Flood and Flash Flood in Hydrology and Water Management Center for Lower Northern Region And Activities

Panya Polsan

Hydrology and Water Management Center

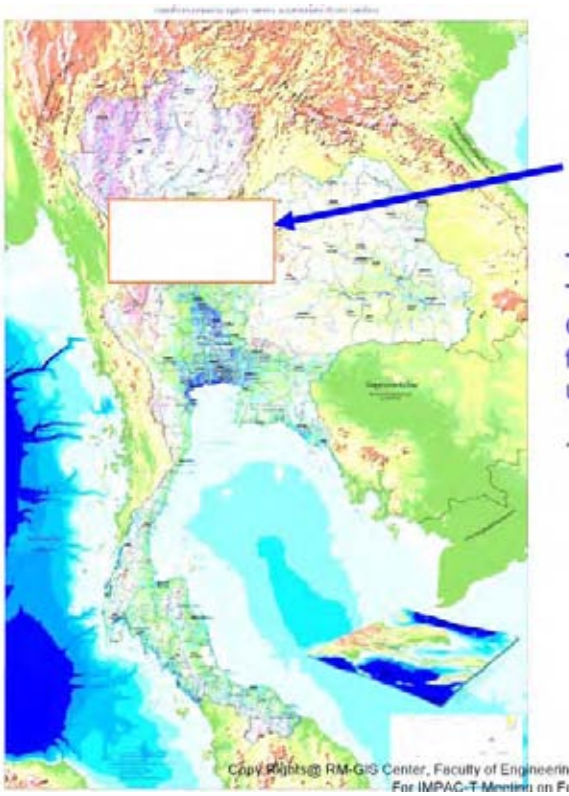
for Lower Northern Region

Royal Irrigation Department (RID)

"IMPAC-T" Project

19 January 2009

Kasetsart Unuversity, Bangkok



Introduction

The Lower Northern Region of Thailand is located in middle of Chaophraya Basin down stream from Bhumibol and Sirikit dam and upstream from Chaophraya river.

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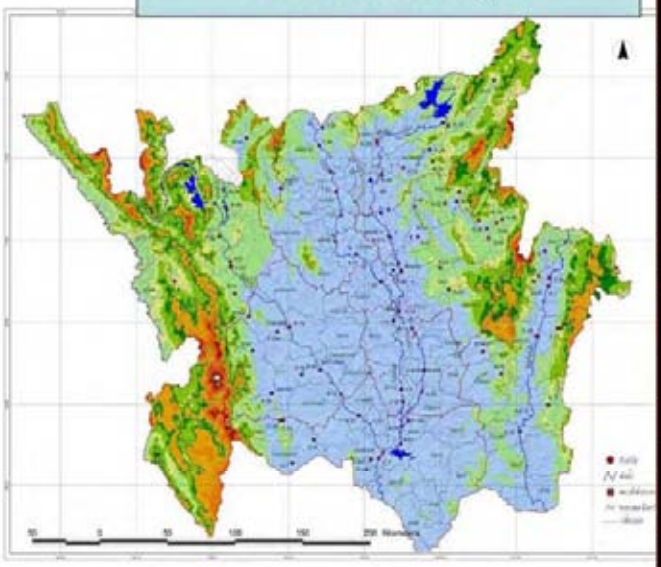
Hydrological Stations Map Lower Northern Region

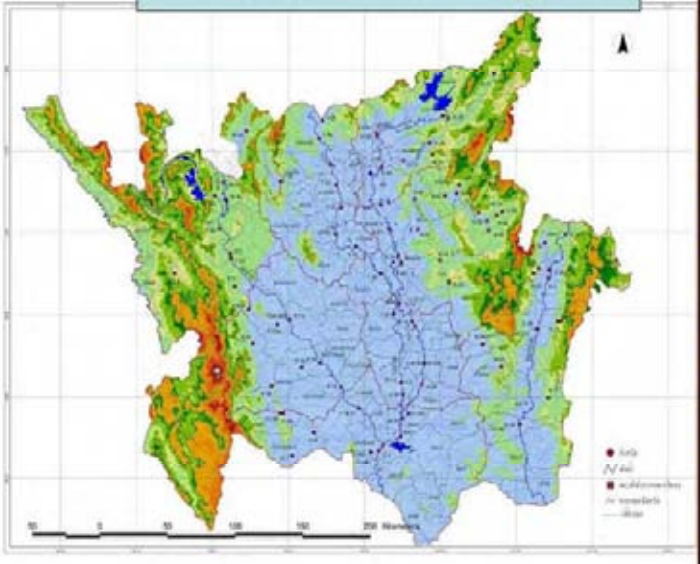


Covered lower Ping, lower Wang, lower Yom, lower Nan, upper Pasak and some of Salawin basin.

This area is affected by the Tropical monsoon from Andaman sea and south China sea and Tropical cyclone from Pacific ocean.

In rainy season there were a lot of floods, repetitiosly flood and some flash flood or debris flow and after rainy season there faced to drought especially in Yom river basin.

Hydrological Stations Map Lower Northern Region



The west side, the north side and the east side of this region are covered by mountain approximately 60 %.

Up stream of two main rivers as Ping river and Nan river were constructed big Dam.

Yom river is the same main river but no dam up stream.

