Monsoon Synoptic Overview of YOTC Period - AMY

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

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

YOTC IPM at Honolulu, Hi USA, July 13, 2009

Fujikawa et al. (2008): JMA

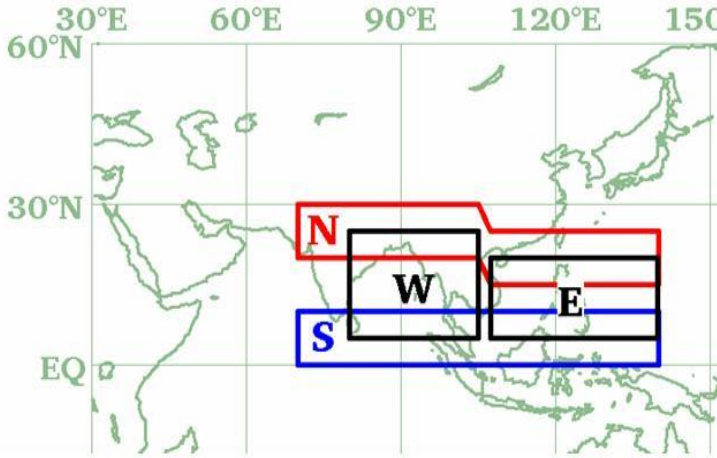
Fig. 1 The definitions of each SAMOIs

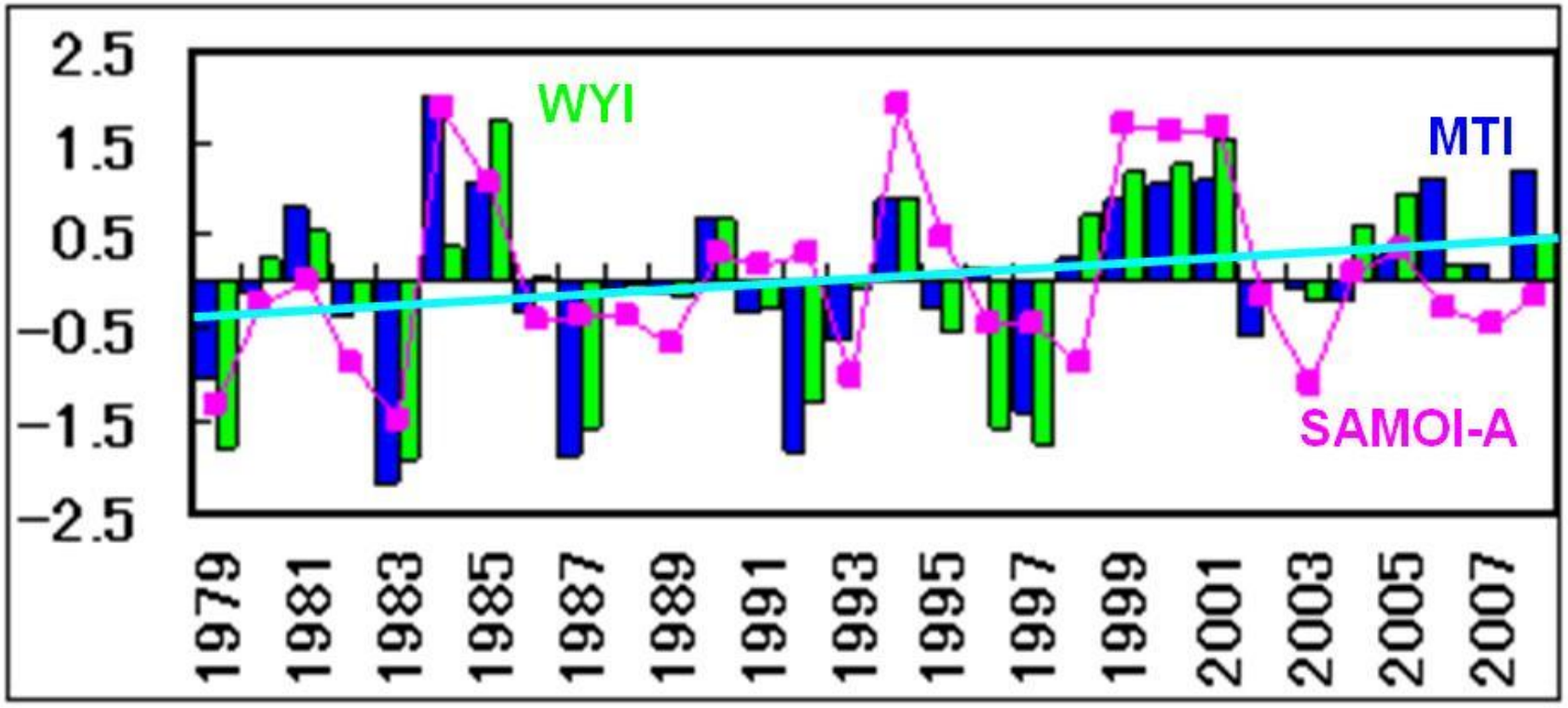
Each box is based on the EOF analysis for OLR.

SAMOI-A = (-1) x (OLR[W] + OLR[E])

SAMOI-N = (-1) x (OLR[S] – OLR[N])

SAMOI-W = (-1) x (OLR[E] – OLR[W])





WYI : Zonal wind shear index (Webster and Yang, 1992)

MTI : Meridional Thickness Index (Kawamura, 1998)

Summer Monsoon in 2008 (Fujikawa et al., 2008)

The total activity of Asian Summer Monsoon was near normal (SAMOI-A was -0.2). However, anti-cyclonic circulation was dominant from the Bay of Bengal to the Philippines in the lower troposphere. As a result, convection was suppressed around the Philippines, while remarkably enhanced in the tropical western Indian Ocean

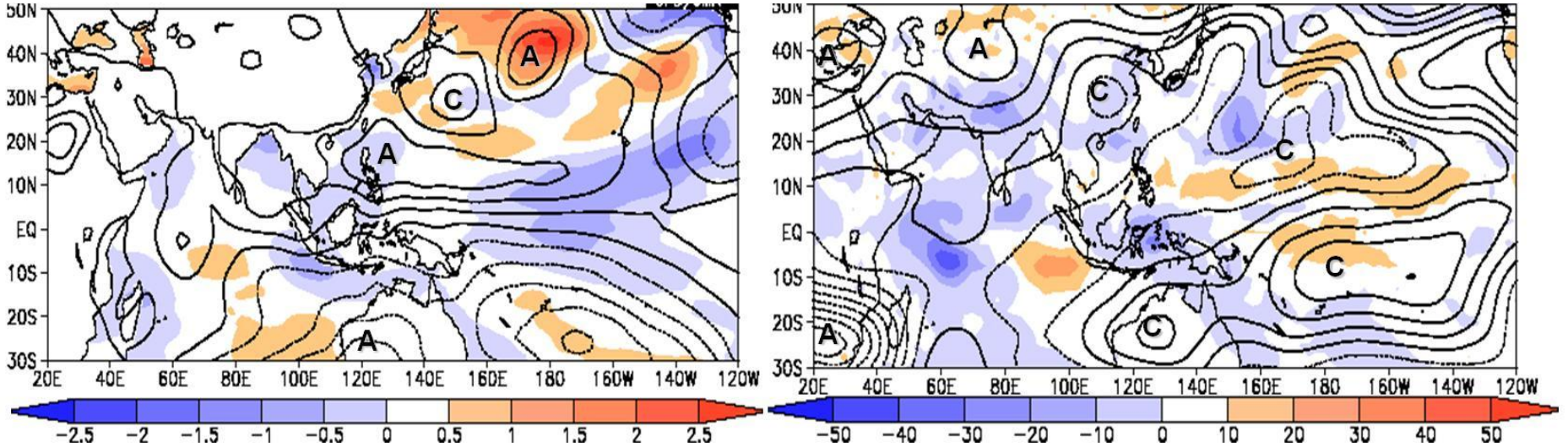


Fig. 6 JJA mean anomalies in 2008

Left : SST anomalies (color shade) and 925 hPa stream function anomalies (contour)
Right: OLR anomalies (color shade) and 200 hPa stream function anomalies (contour)
'A' and 'C' indicate the center of anti-cyclonic and cyclonic circulation anomalies, respectively.

Overview of Asian Summer monsoon in 2008

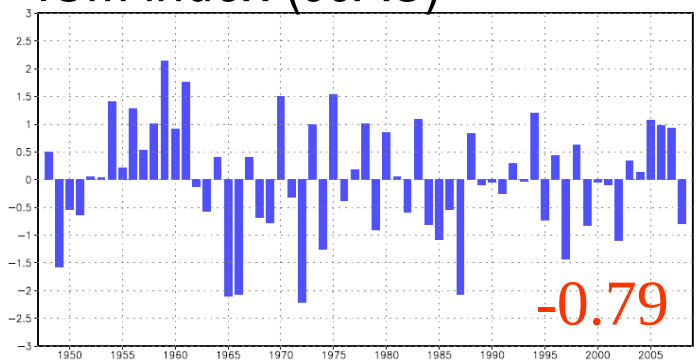
(by Dr. Yoshiyuki Kajikawa, IPRC, Univ. Hawaii)

Both (seasonal JJA mean) ISM and WNPM in 2008 was weaker than normal !!

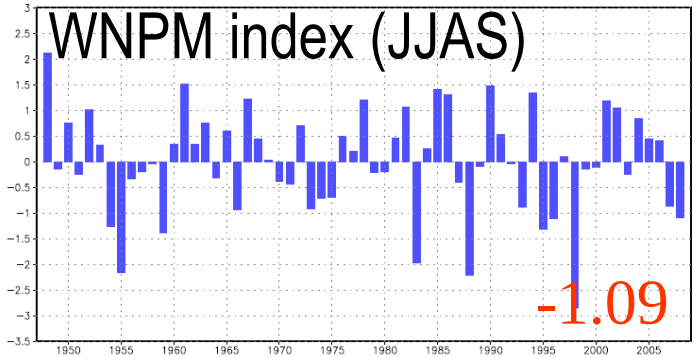
Increasing Rainfall over N-India with strengthened Somali Jet …

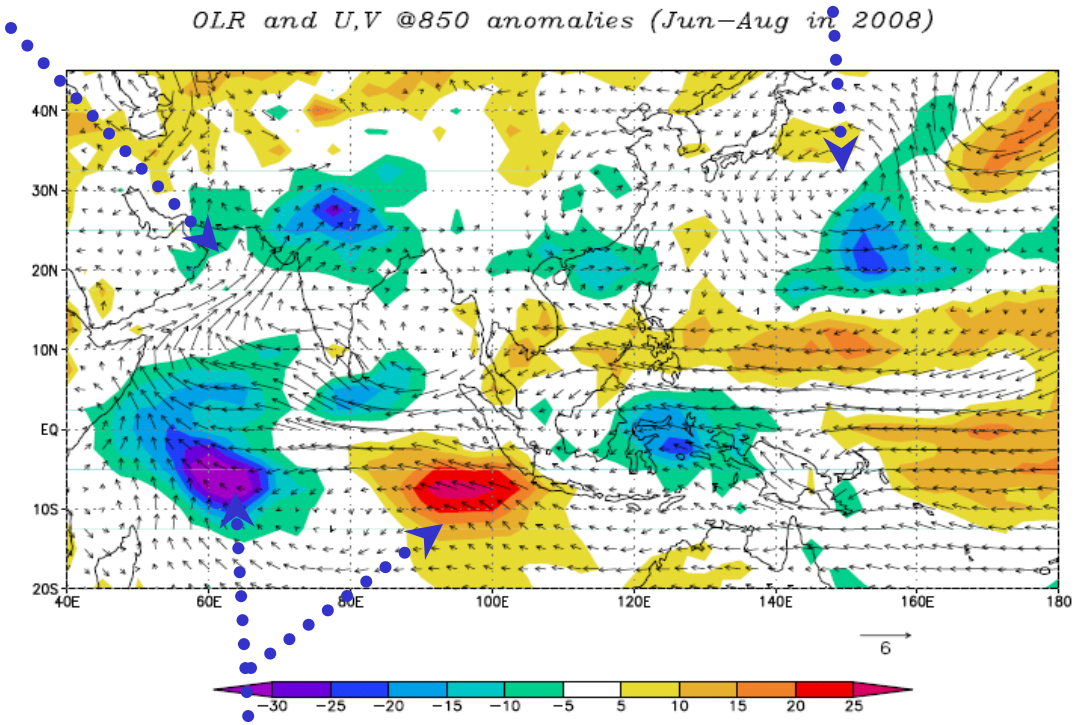
Weakening of subtropical High

ISM index (JJAS)



WNPM index (JJAS)



