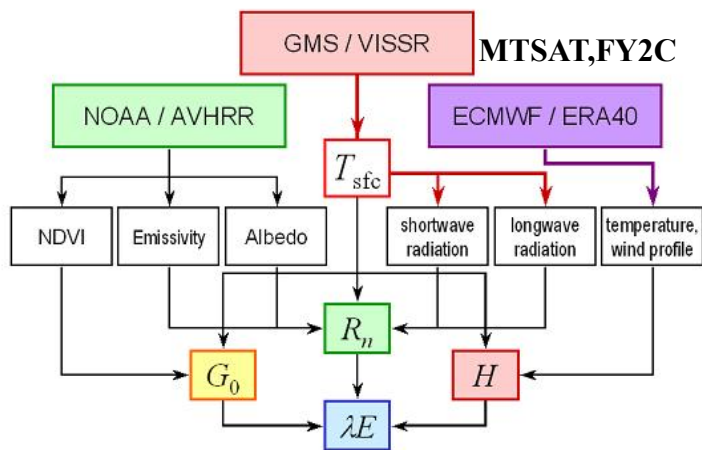
Earth observation
considering
climate change

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

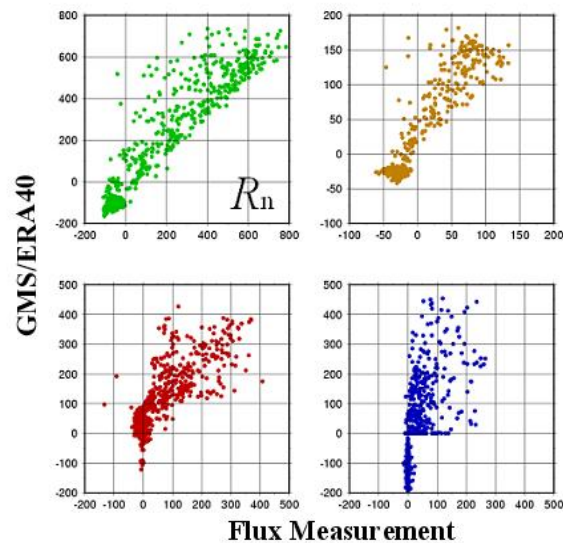
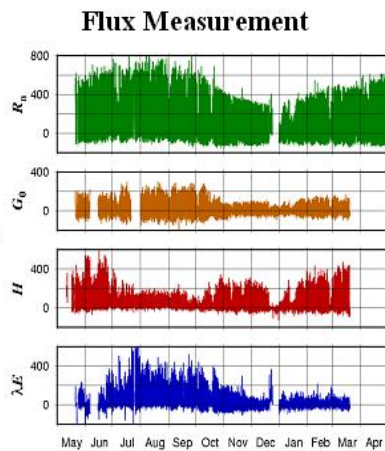
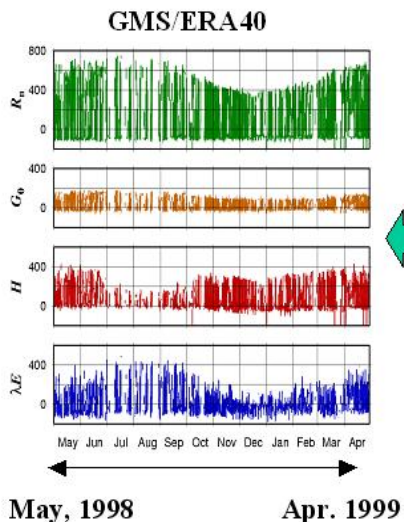
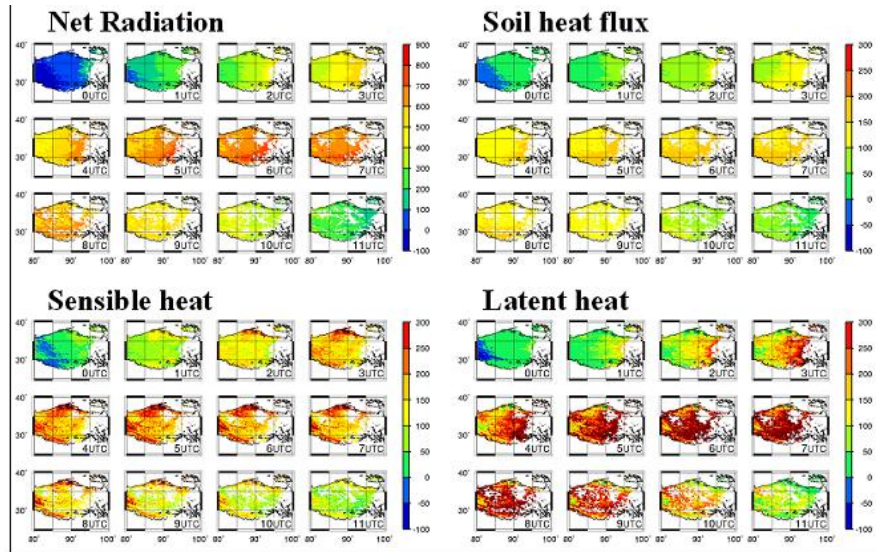
Natural-anthropogenic
model for Hydrology
and Water Resources
Assessments