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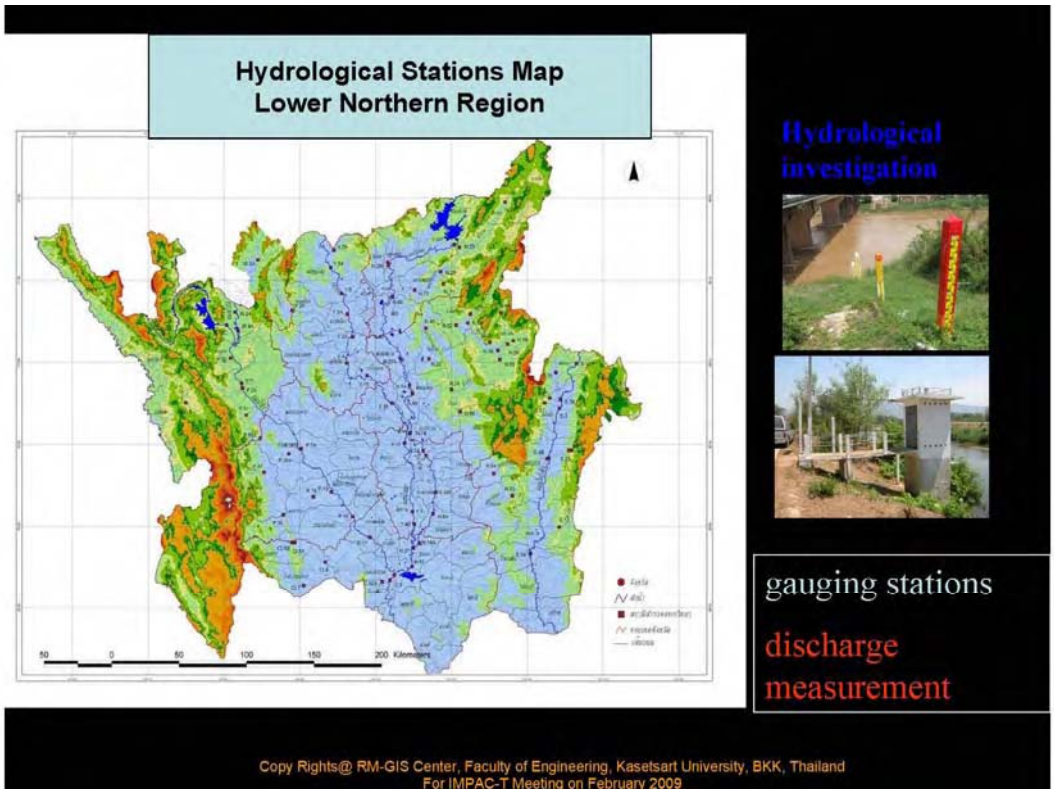
Hydrological Stations Map
Lower Northern Region
Hydrological investigation
gauging stations
discharge measurement
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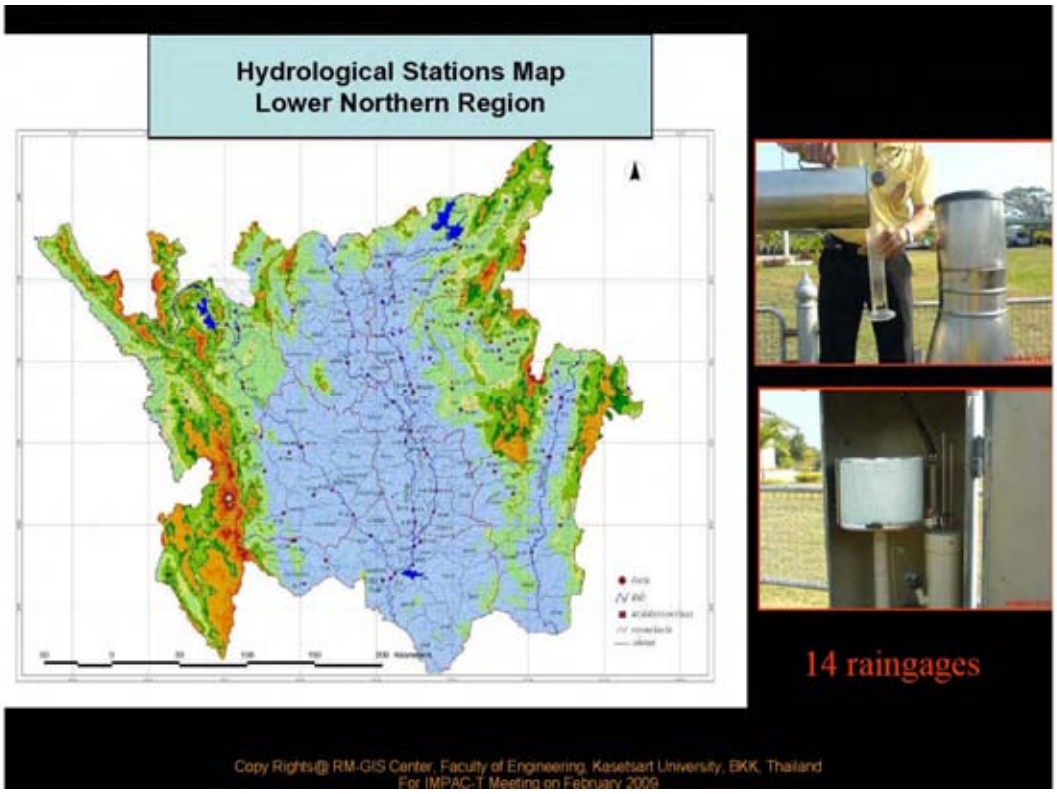
Hydrological Stations Map
Lower Northern Region
14 raingages