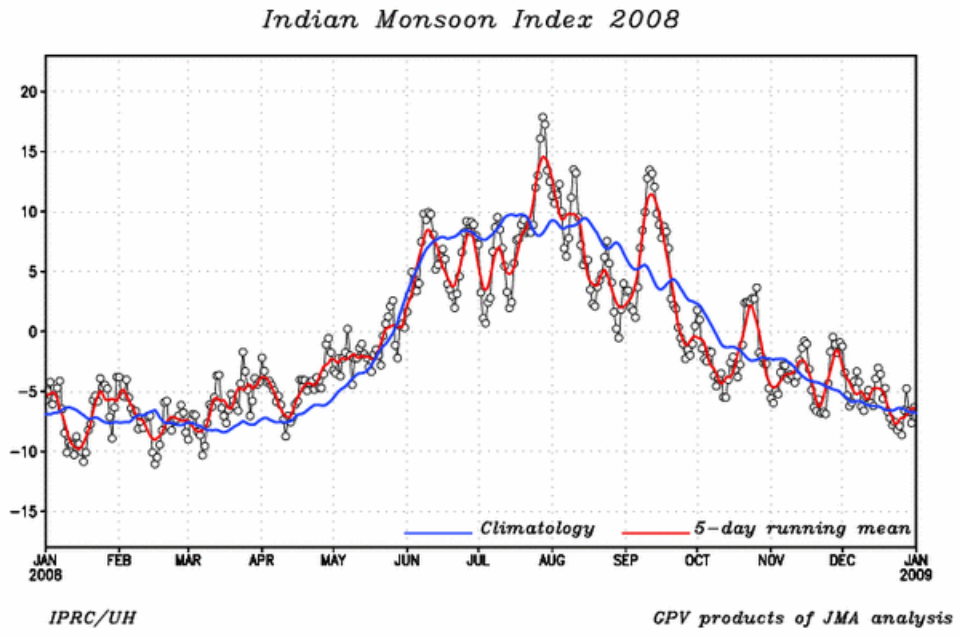


Dipole pattern of convection anomalies

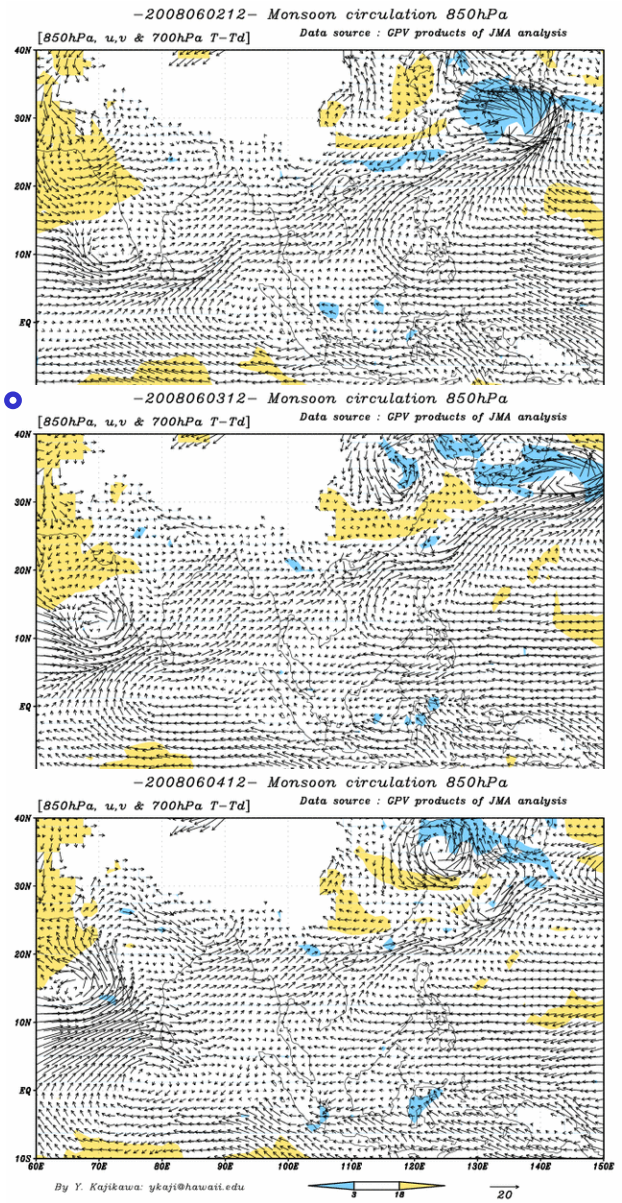
Overview of Asian Summer monsoon in 2008
(by Dr. Yoshiyuki Kajikawa, IPRC, Univ. Hawaii)

1. Indian summer monsoon

ISM index = U850(40E-80E,5N-15N)-
U850(70E-90E,20N-30N)



Developing Onset vortex

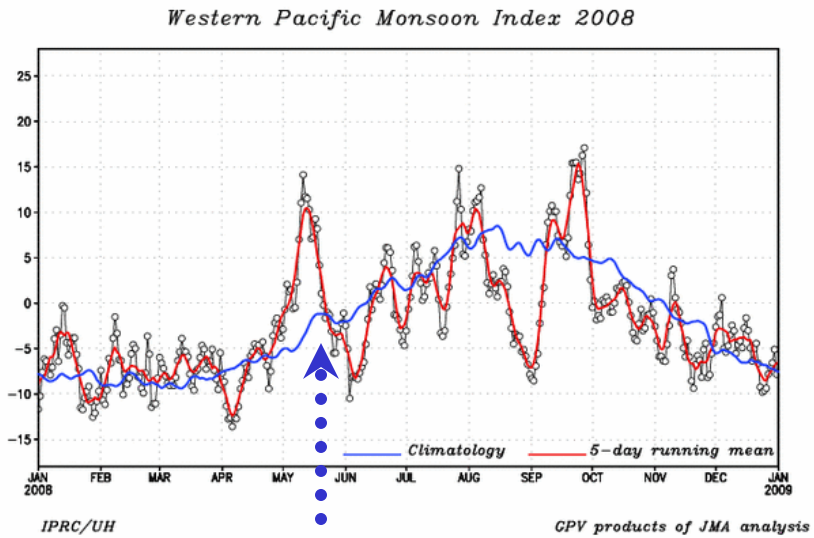


ISM onset in 2008 was clear with **onset vortex** over the Arabian Sea and the timing was quite similar to climatology, *although the ISM was relatively weaker in June and July*.

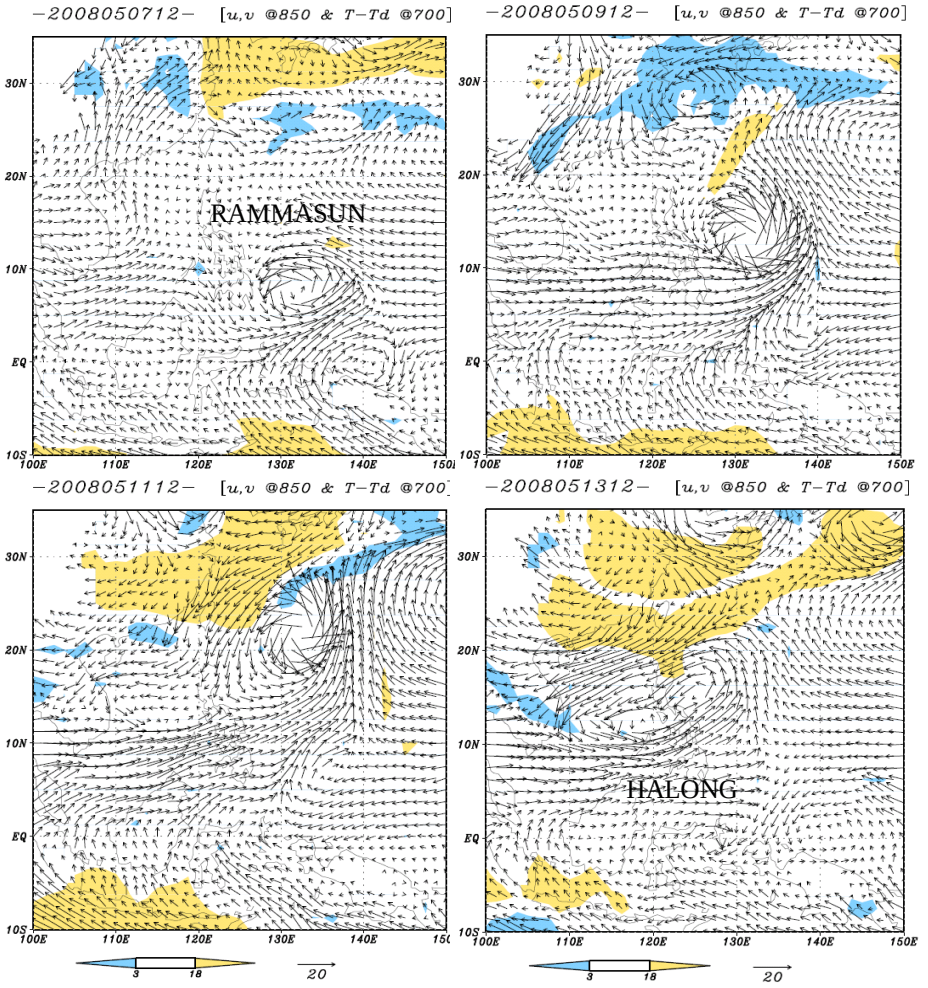
Overview of Asian Summer monsoon in 2008
(by Dr. Yoshiyuki Kajikawa, IPRC, Univ. Hawaii)

2. Western North Pacific monsoon

WNPM Index = U_{850}(100E-130E,5N-15N)-
U_{850}(110E-140E,20N-30N)



RAMMASUN (TY200802) induced the WNPM onset and HALONG (TY200804) over the SCS.



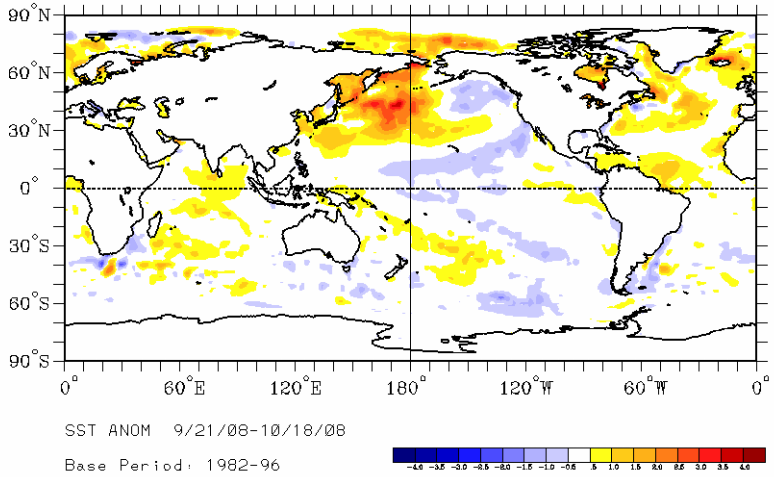
ISO in MJO time scale was overall weak in 2008.

Overview of Asian Summer monsoon in 2008

(by Dr. Yoshiyuki Kajikawa, IPRC, Univ. Hawaii)

East-West Dipole pattern of convection anomalies over the (South) Indian Ocean with easterly wind anomalies.

SST anomalies over EIO and WIO is not clear in Sep. and Oct.



9/21-10/18 mean

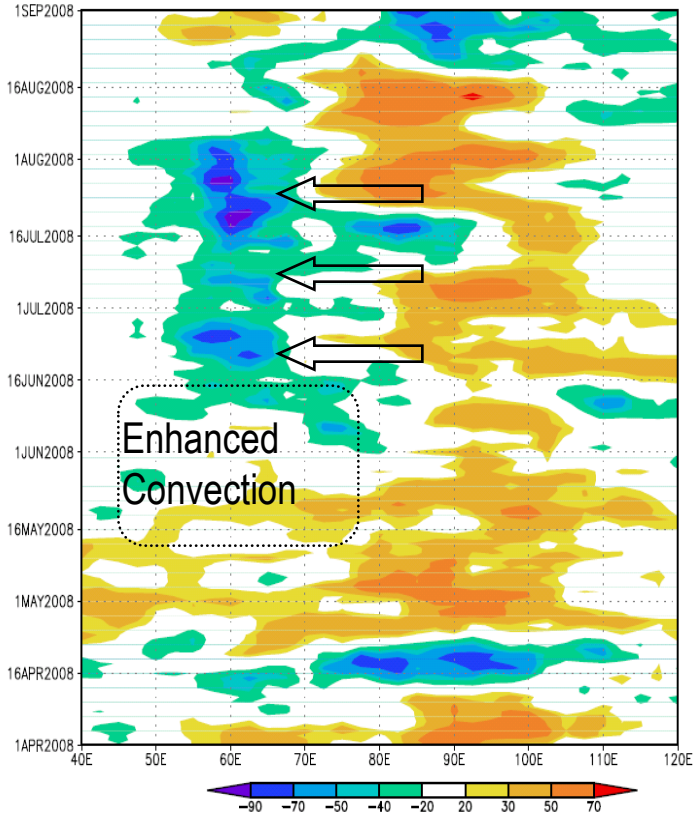
NOAA/CDC Map Room

OLR anomalies along 5 S

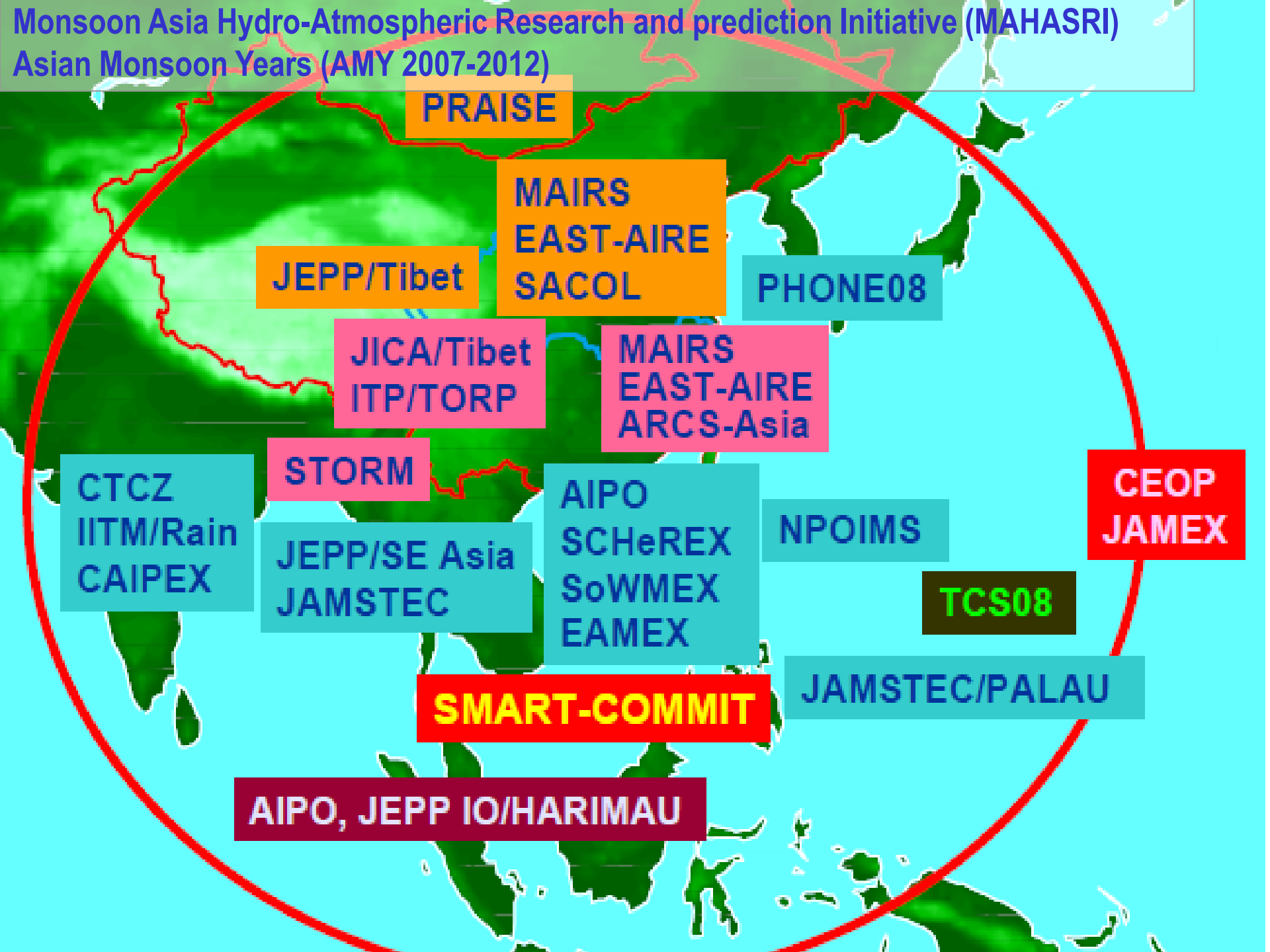
August

July

June



[Q] Why the (SST) IOD mode was not developed through boreal autumn in 2008?