衛星データと地上観測を融合した研究成果

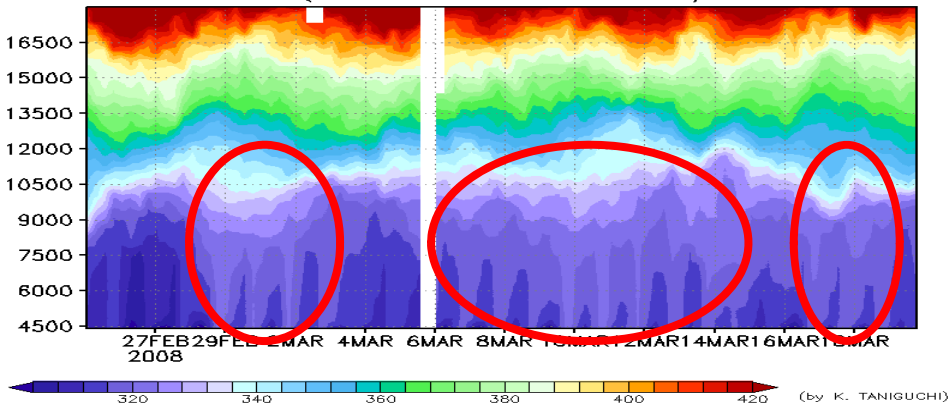
SEBS with GMS + ERA40



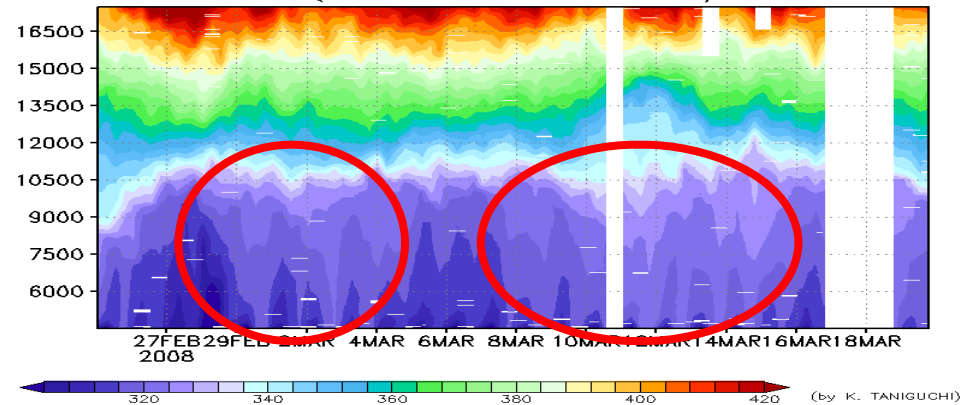
R_n : net radiation, G_0 : soil heat flux, H : sensible heat flux, λE : latent heat flux