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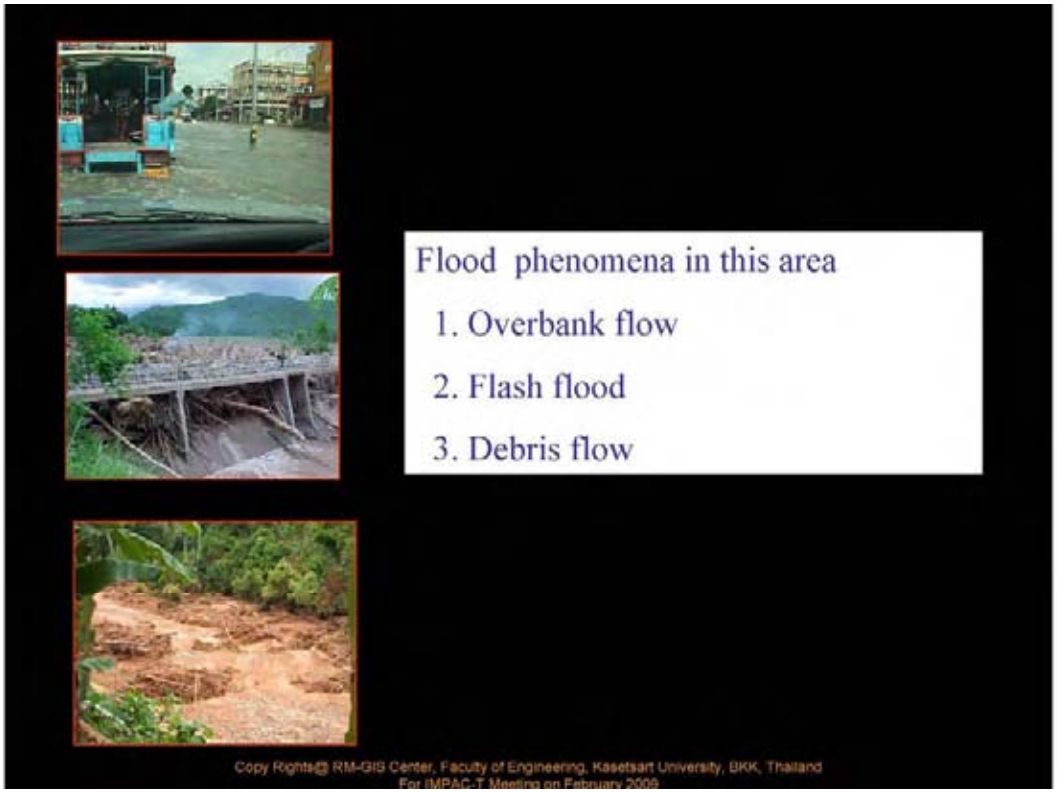
Flood phenomena in this area
1. Overbank flow
2. Flash flood
3. Debris flow
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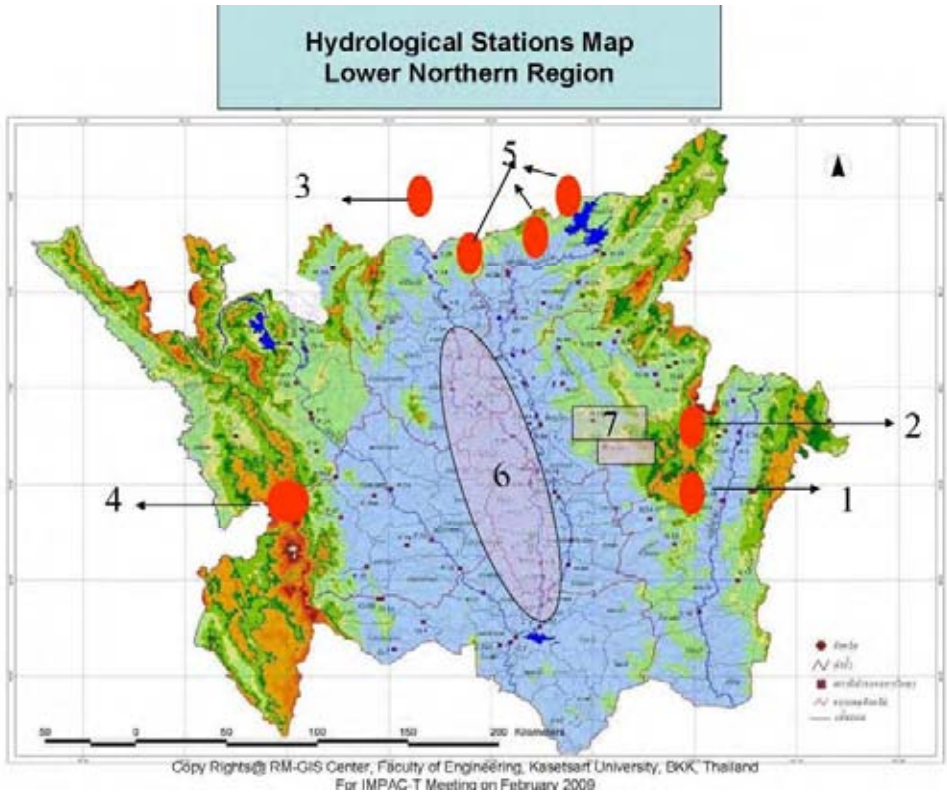
Hydrological Stations Map
Lower Northern Region
1
2
3
4
5
6
7
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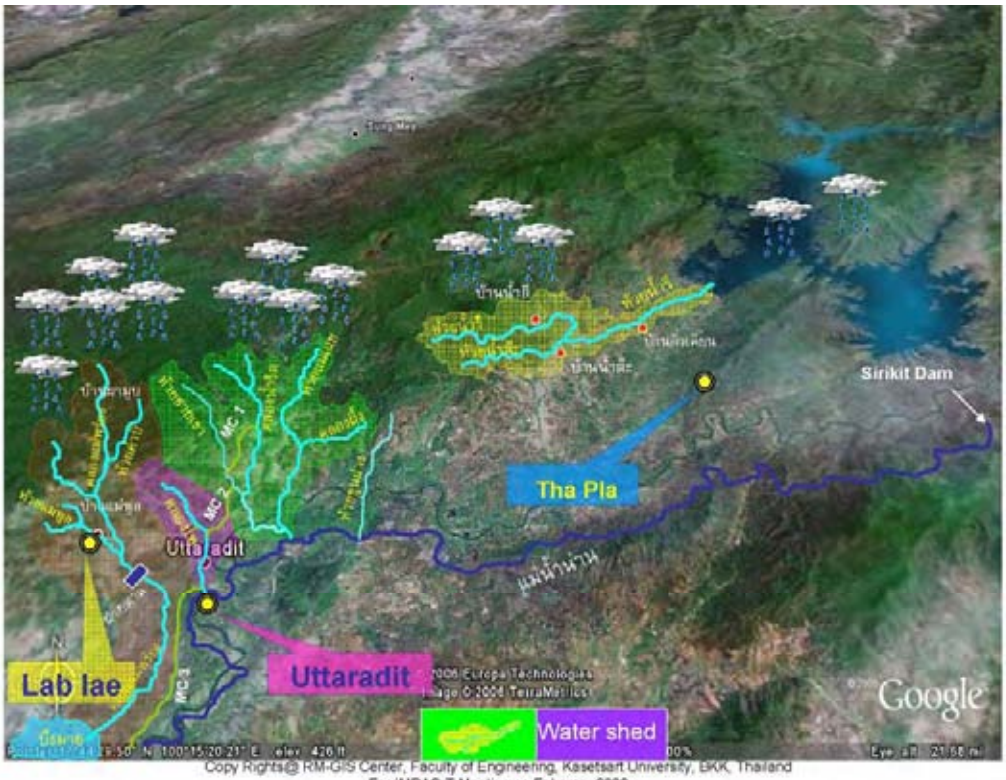