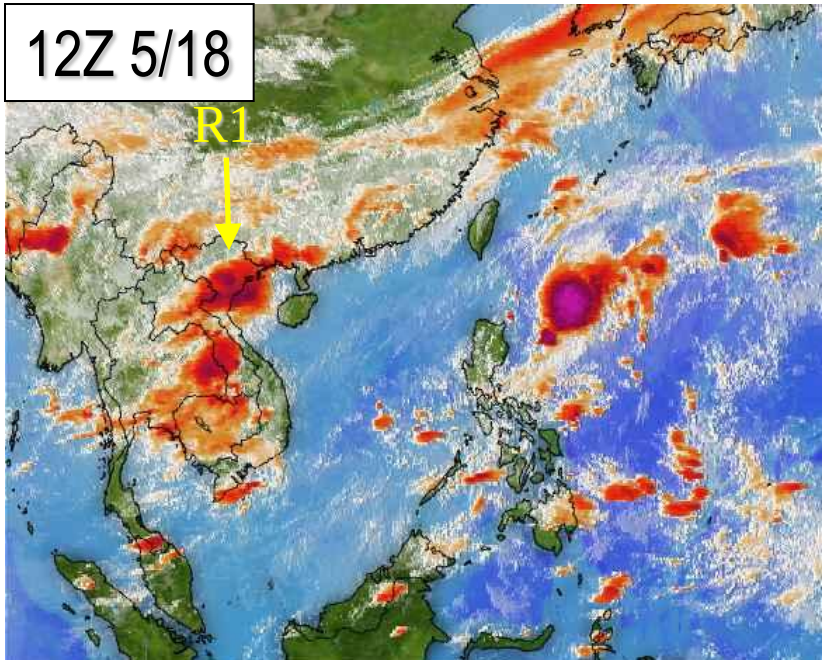

Monsoon Asia Hydro-Atmospheric Research and prediction Initiative (MAHASRI)
Asian Monsoon Years (AMY 2007-2012)
PRAISE
MAIRS
EAST-AIRE
SACOL
JEPP/Tibet
PHONE08
JICA/Tibet
ITP/TORP
MAIRS
EAST-AIRE
ARCS-Asia
STORM
CTCZ
IITM/Rain
CAIPEX
AIPO
SCHeREX
SoWMEX
EAMEX
NPOIMS
CEOP
JAMEX
JEPP/SE Asia
JAMSTEC
TCS08
SMART-COMMIT
JAMSTEC/PALAU
AIPO, JEPP IO/HARIMAU

Late Spring - Early Summer EAMEX Field Experiment

Tsing-Chang Chen and EAMEX science team

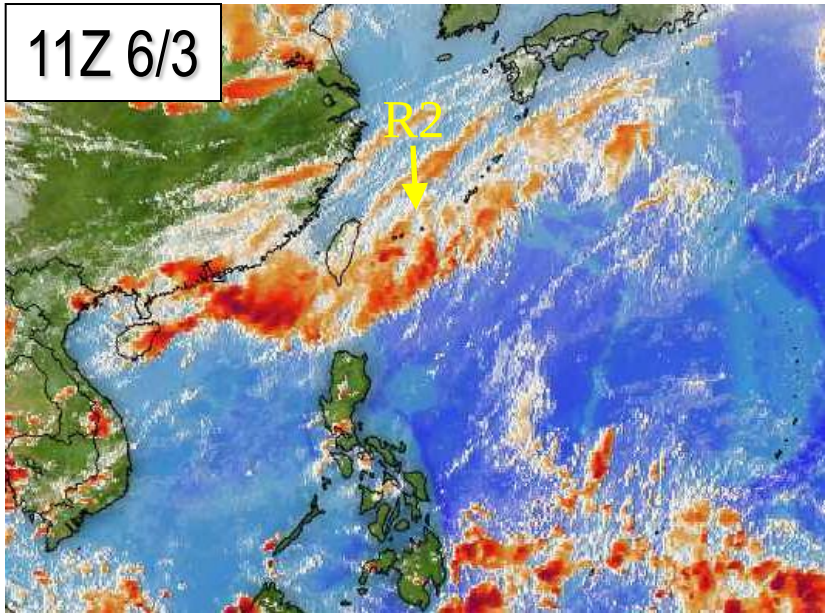
Iowa State University, Ames, IA, U.S.A

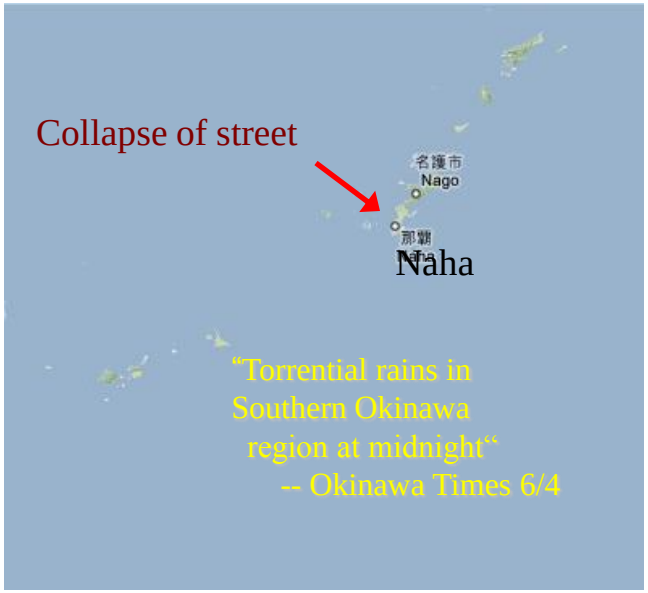
Rainstorm 1: Hanoi, Vietnam



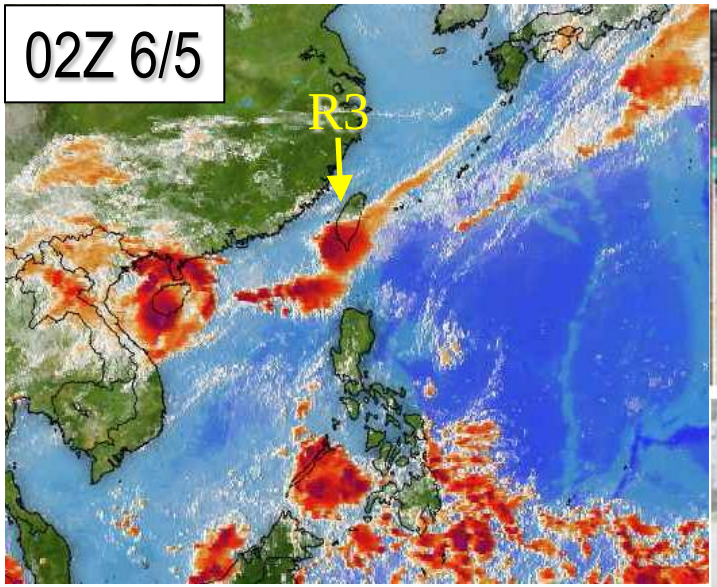
Source: Vietnam News Agency

Rainstorm 2: Okinawa, Japan



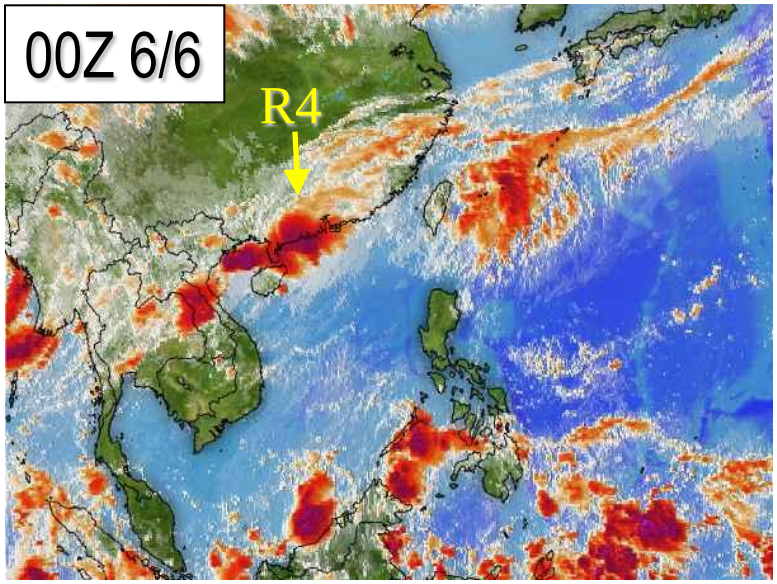


Rainstorm 3: Kaohsiung, Taiwan



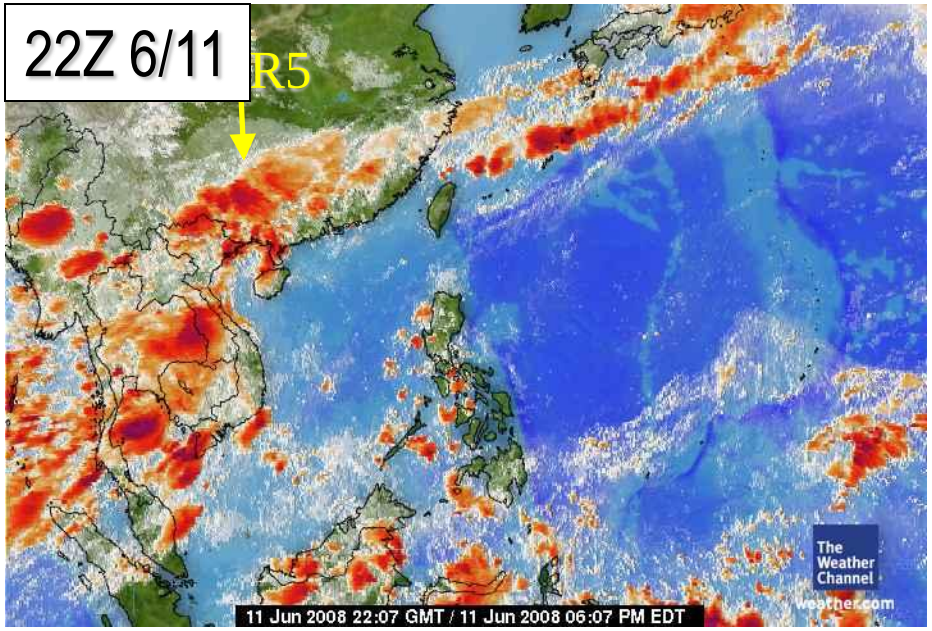
"Rainstorm caused floods and Agriculture damage in Southern Taiwan" – The Liberty Time 6/6

Rainstorm 4: Hong Kong, China



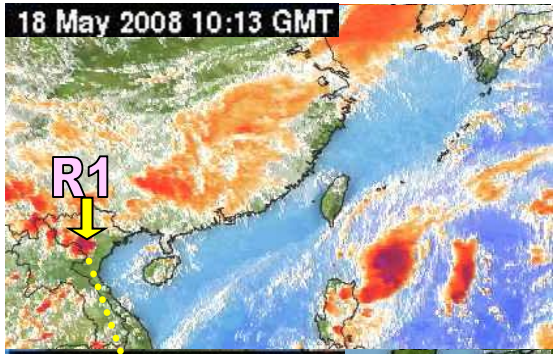
"Rainstorms which brought the heaviest downpour since records began have swamped Hong Kong, causing landslides which claimed two Lives"
– BBC news 6/7

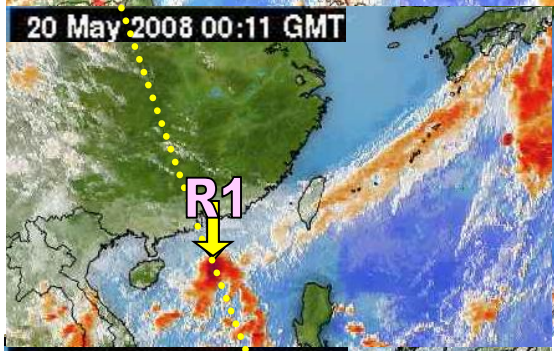
Rainstorm 5: Guangjsih, China

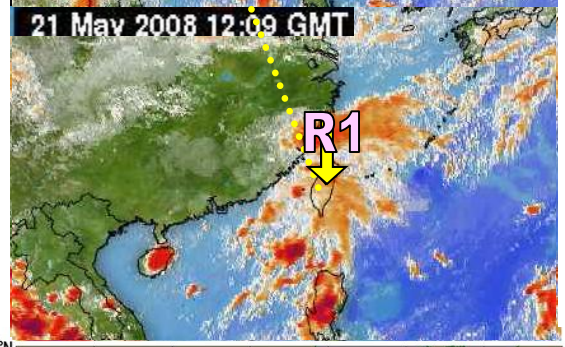


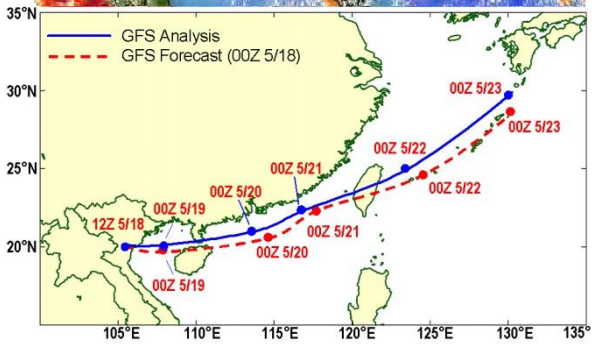
"At least 71 people are now known to have died, and 640,000 displaced, after floods and landslides triggered by days of heavy rain in southern China."
– BBC news 6/12

R1 (5/18~5/22)