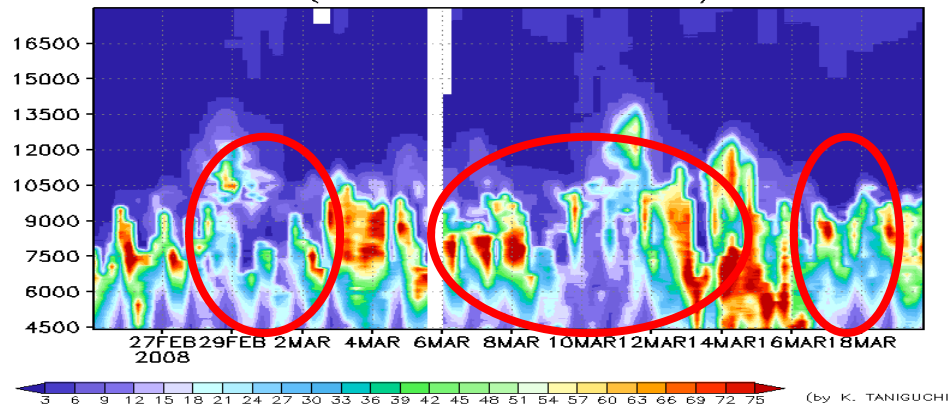
Temporal Variation of PT at Gaize
(01Z25Feb2008–19Z19Mar2008)



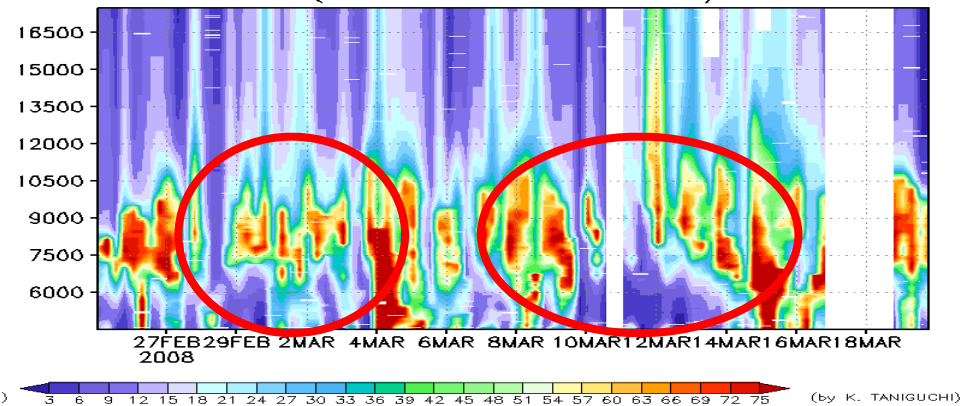
Temporal Variation of PT at Naqu
(01Z25Feb2008–19Z19Mar2008)



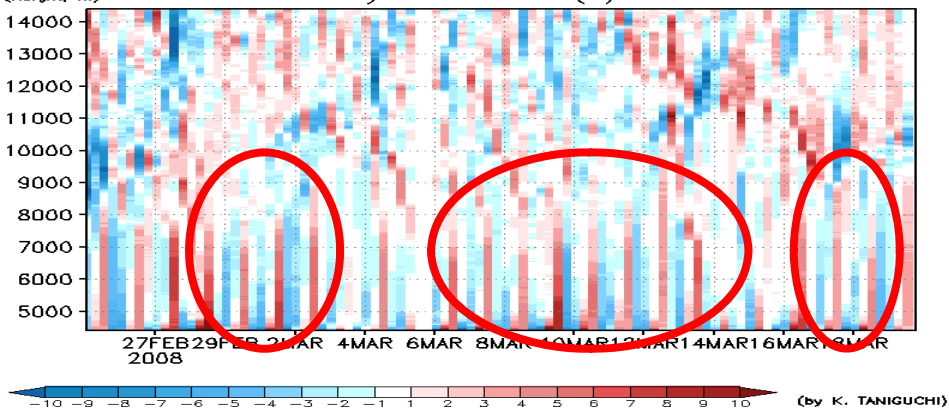
Temporal Variation of Relative Humidity at Gaize
(01Z25Feb2008–19Z19Mar2008)