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Flood and damages at Lab Lae district

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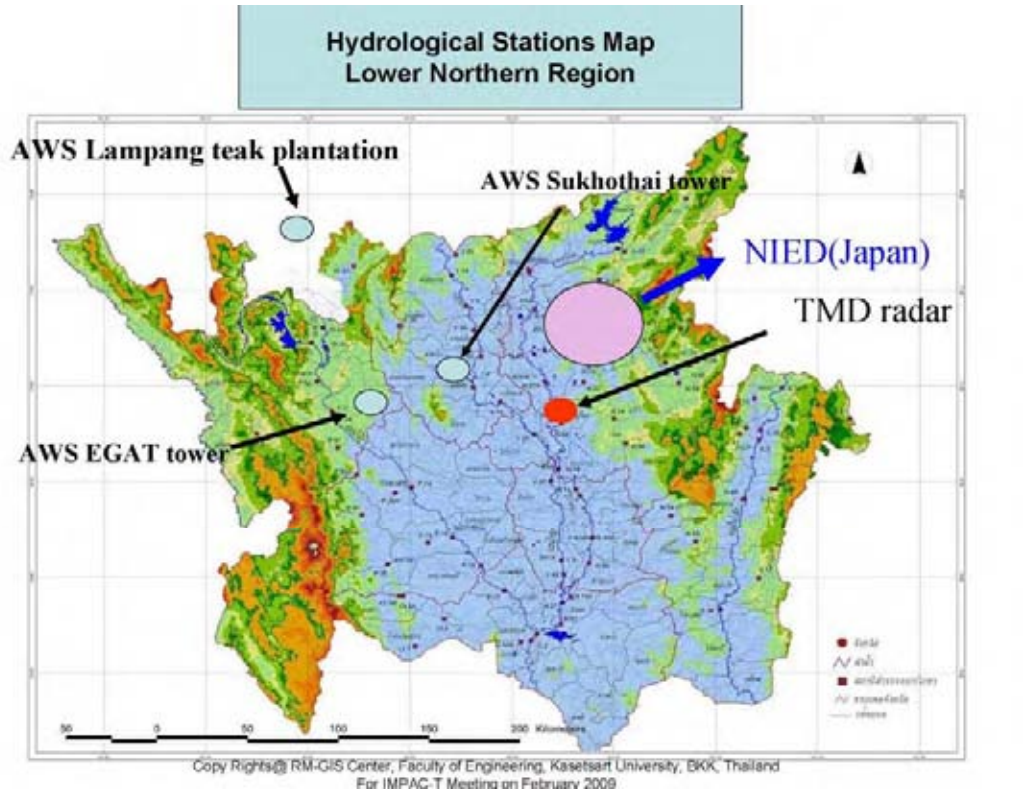
Hydrological Stations Map
Lower Northern Region
AWS Lampang teak plantation
AWS Sukhothai tower
NIED(Japan)
TMD radar
AWS EGAT tower
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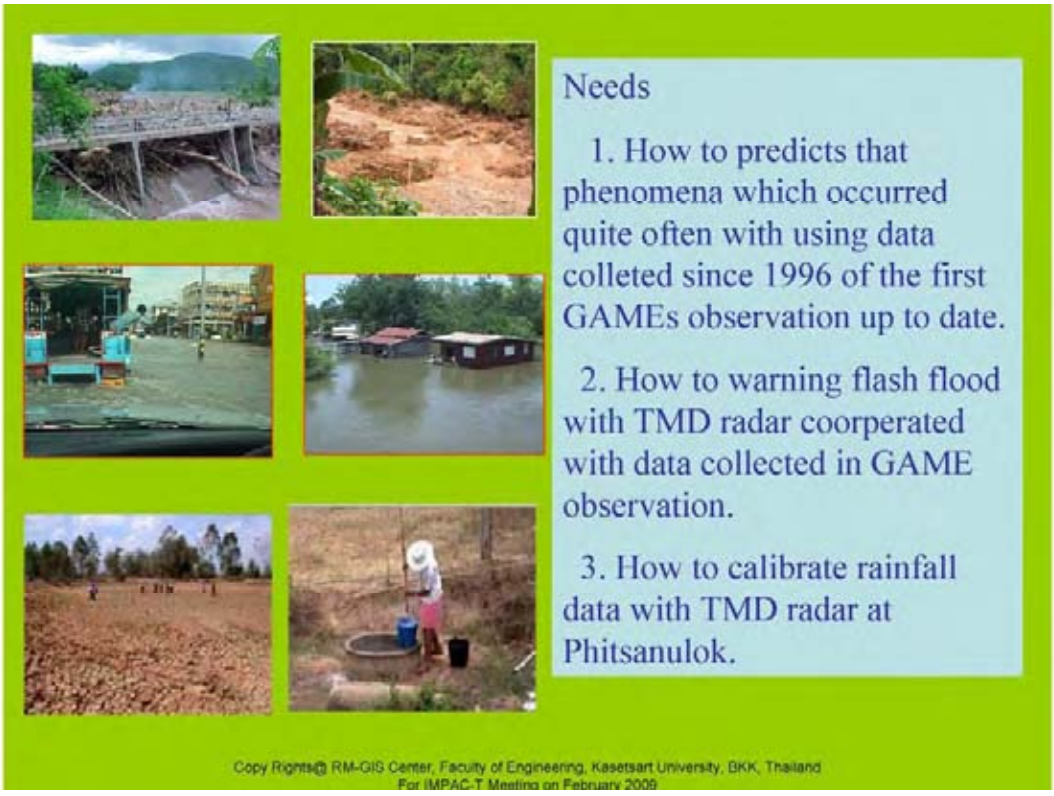
Needs