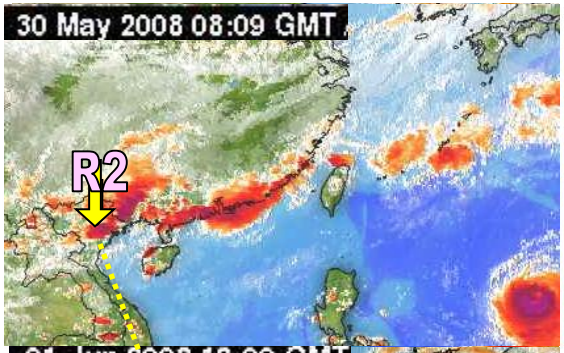


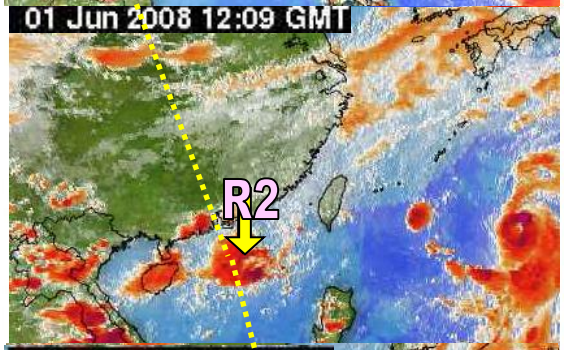


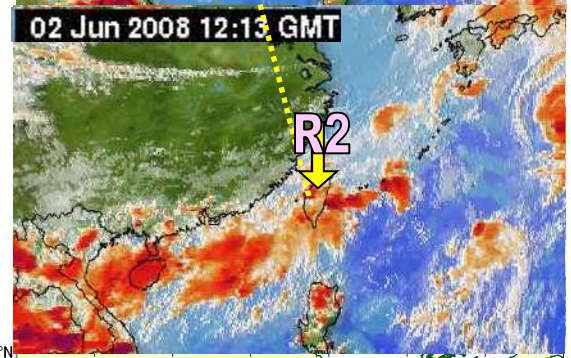


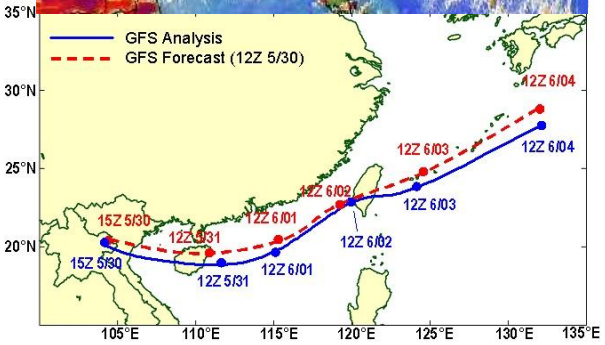


R2 (5/30~6/4)

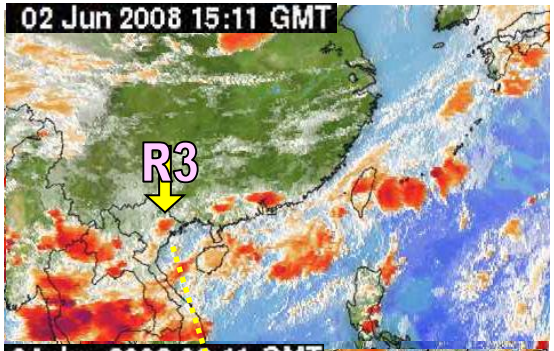


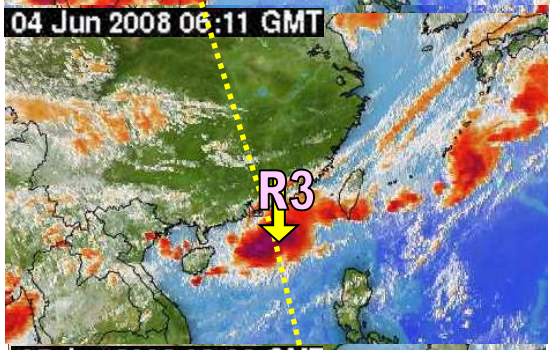


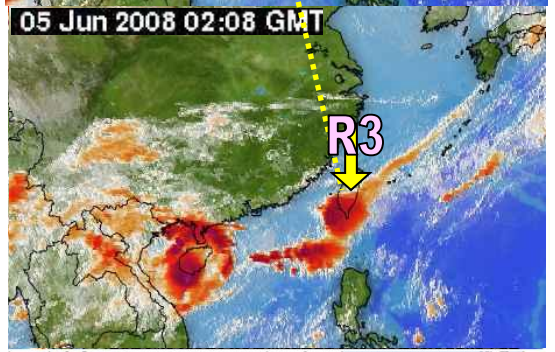




R3 (6/2~6/5)

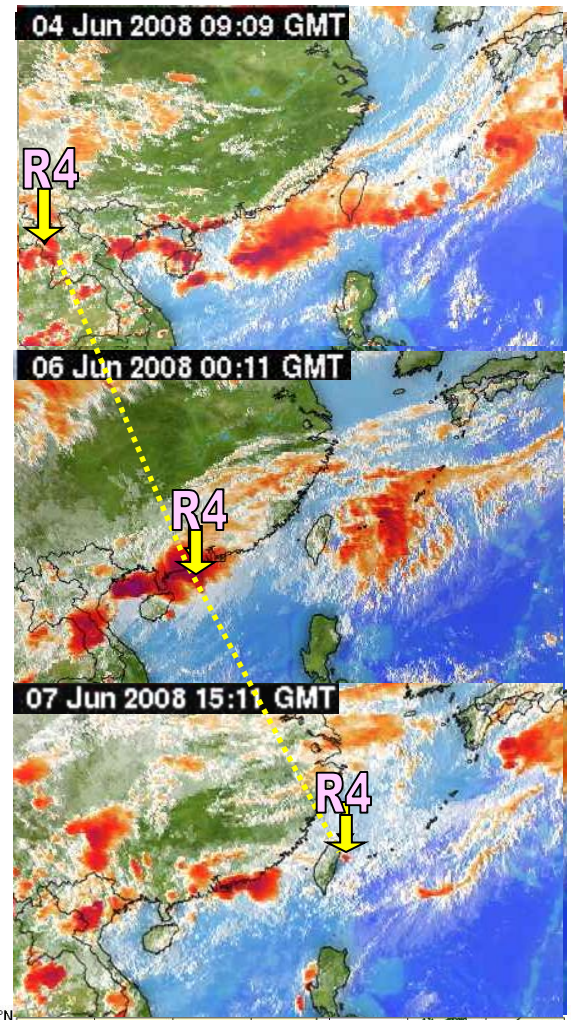


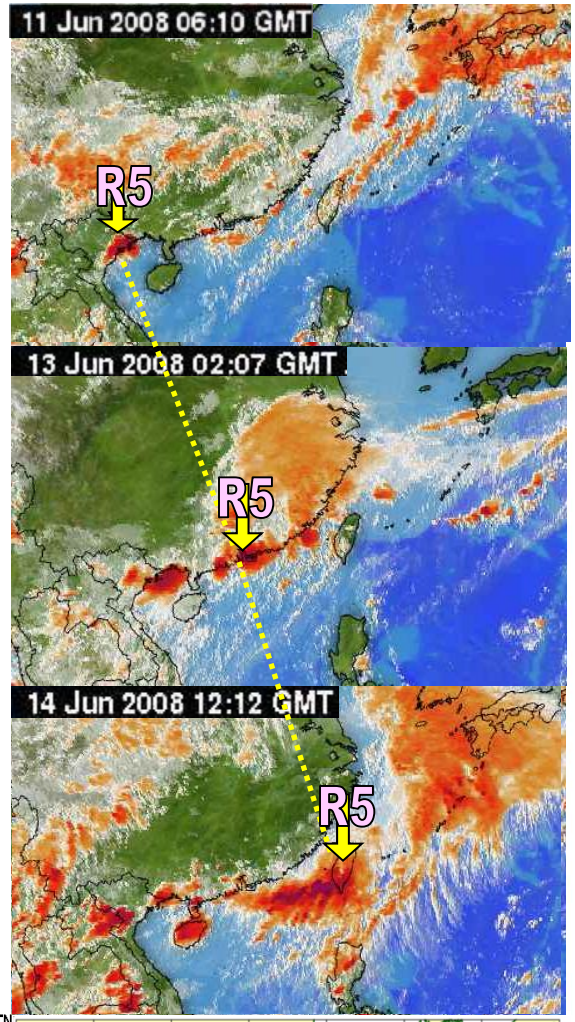




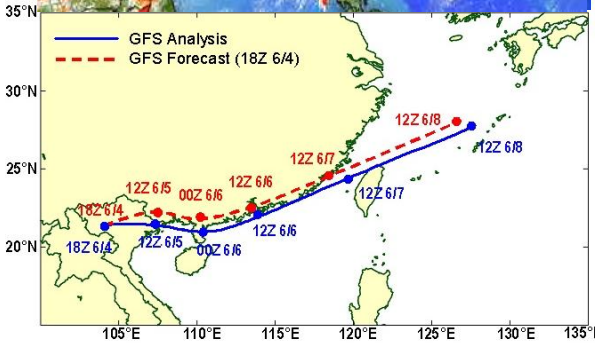
R4 (6/4~6/8)

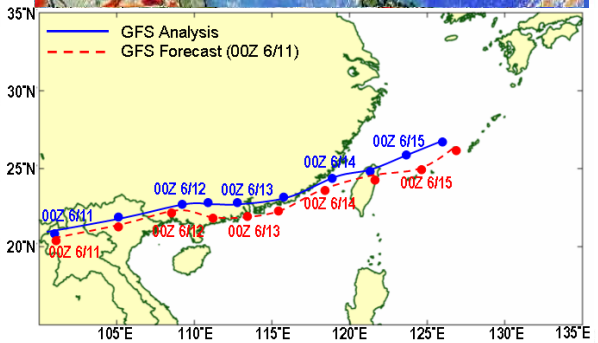
R5 (6/11~6/15)





Passing through northern Taiwan only

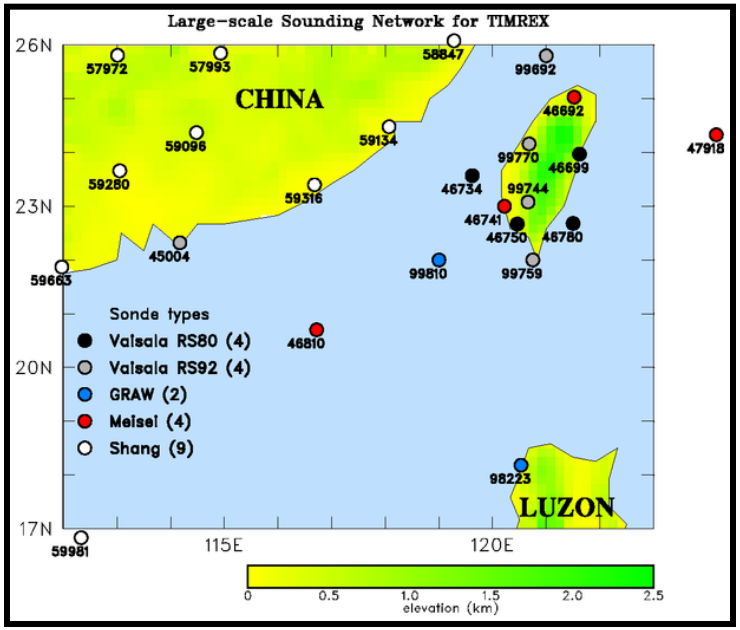




SoWMEX/TiMREX

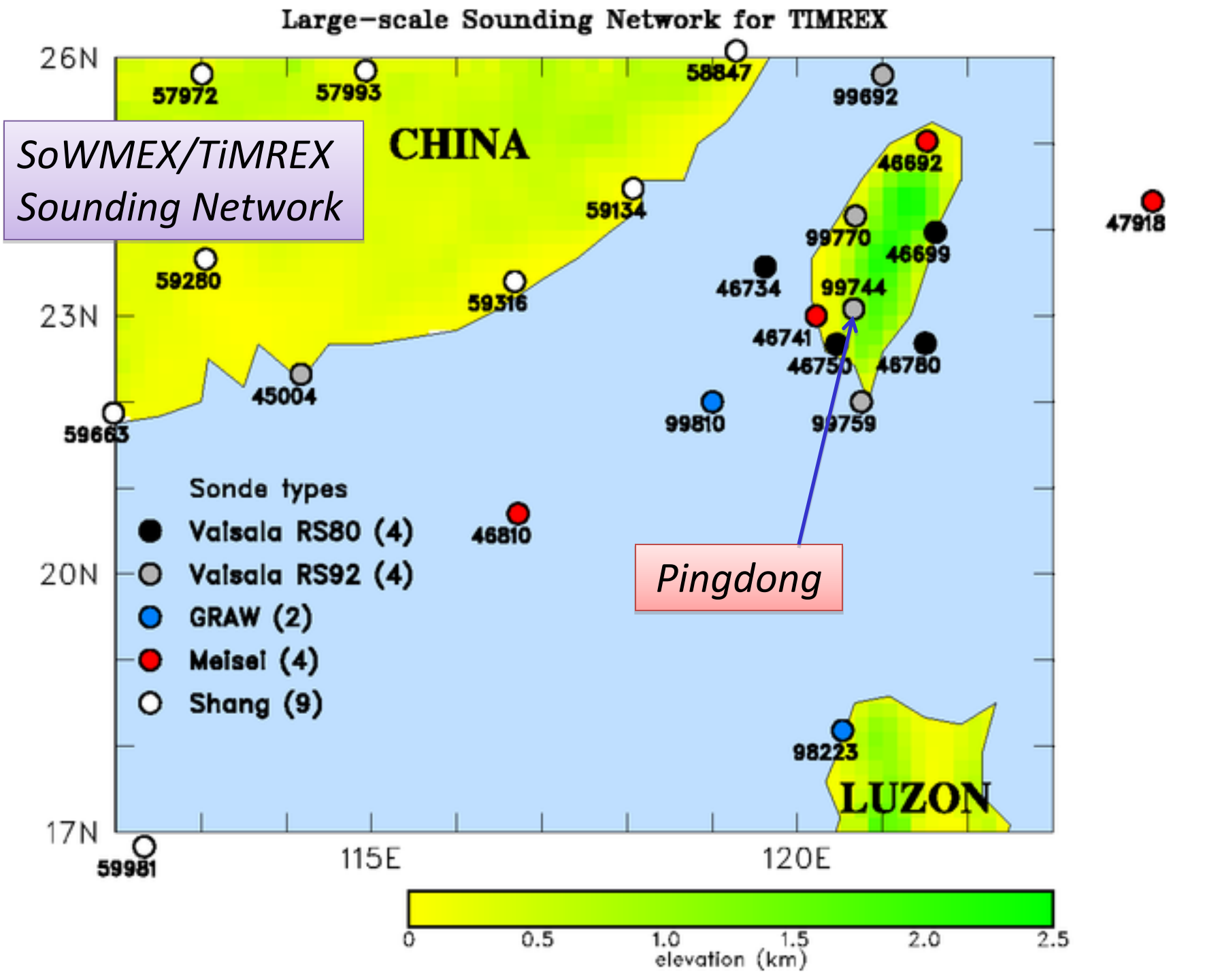
Jong-Dao (Ben) Jou
Richard H. Johnson
Paul E. Ciesielski
Andrew J. Newman
Zachary Finch