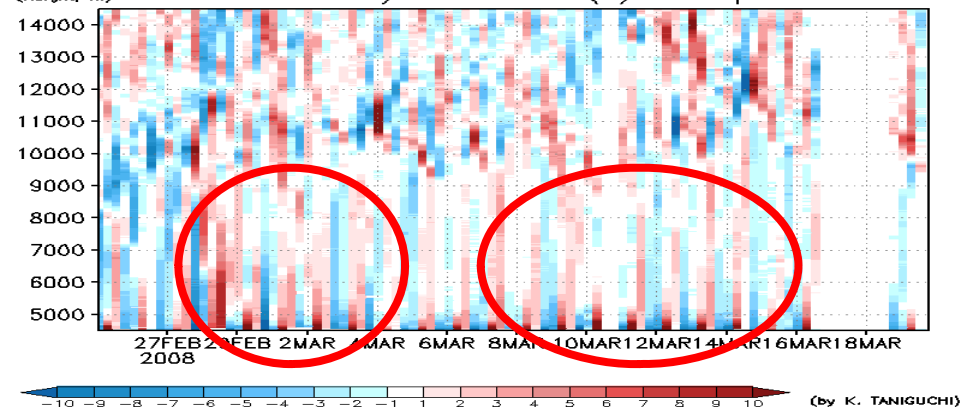
Temporal Variation of Relative Humidity at Naqu
(01Z25Feb2008–19Z19Mar2008)