1. How to predicts that phenomena which occurred quite often with using data colleted since 1996 of the first GAMEs observation up to date.
2. How to warning flash flood with TMD radar coorperated with data collected in GAME observation.
3. How to calibrate rainfall data with TMD radar at Phitsanulok.
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Thank you
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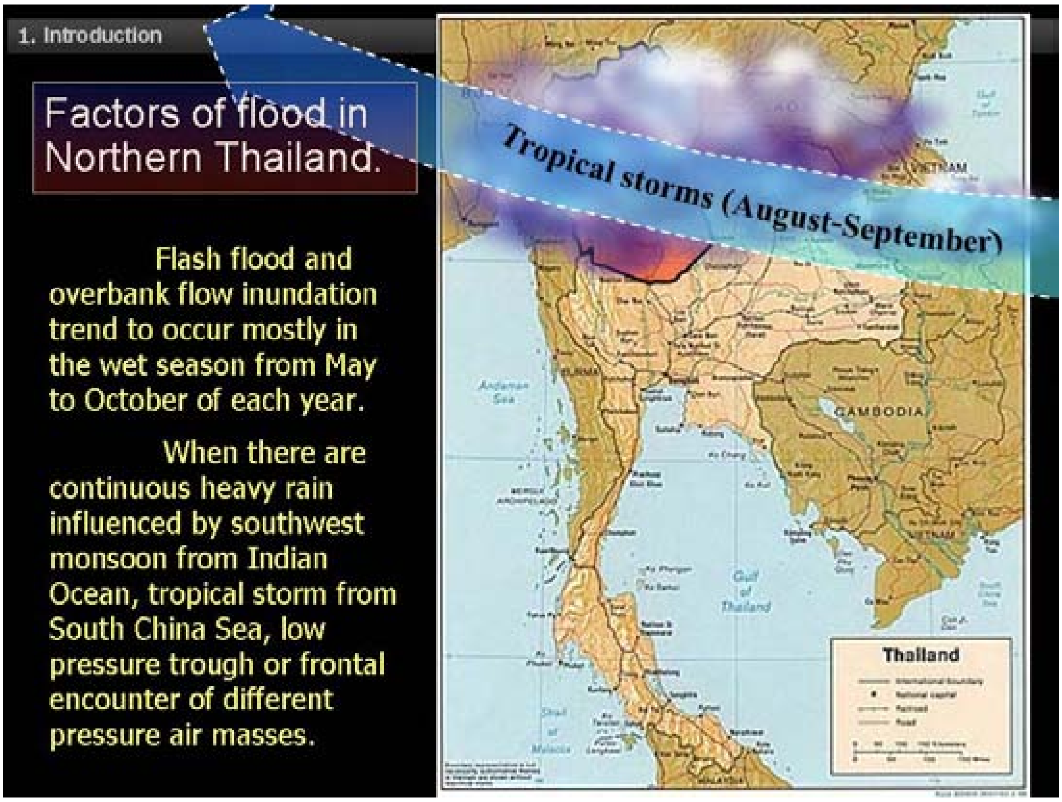
APPROPRIATE FLOOD WARNING SYSTEM in NORTHERN THAILAND