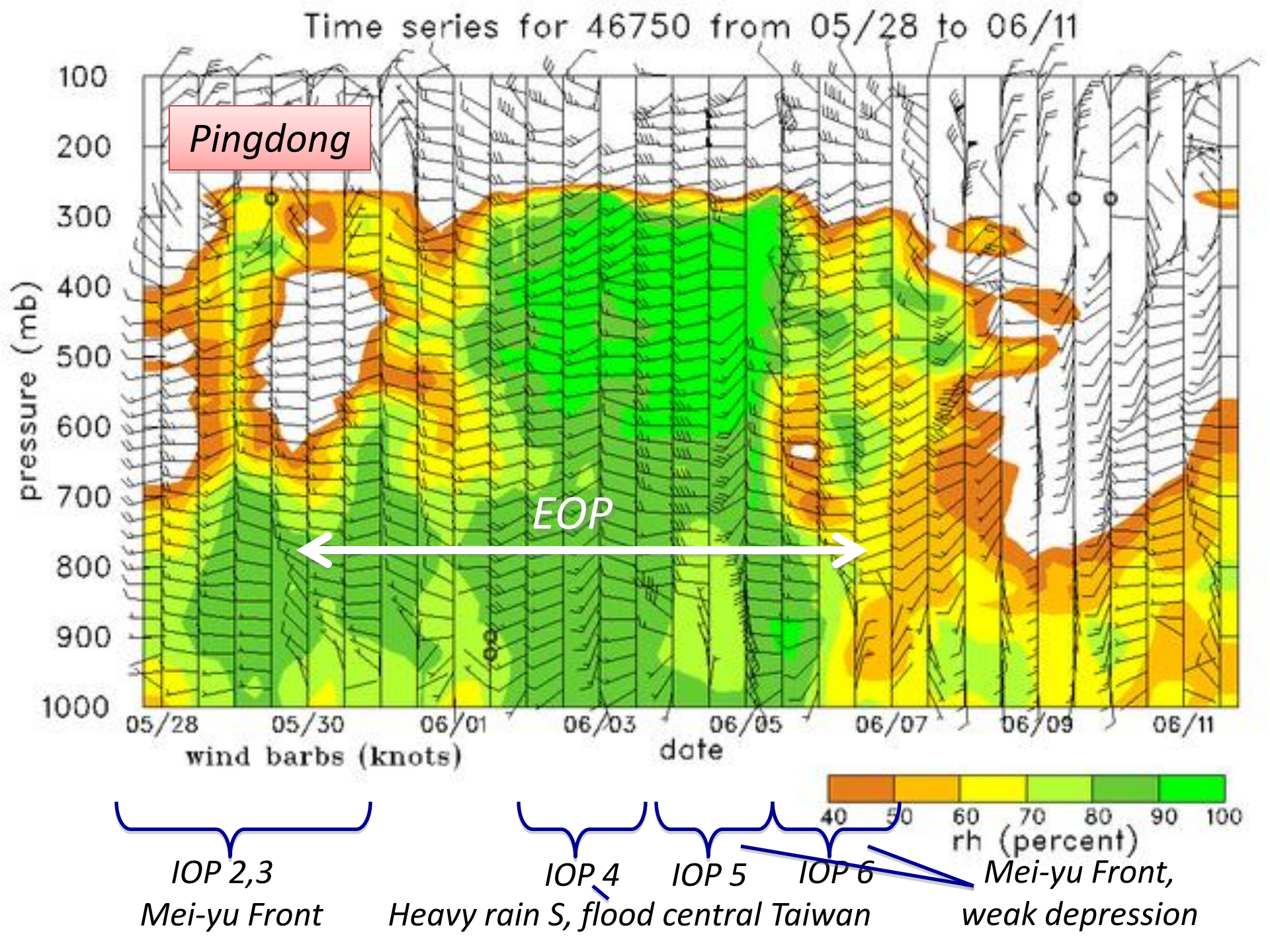
Colorado State University

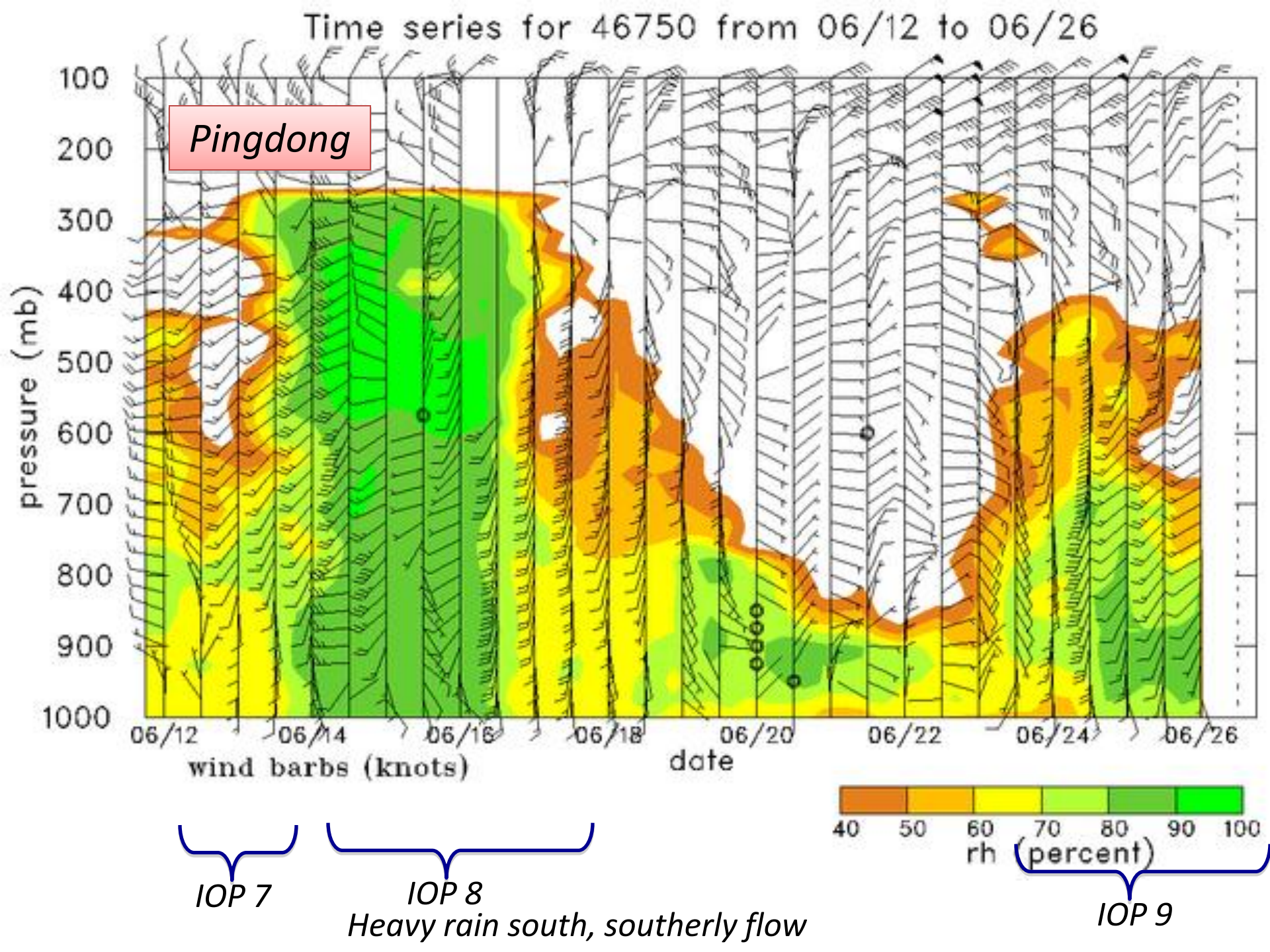


Southwest Monsoon Experiment 2008
Terrain-influenced Monsoon Rainfall Experiment

SoWMEX TIMREX


Large-scale Sounding Network for TIMREX
SoWMEX/TiMREX
Sounding Network
CHINA
LUZON
Pingdong
26N
23N
20N
17N
115E
120E
57972
57993
58847
99692
46692
47918
59134
99770
46699
59280
59316
46734
99744
46741
46750
46780
45004
59663
99810
99759
46810
98223
59981
Sonde types
Vaisala RS80 (4)
Vaisala RS92 (4)
GRAW (2)
Meisei (4)
Shang (9)
0
0.5
1.0
1.5
2.0
2.5
elevation (km)

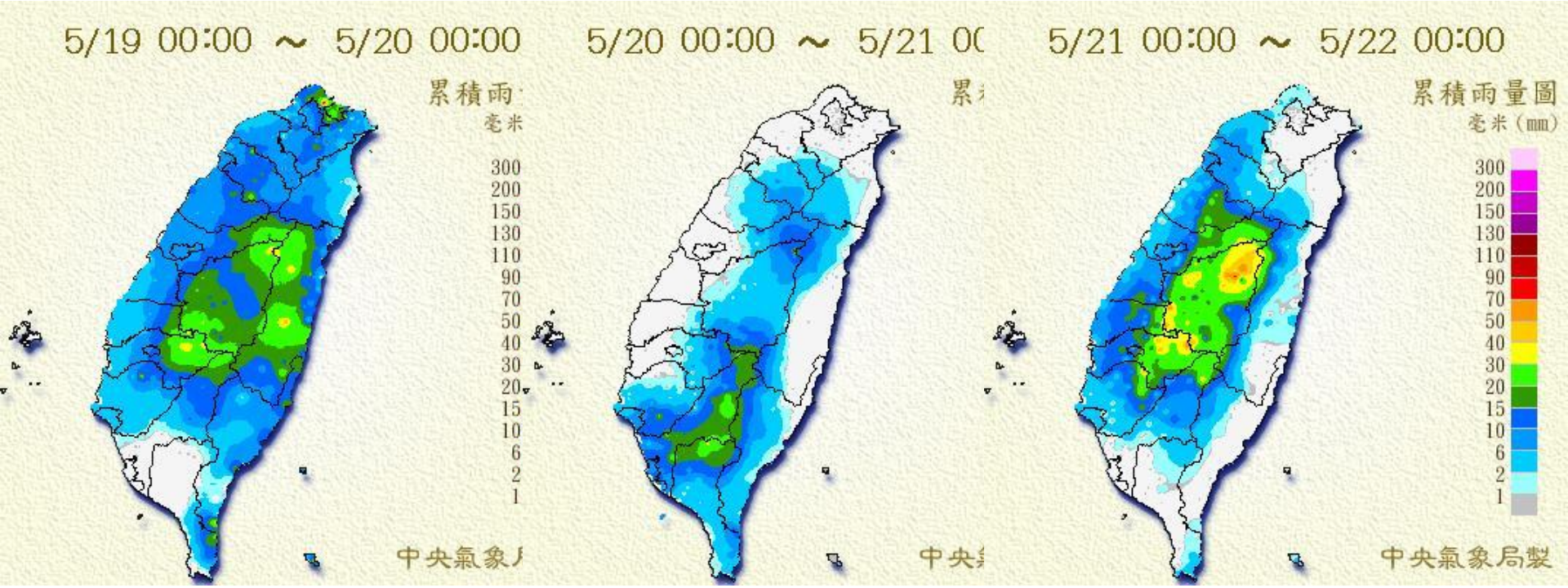

Time series for 46750 from 05/28 to 06/11
Pingdong
EOP
pressure (mb)
100
200
300
400
500
600
700
800
900
1000
05/28
05/30
06/01
06/03
06/05
06/07
06/09
06/11
date
wind barbs (knots)
40
50
60
70
80
90
100
rh (percent)
IOP 2,3
Mei-yu Front
IOP 4
Heavy rain S, flood central Taiwan
IOP 5
IOP 6
Mei-yu Front,
weak depression


Time series for 46750 from 06/12 to 06/26
Pingdong
pressure (mb)
100
200
300
400
500
600
700
800
900
1000
06/12
06/14
06/16
06/18
06/20
06/22
06/24
06/26
date
wind barbs (knots)
40
50
60
70
80
90
100
rh (percent)
IOP 7
IOP 8
IOP 9
Heavy rain south, southerly flow