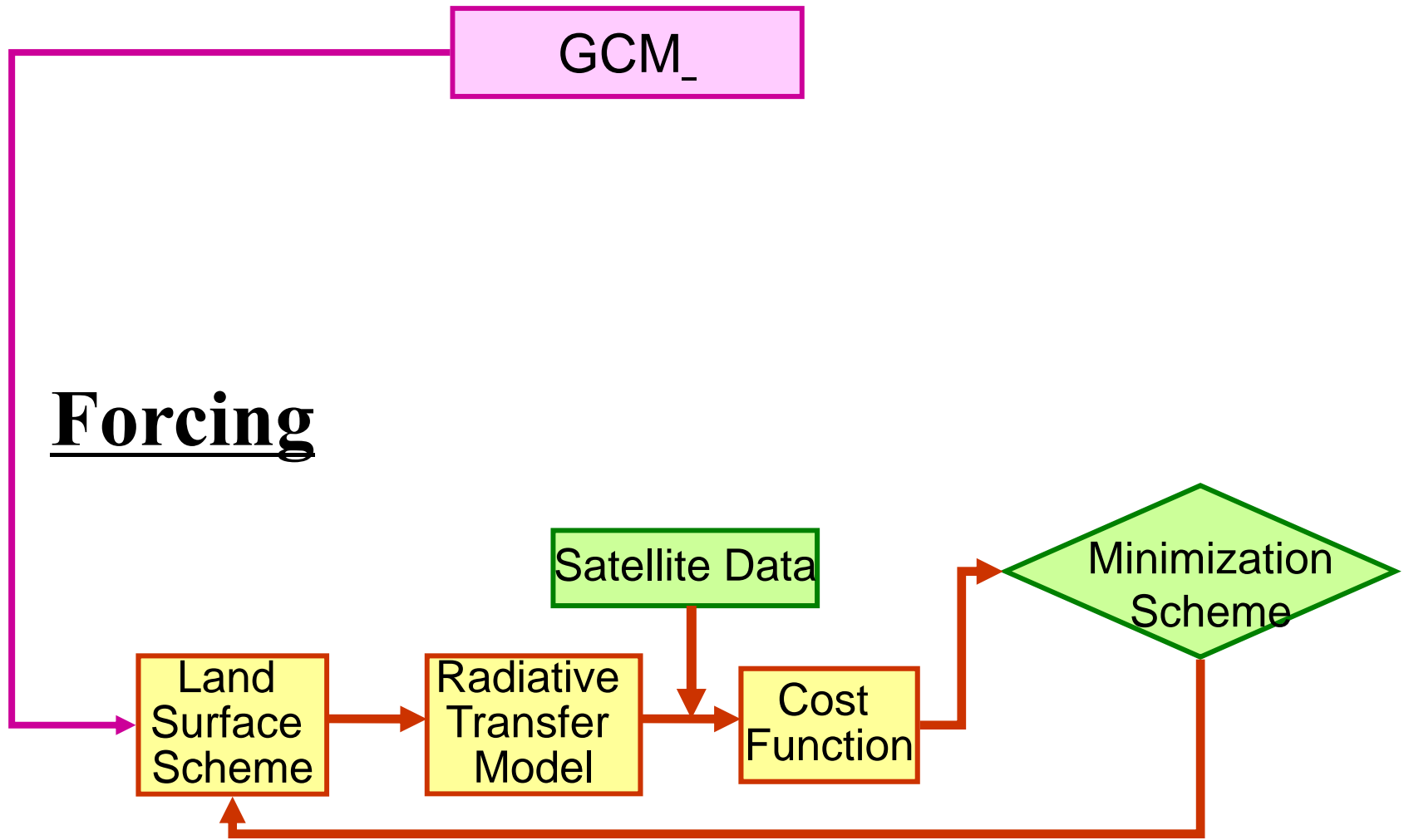


6-Hourly PT Increase (K) at Gaize



6-Hourly PT Increase (K) at Naqu





Forcing

Satellite Data

Land Surface Scheme

Radiative Transfer Model

Cost Function

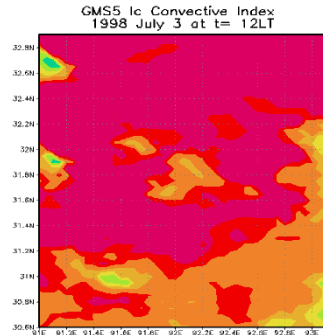
Minimization Scheme

LDAS

Improvement of Land surface assimilation (T. Koike)

Land Surface Data Assimilation Effect on Precipitation over the Tibet by T. Koike et al.

Convection

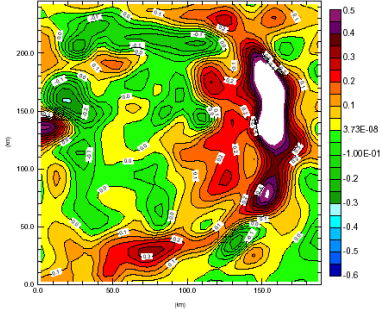


Satellite IR

Boundary and initial atmospheric condition are from Game Reanalysis ver 1.5

12:00LT Fri 3 Jul 1998 t=21600.0 s (6:00:00)

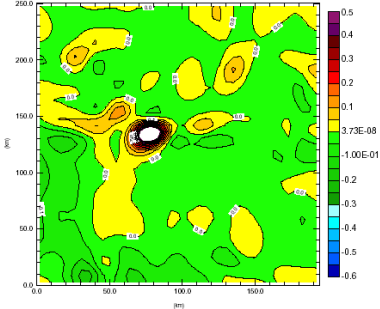
Grid level=17



Boundary and initial atmospheric condition are from Game Reanalysis ver 1.5

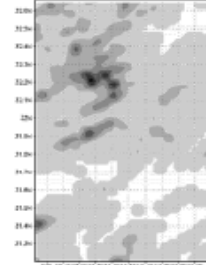
12:00LT Fri 3 Jul 1998 t=21600.0 s (6:00:00)