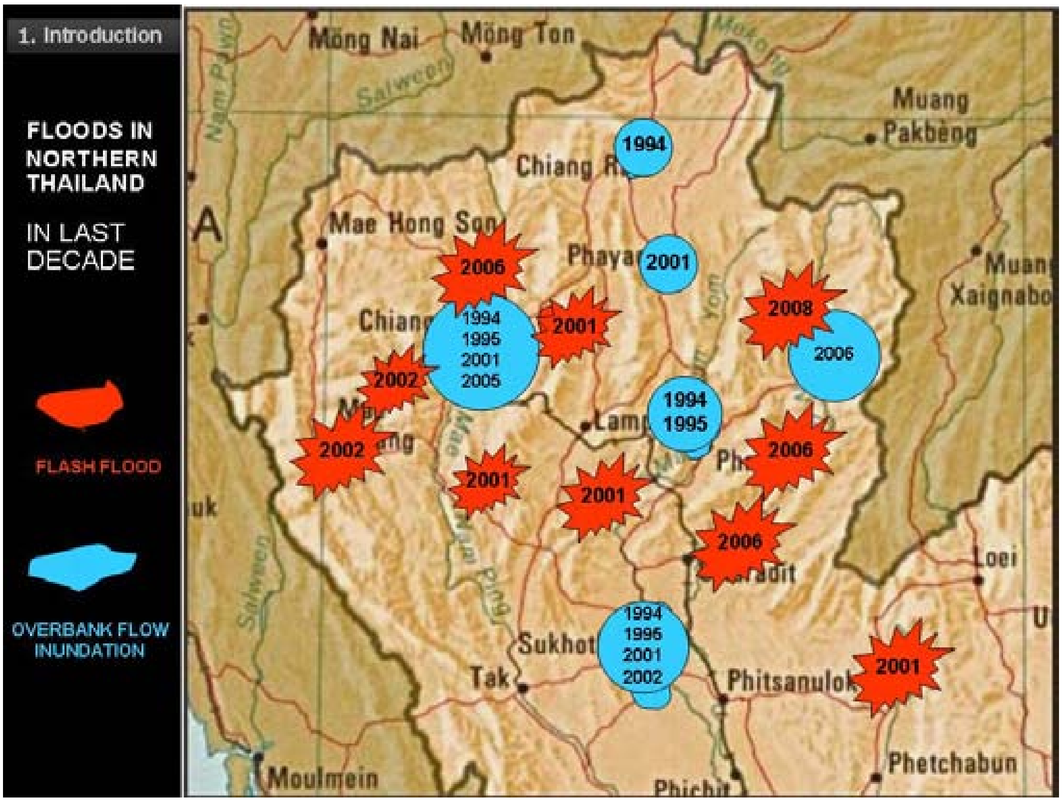
Thada Sukhapunnaphan

APHW, Beijing, China, 5 November 2008

CONTENT

1. Introduction
2. Types of Flood in Northern Thailand
   - 2.1 Overbank flow inundation
   - 2.2 Flash flood
3. Causes and factors of flood and debris flow
4. Flood Warning System Management
   - 4.1 Rainfall
   - 4.2 River water level
5. Public awareness
6. Conclusion


1. Introduction
Factors of flood in Northern Thailand.
Flash flood and overbank flow inundation trend to occur mostly in the wet season from May to October of each year.
When there are continuous heavy rain influenced by southwest monsoon from Indian Ocean, tropical storm from South China Sea, low pressure trough or frontal encounter of different pressure air masses.
Tropical storms (August-September)
CAMBODIA
Thailand


1. Introduction
FLOODS IN NORTHERN THAILAND
IN LAST DECADE
FLASH FLOOD
OVERBANK FLOW INUNDATION
Mong Nai
Mong Ton
Muang Pakbeng
Mae Hong Son
Phitsanulok
Phetchabun
Moulmein
Tak
Loei
1994
2001
2006
1994 1995 2001 2005
2001
2008
2006
2002
1994 1995
2002
2006
2001
2001
2006
1994 1996 2001 2002
2001