IOP-1

Front across Taiwan, orographic rain

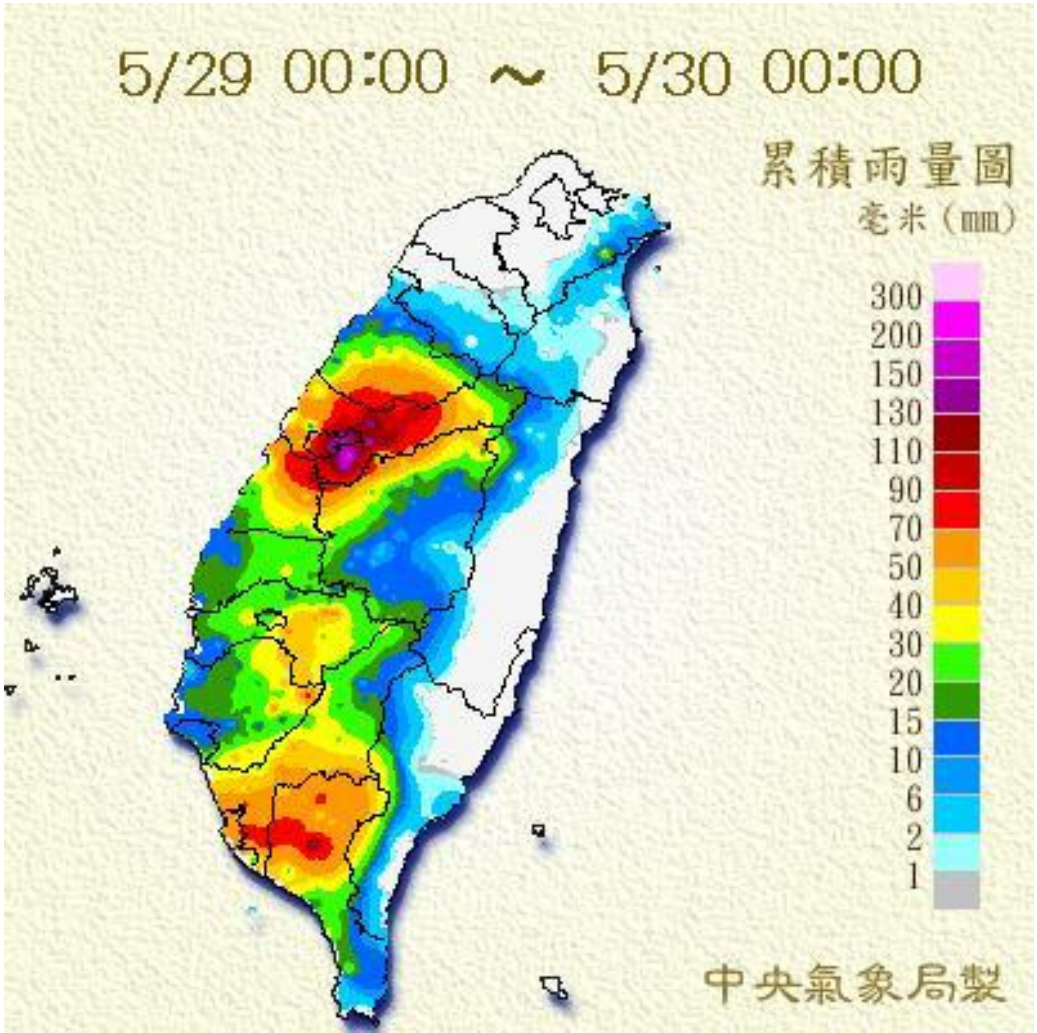
19-22 May 2008



IOP-2

Afternoon showers near Taichung and southern Taiwan

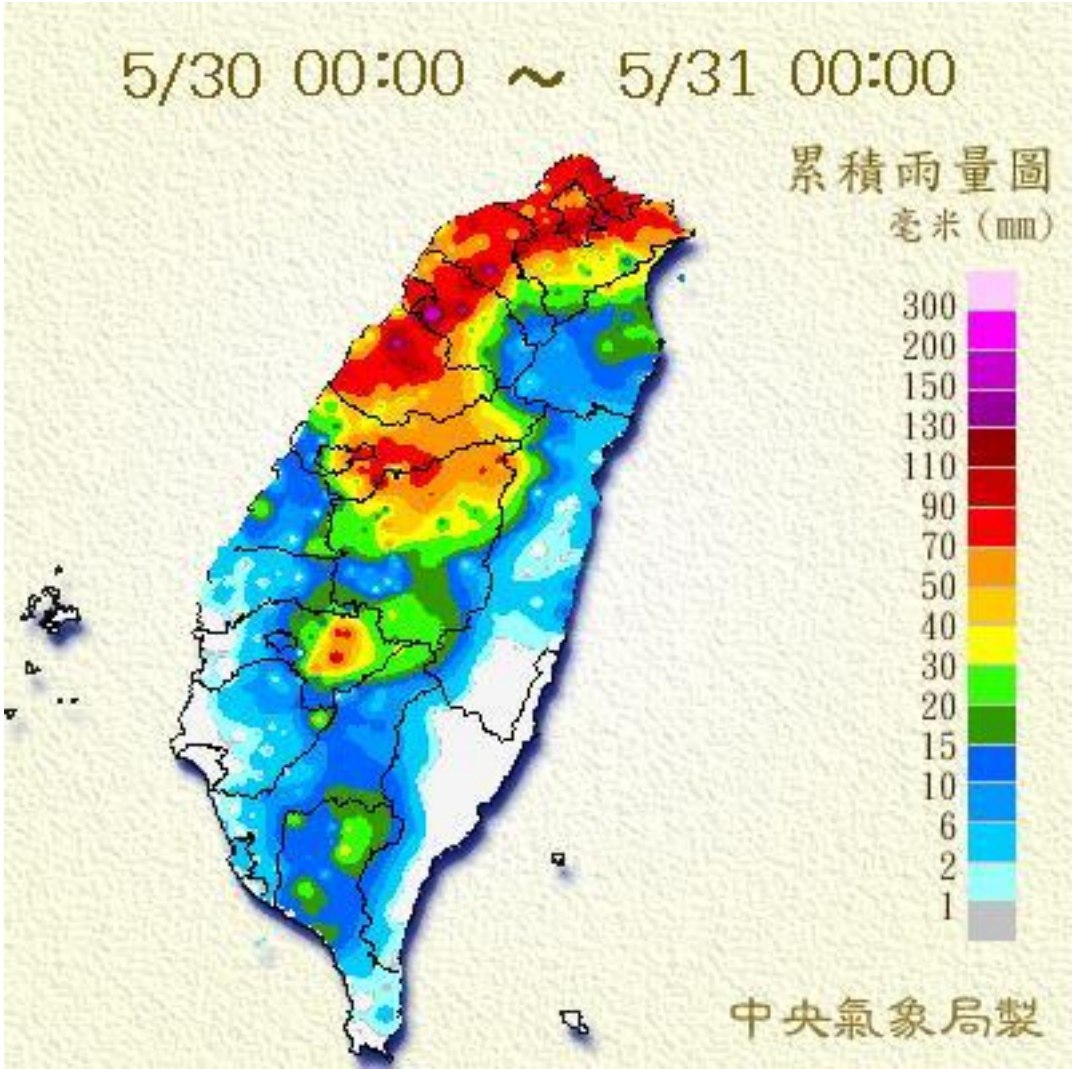
28-29 May 2008



IOP-3

Front Approaching, Rainfall over Northern Taiwan

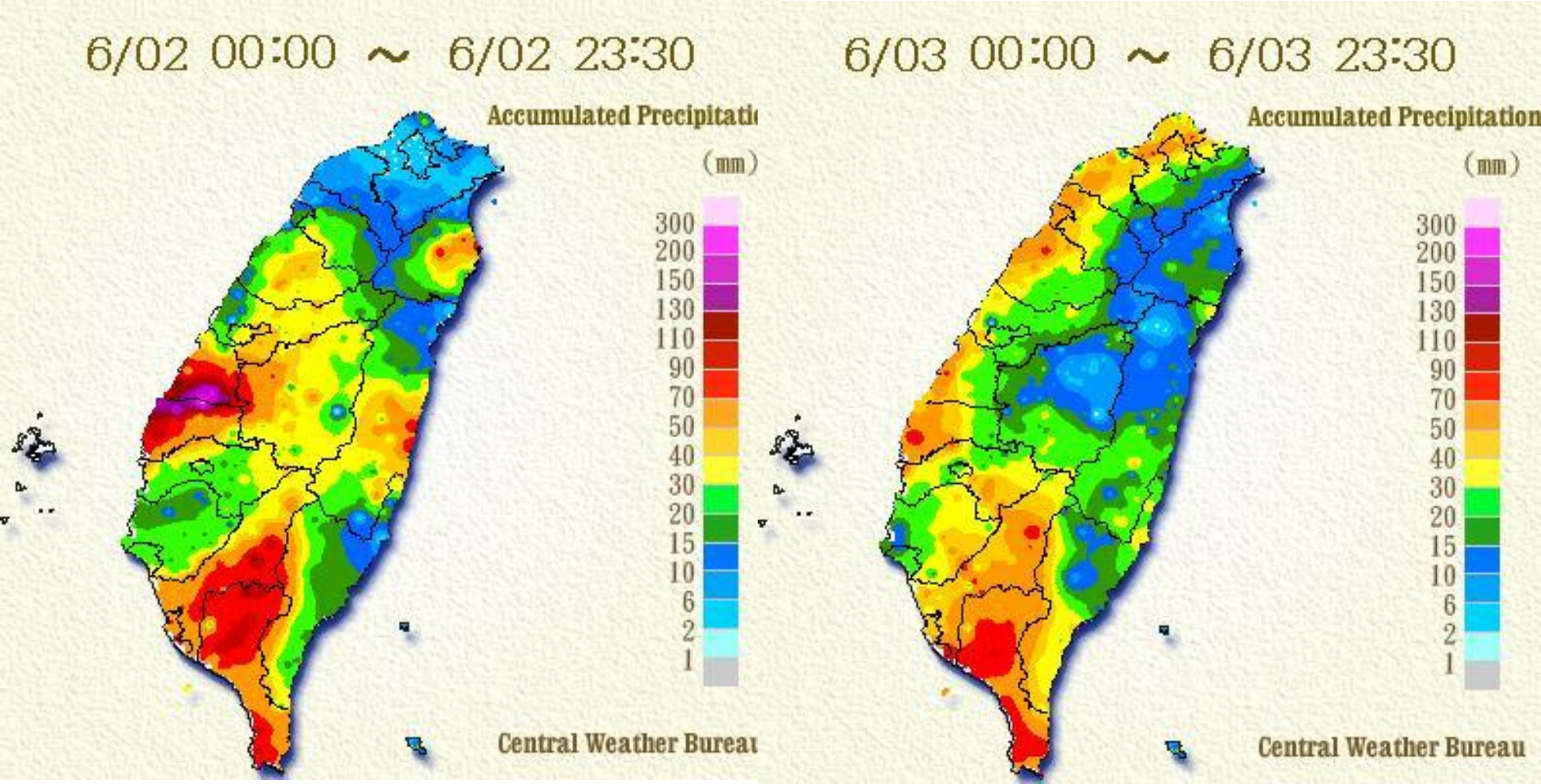
30 May 2008



IOP-4

Heavy Rainfall South, Floods in Central Taiwan

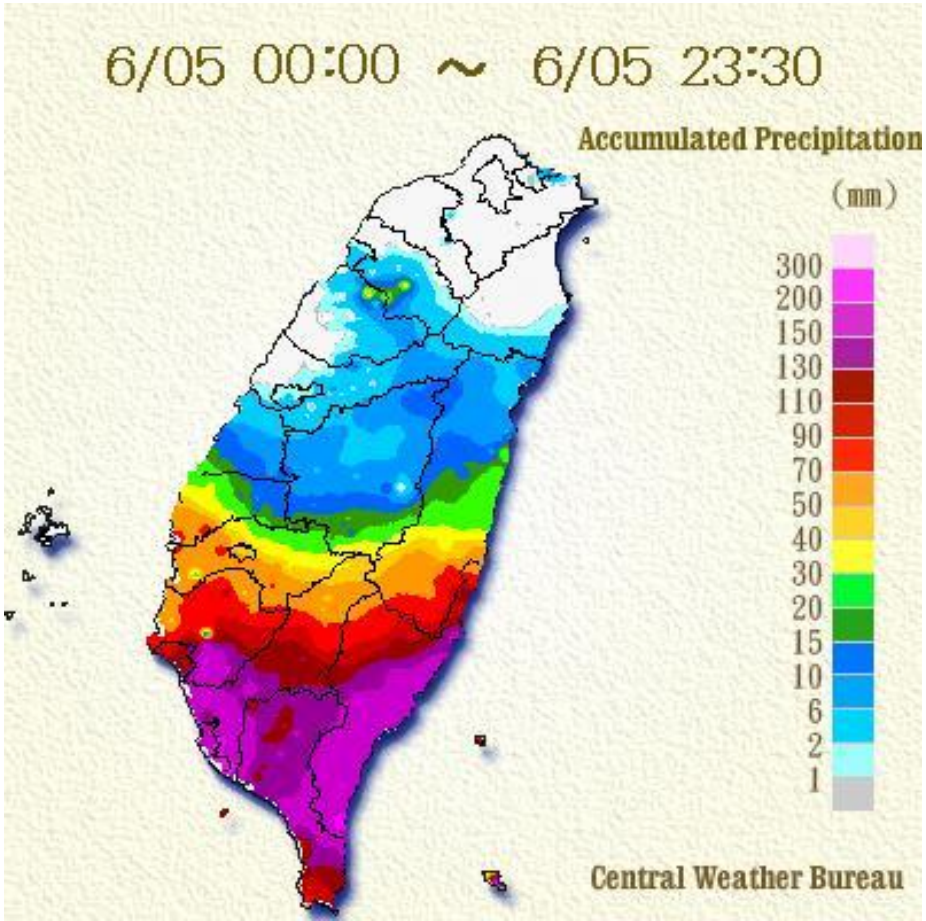
2-3 June 2008



IOP-5,6

Heavy Rainfall Southern Taiwan; Weak Depression along Meiyu Front

4-6 June



Torrential Rains over Hainan Island in October 2008

-- The Interaction of Asian Winter Monsoon with Tropical Synoptic-scale Disturbances --

～　0810海南大暴雨　～ 0810海南島豪雨　～

伍 培明 *Wu Peiming*

Research Institute for Global Change, JAMSTEC, Japan

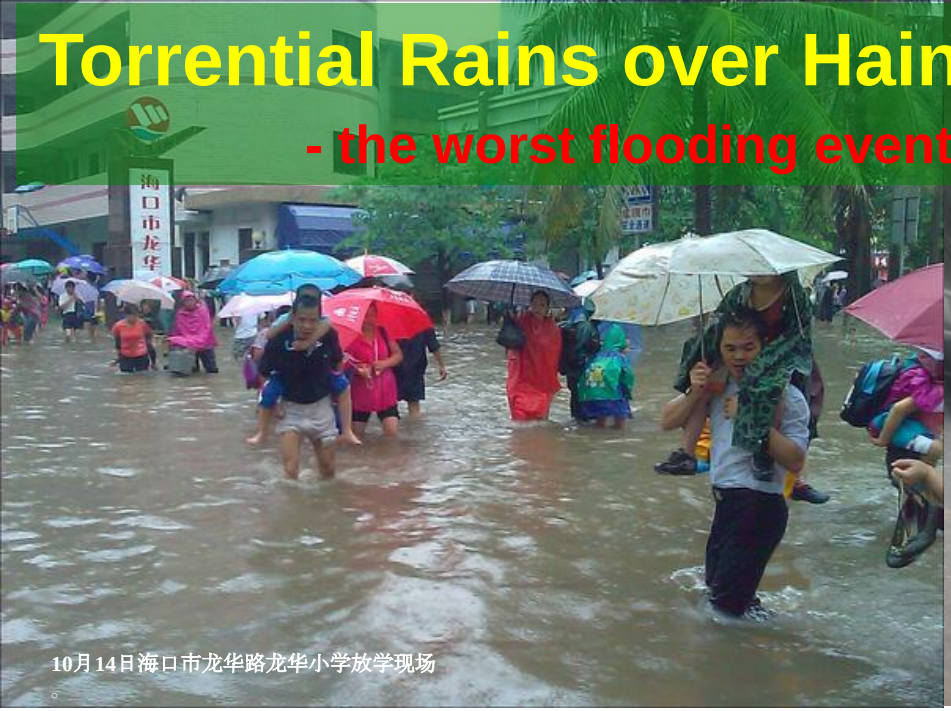
with Y Fukutomi, B Wu, M D Yamanaka and J Matsumoto