Grid level=17



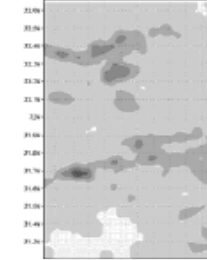
9-15

Total precipitation
Radar product - 1998 July 13 9-15LT



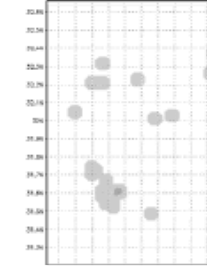
16-22

Total precipitation
Radar product - 1998 July 13 16-22LT



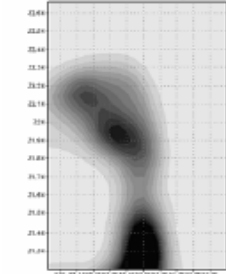
23-04

Total precipitation
Radar product - 1998 July 13 23-04LT

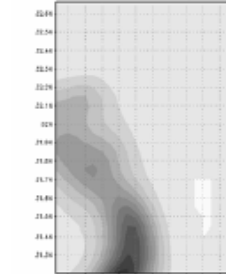


Radar Obs. (1998IOP)

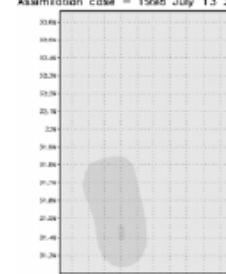
Total precipitation
Assimilation case - 1998 July 13 9-15LT