2. Types of Flood in Northern Thailand

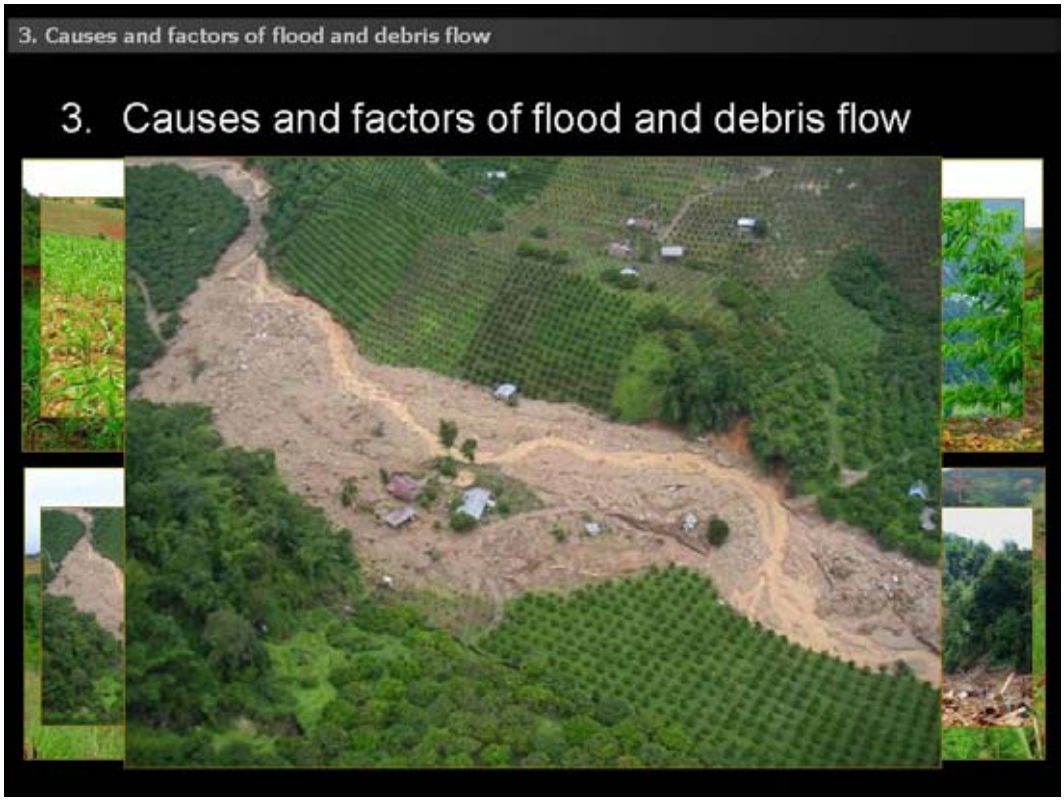
2.1 Overbank flow inundation

2.2 Flash flood

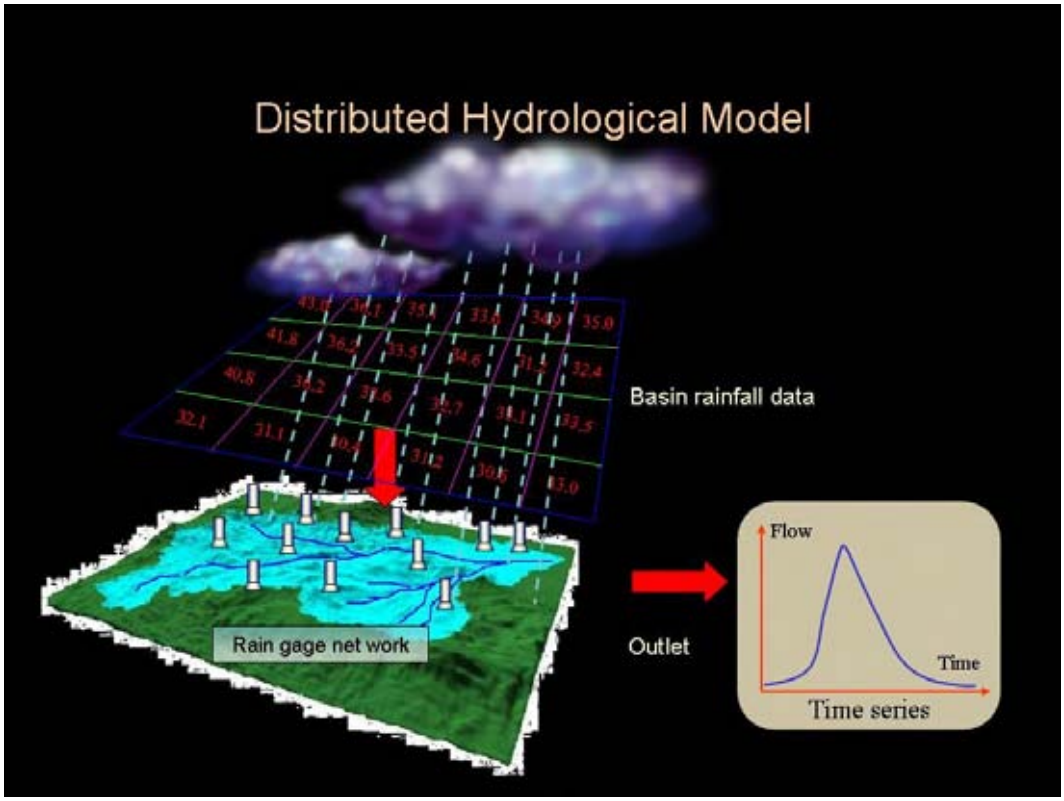
2.1 Overbank flow inundation

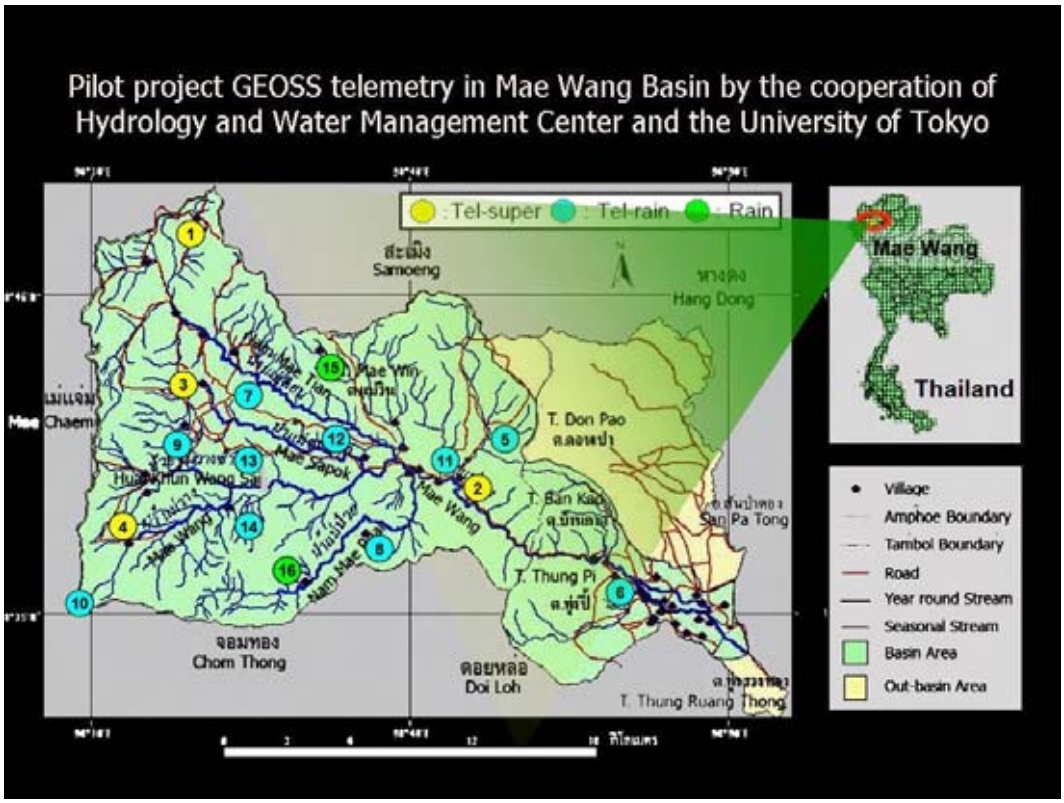
Flood in Chiang Mai city 2005