Contents:

1. Hainan Island and its Climate, the heavy rainfall in October 2008;
2. Occurrence and westward propagation of tropical synoptic-scale disturbances from the the western Pacific;
3. **Mid-latitude synoptic-scale atmospheric conditions;**
4. **The roles of tropical synoptic-scale disturbances and Asian winter monsoon in the heavy rains.**

Torrential Rains over Hainan Island in October 2008

- the worst flooding event in the island in 42 years -



10月14日海口市龙华路龙华小学放学现场
。

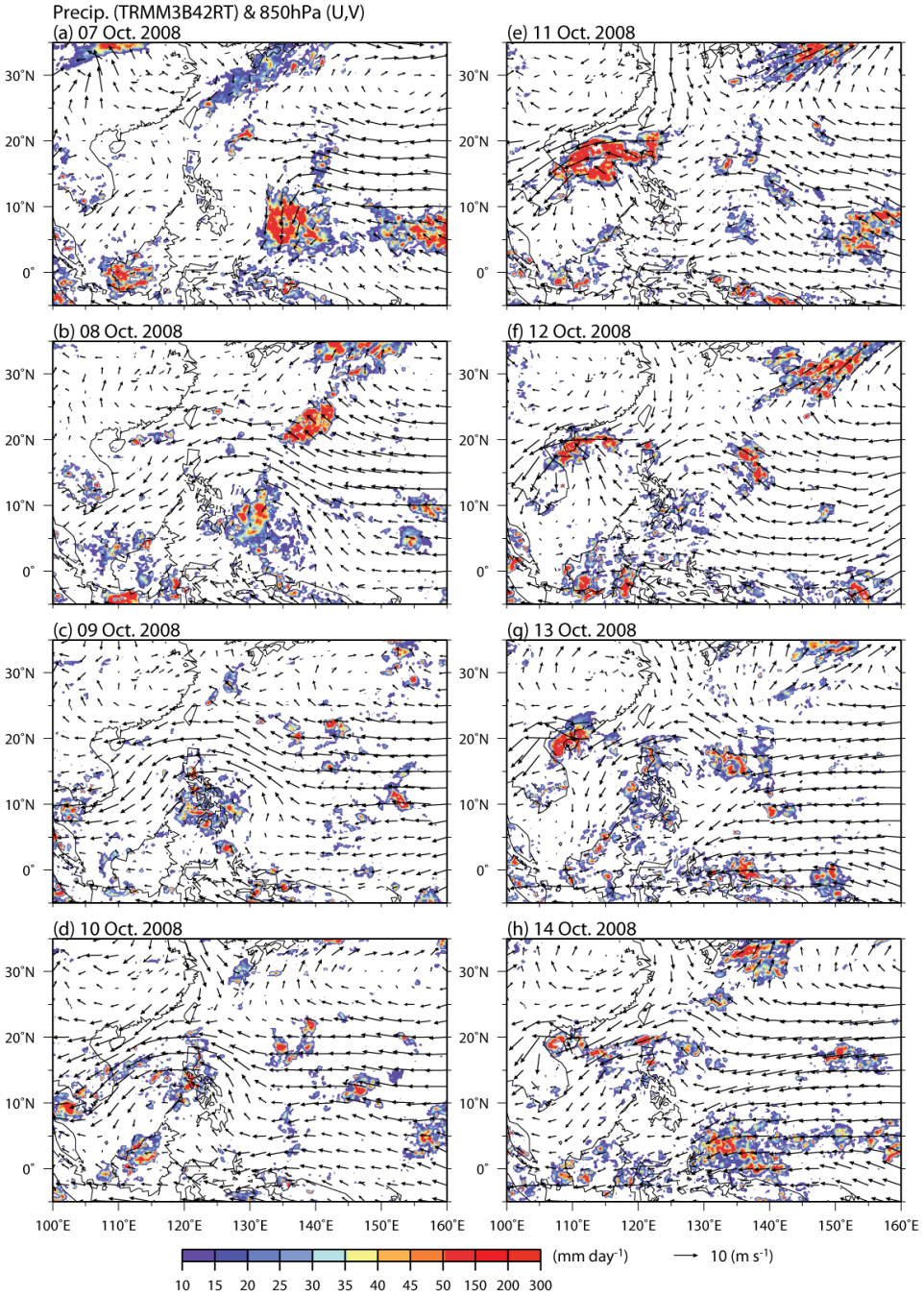

大雨来了，海口市民出行困难

琼海市前往博鳌方向 桥头路段浸水严重

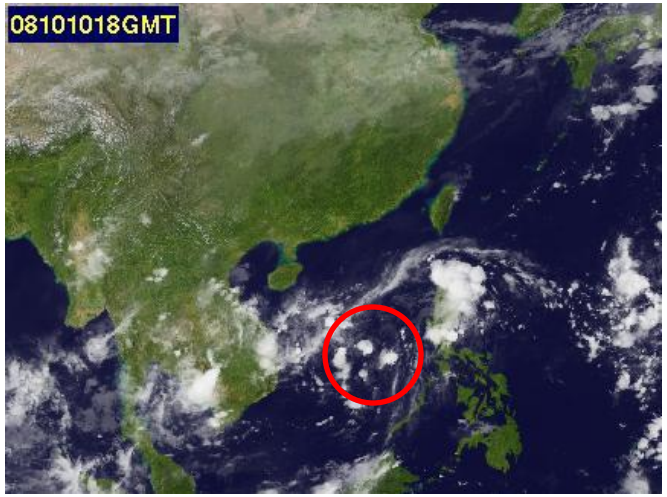

10月14日，海口市区几乎成为泽国，各路段均被洪水淹没，一位小朋友被汽车掀起的水浪冲倒。

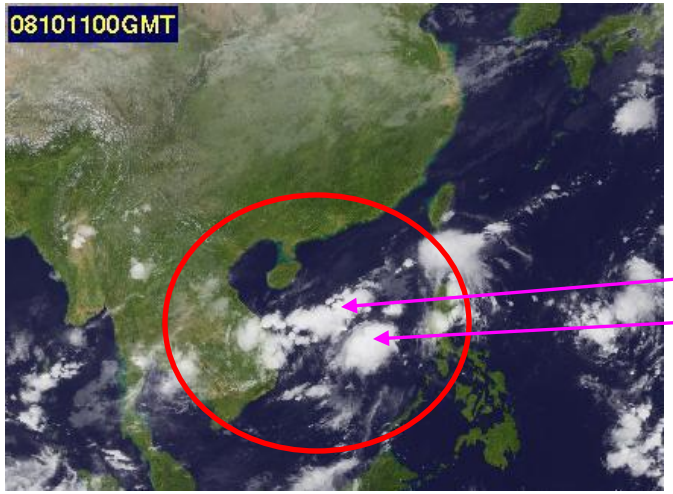
2. Occurrence and propagation of tropical synoptic-scale disturbances:

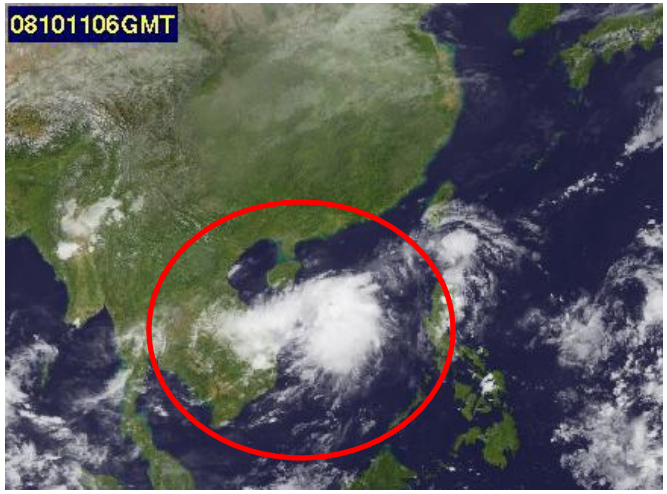
TRMM Rainfall, 850-hPa winds:

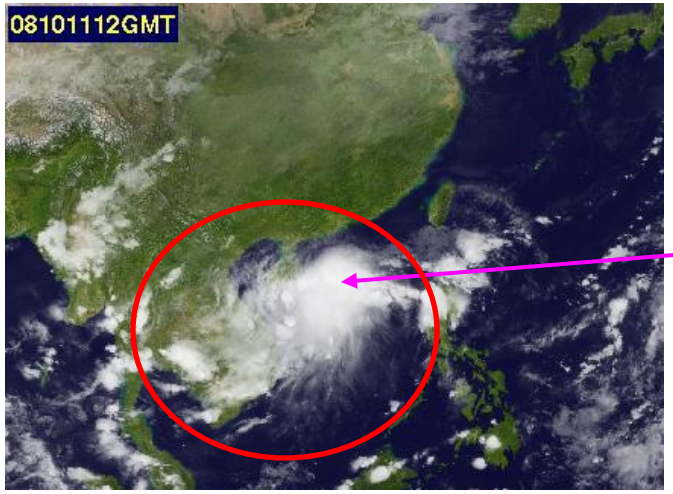


GMS satellite IR images from MTSAT-1R:

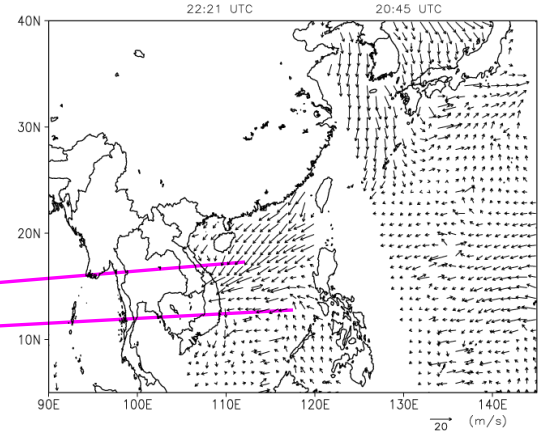


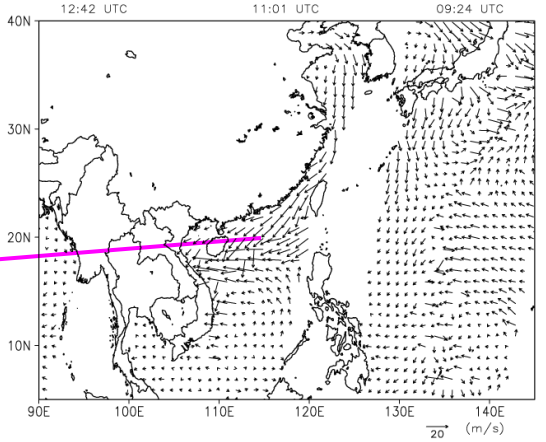






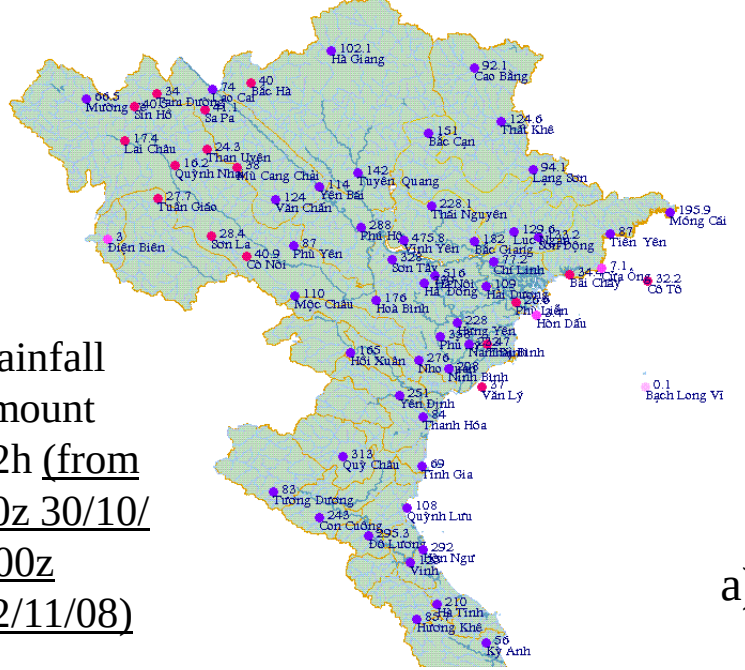
QuikSCAT Sea surface winds:





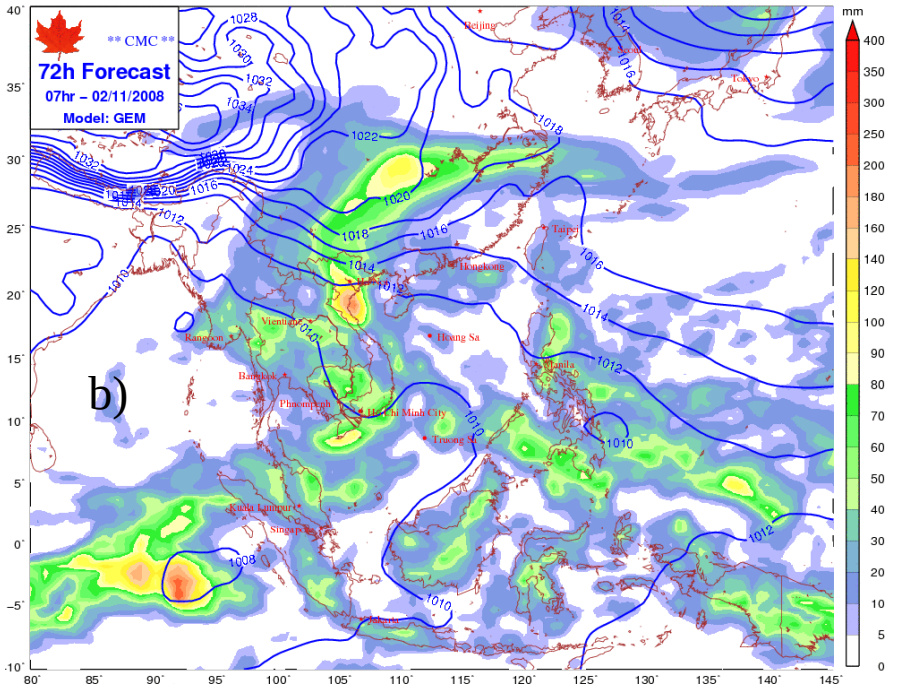
Heavy rains at Hanoi on 30 Oct. – 1st Nov. 2008
By Dr. Nguyen Thi Tan Thanh, VNHMS