Total precipitation
Assimilation case - 1998 July 13 16-22LT

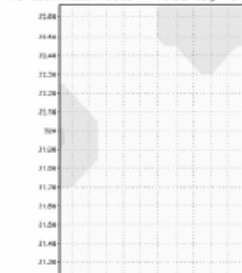


Total precipitation
Assimilation case - 1998 July 13 23-04LT

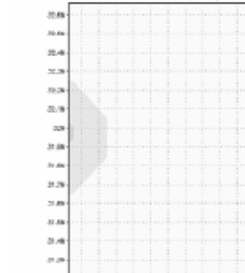


Data assimilation ON↑ OFF↓

Total precipitation
No assimilation case - 1998 July 13 9-15LT



Total precipitation
No assimilation case - 1998 July 13 16-22LT



Total precipitation
No assimilation case - 1998 July 13 23-04LT

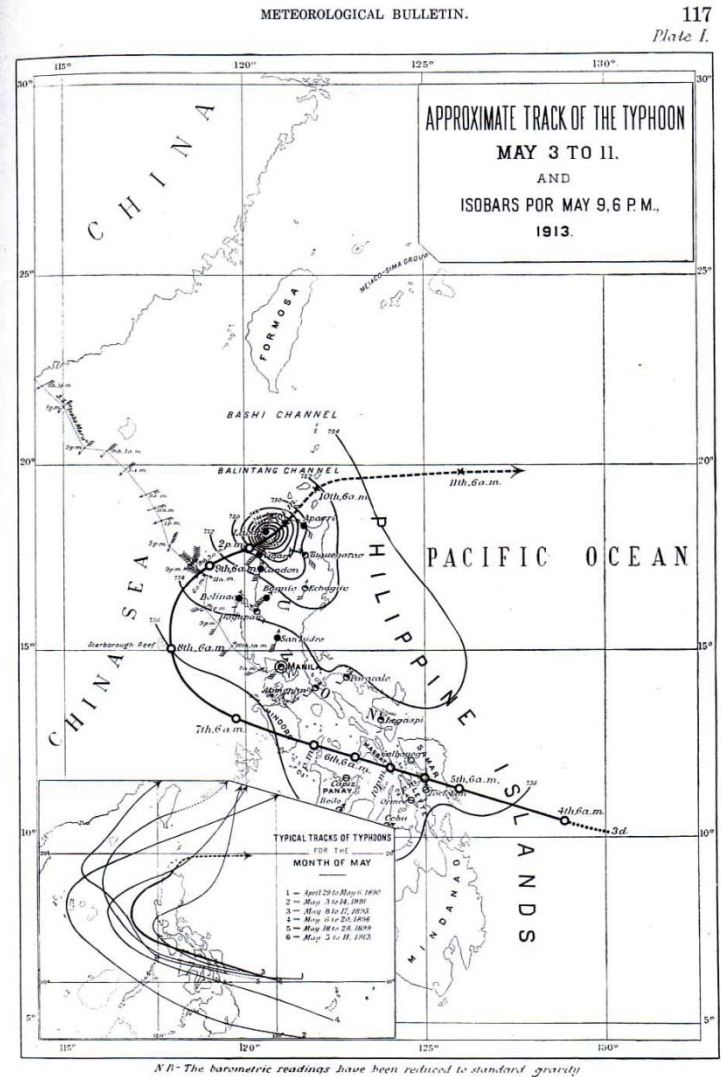


Monthly Bulletins of
Philippines Weather Bureau
(1901-1940) stored in
Hamilton Library
at the University of Hawaii

300 stations observation data
Typhoon tracks over the WNP

-> Typhoon courses are all
digitized, while rainfall/SLP
etc. data have been digitized at
approx. 40 stations.

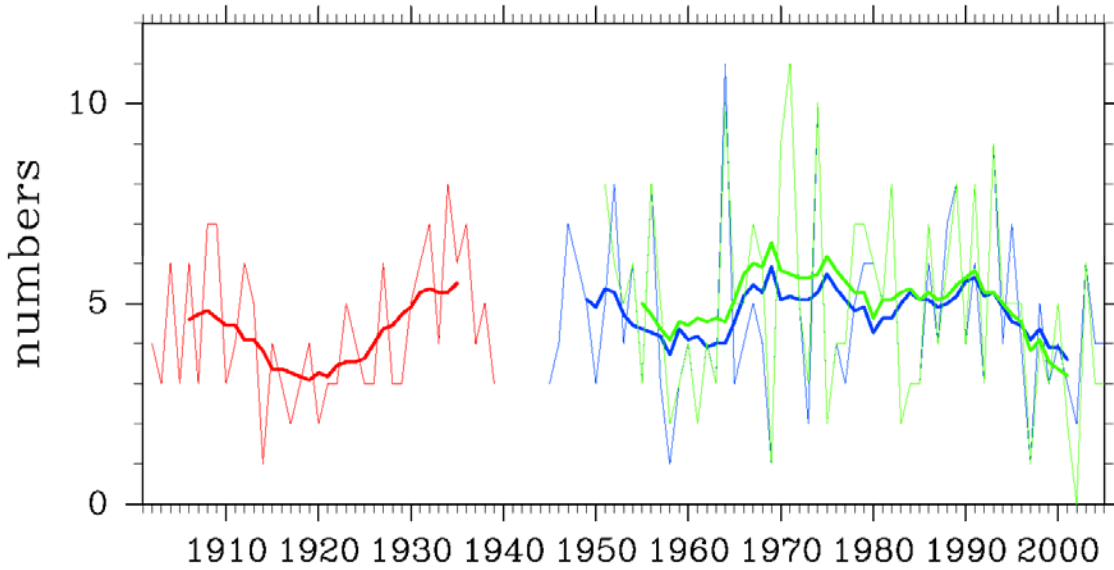
(Kubota & Chan, 2009:GRL)