Rainfall amount 72h (from 00z 30/10/ - 00z 02/11/08)



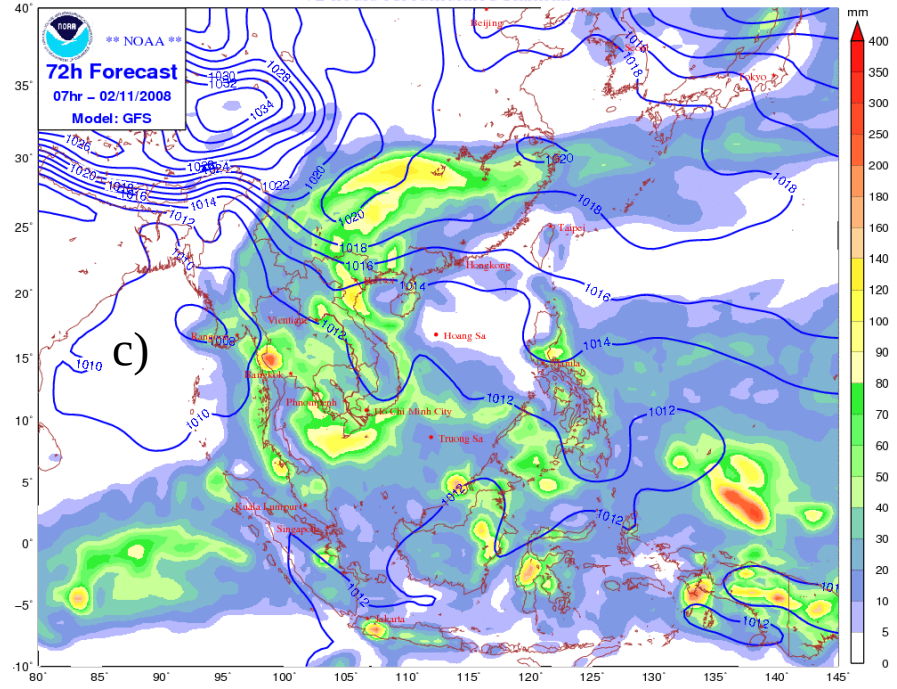
a)

72 hours Accumulated Rainfall



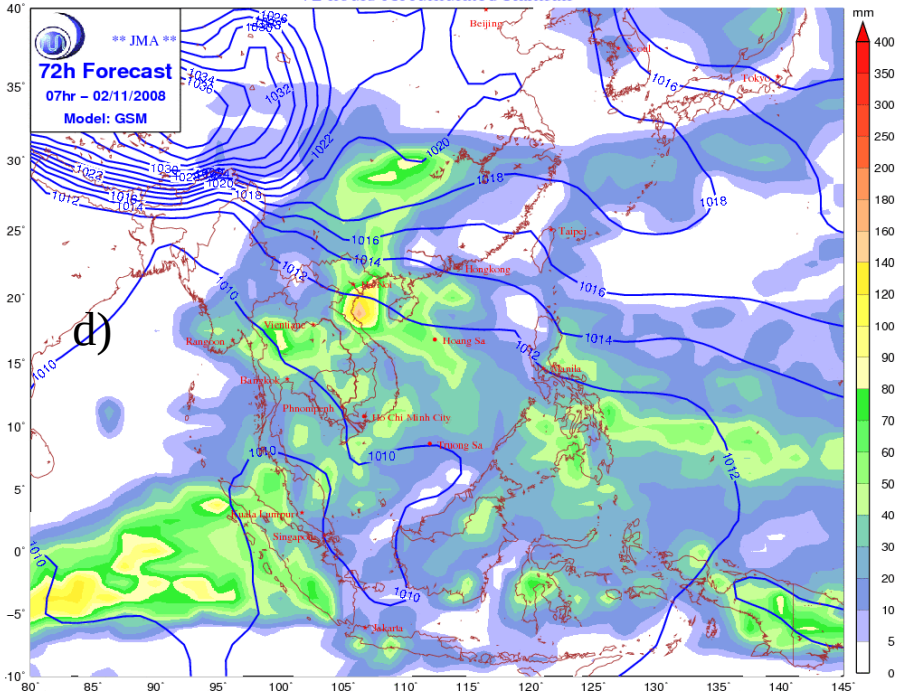
b)

72 hours Accumulated Rainfall

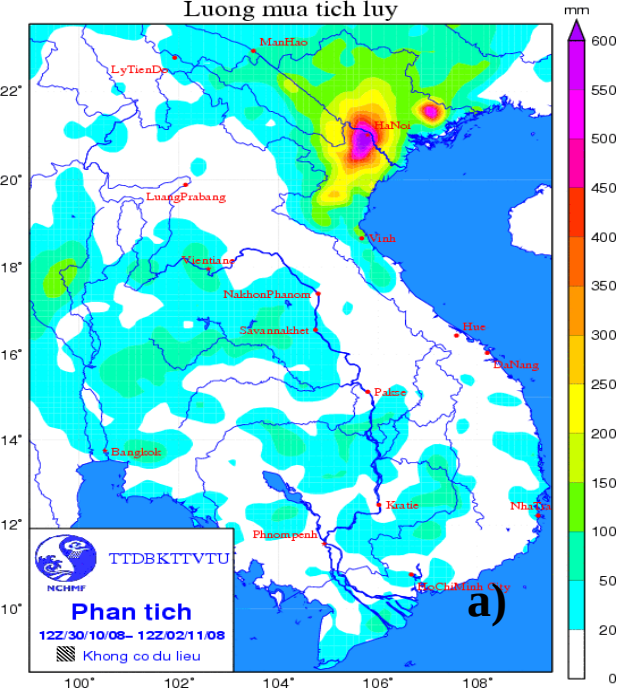


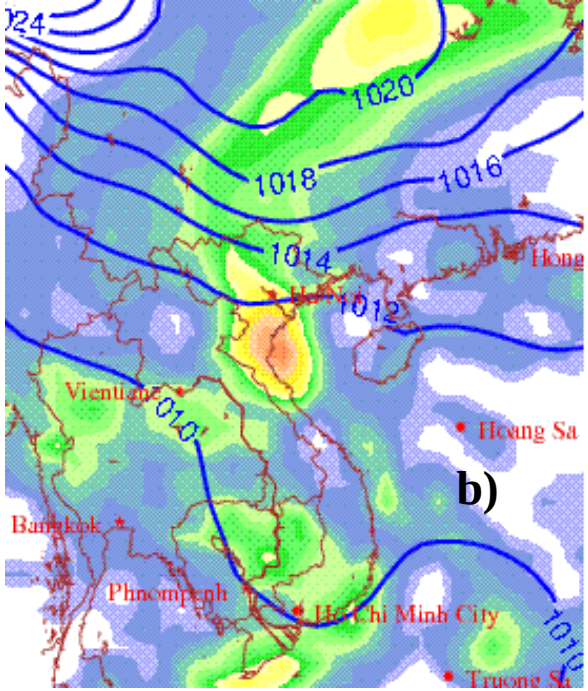
c)

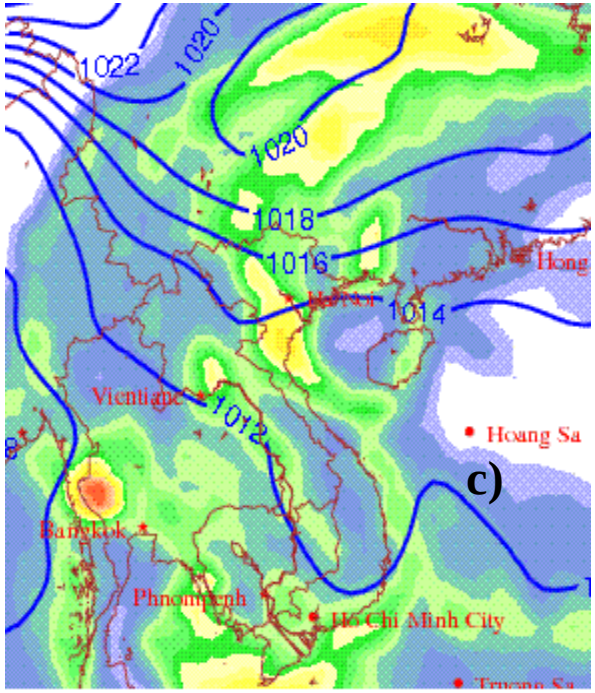
72 hours Accumulated Rainfall

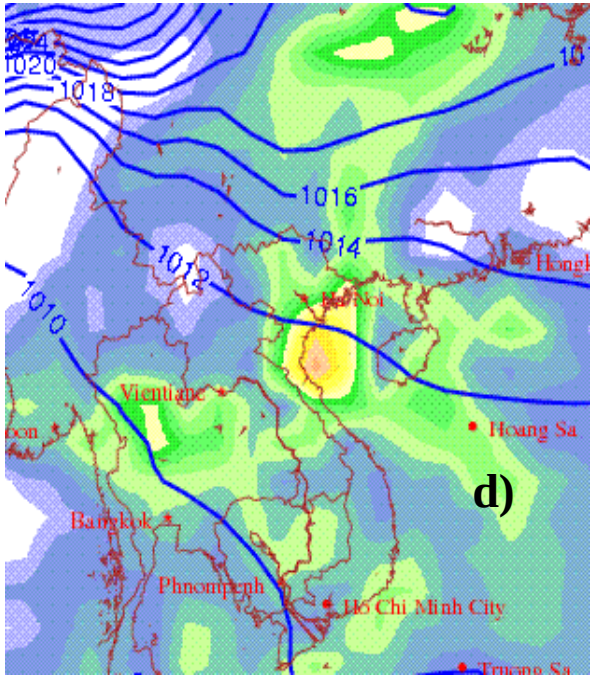


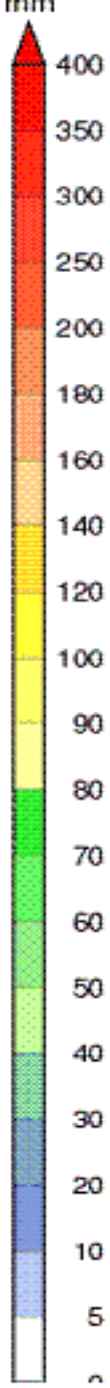
d)











Rainfall amount

72h

(from 7h 30/10-7h 02/11/2008)

a) Observation

b) GEM

c) GFS

d) GSM

Forecasting Time 7h 30/10/2008

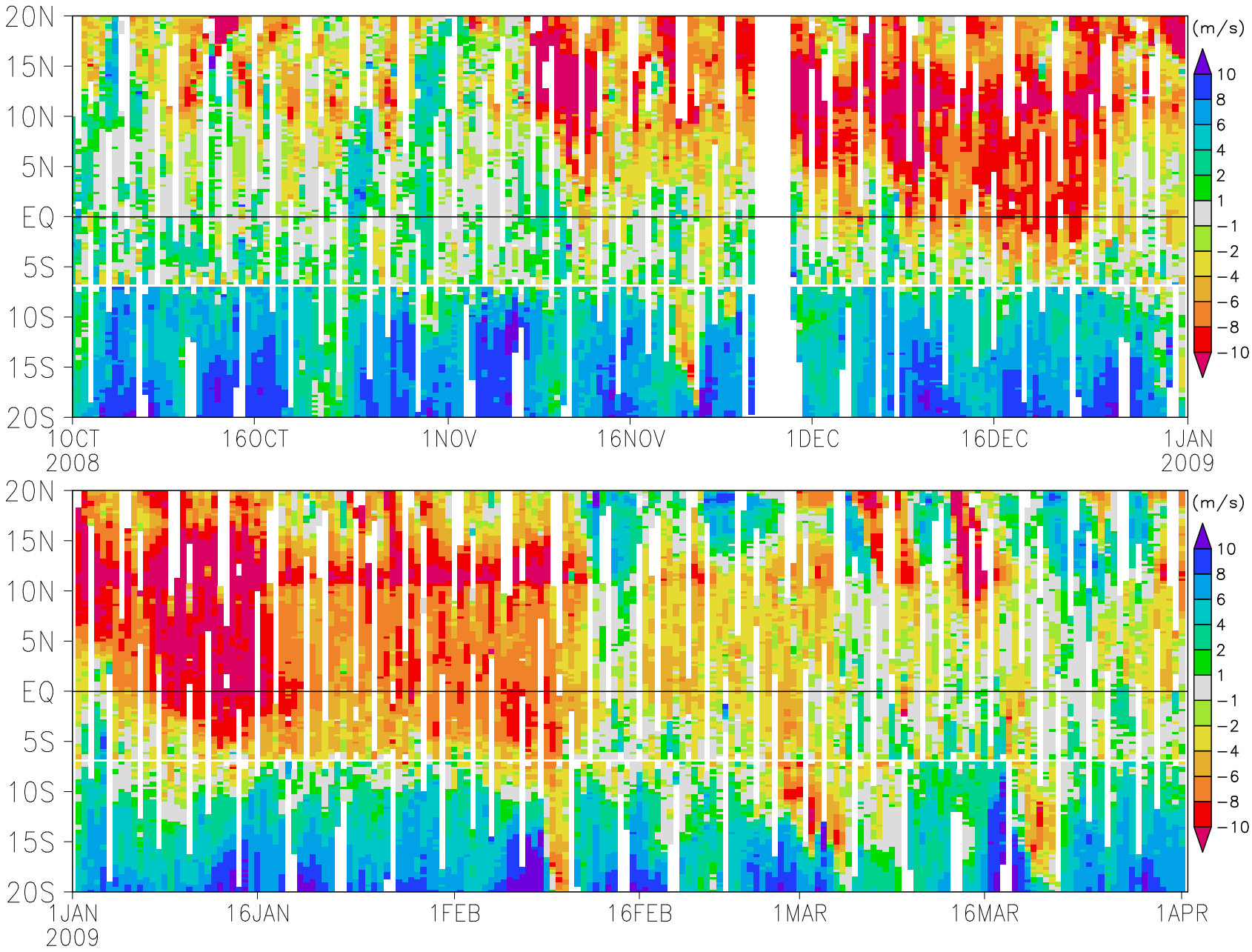


Fig. 1. Time-latitude sections showing the meridional winds from QuikSCAT sea surface winds along 108 E from October 2008 to April 2009 (By Dr. Wu Pei-Ming).

Suggested period of interest

- May-June, 2008: Monsoon onset phase, many torrential rain events in East Asia.

- October, 2008: Vietnam, Hai-nan heavy rainfall events.