TC track and isobar map on May 1913

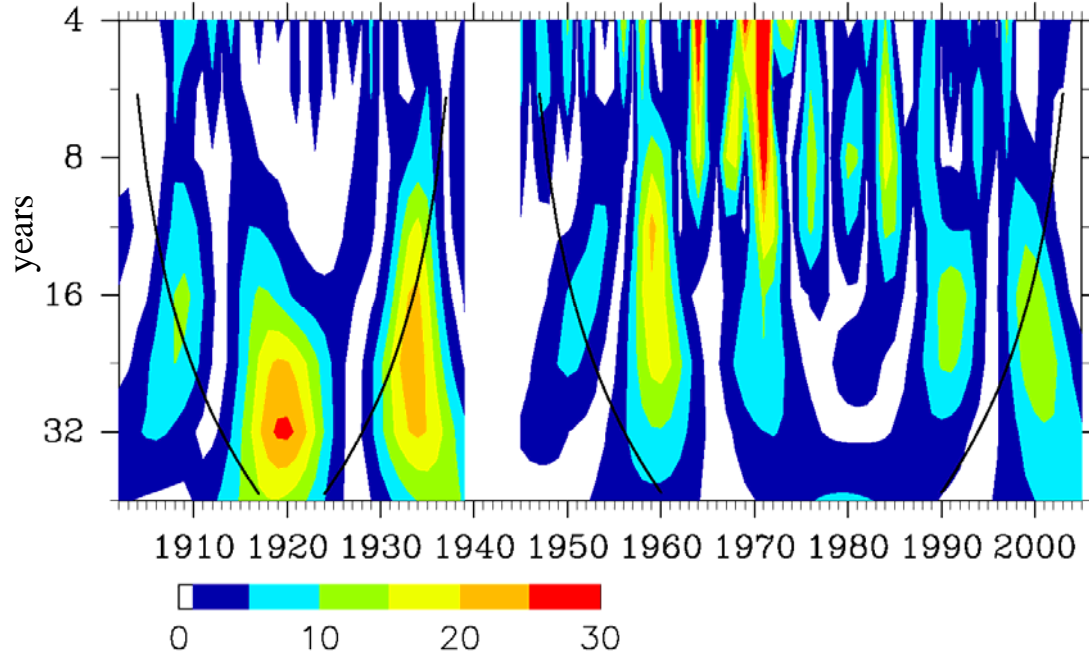
100 years Tropical Storms numbers landfall at Philippines

1902–2005 TS Philippines landfall



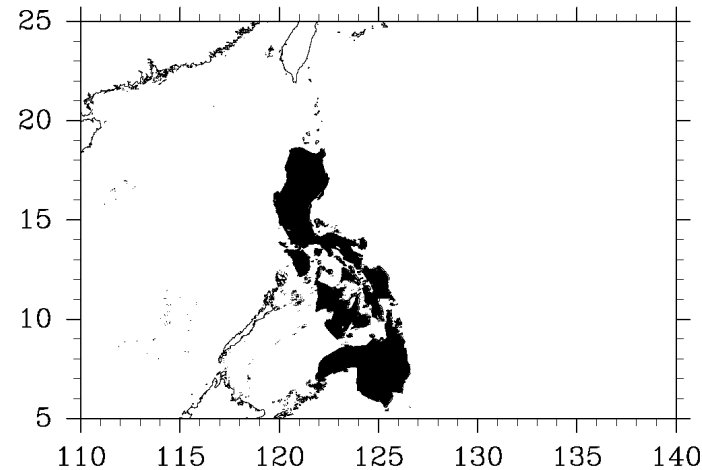
— MBP
— JTWC
— JMA

:10 years running mea



Wavelet analysis

Philippines landfall area



Meeting Schedule in 2009 / 2010

- Nov. 30-Dec. 1 , 2009: The 6th AMY Workshop at Kunming (?), China, in collaboration with CEOP monsoon.
- Mar., 2010: GEOS/AM meeting at Bali(?), Indonesia
- Jul. 5-9, 2010: AOGS-7 at Hyderabad, India.
AMY Workshop will also be organized.
Modeling WS in collaboration with CLIVAR/AMMP, YOTC, APCC is also planned.

Summary

- Data management of IOP is a key issue for the success including collaboration with CLIVAR/AMMP, YOTC etc, and also contributing to CEOP data itself.
- More researches on regional water and energy cycle are needed.
- Contribution to the synthesis article:
 - Multi-scale interactions in Asian monsoon, in particular, during extreme events
 - Role of orography on monsoon
 - Improvement of in-situ observations/high resolution precipitation data in monsoon Asia
 - Application for flood prediction