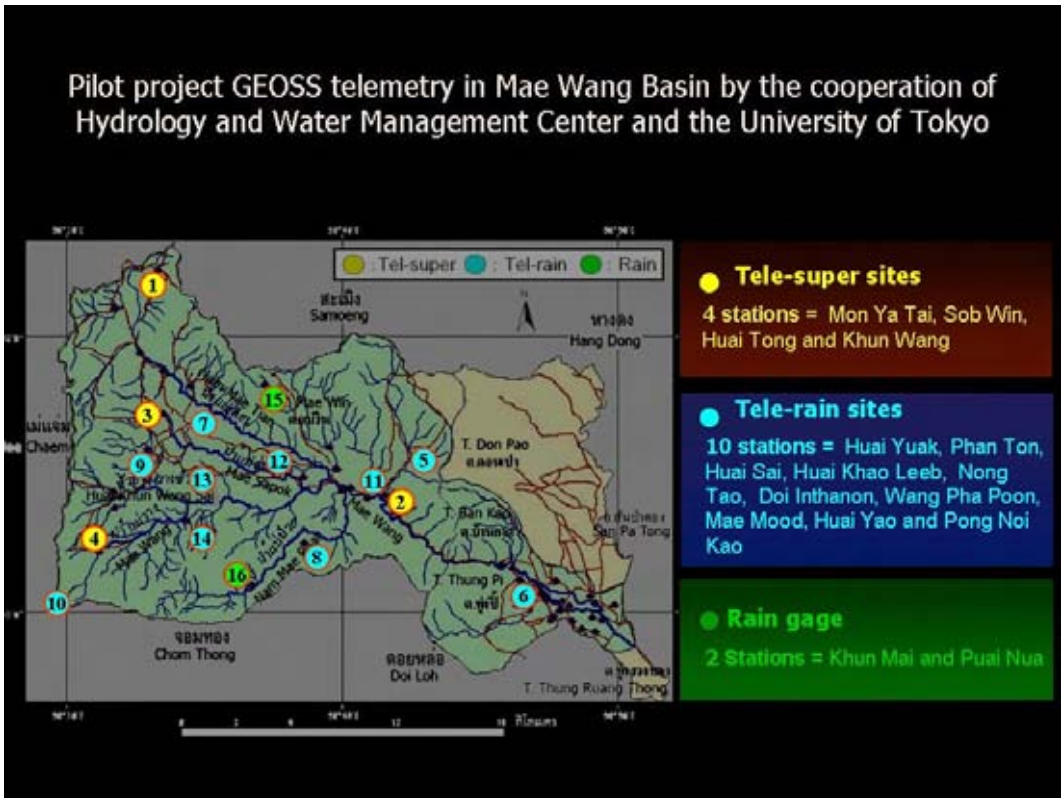

2. Types of Floods in Northern Thailand
2.2 Flash flood
and debris flow


3. Causes and factors of flood and debris flow
3. Causes and factors of flood and debris flow

4. Flood Warning System Management
4.1 Rainfall

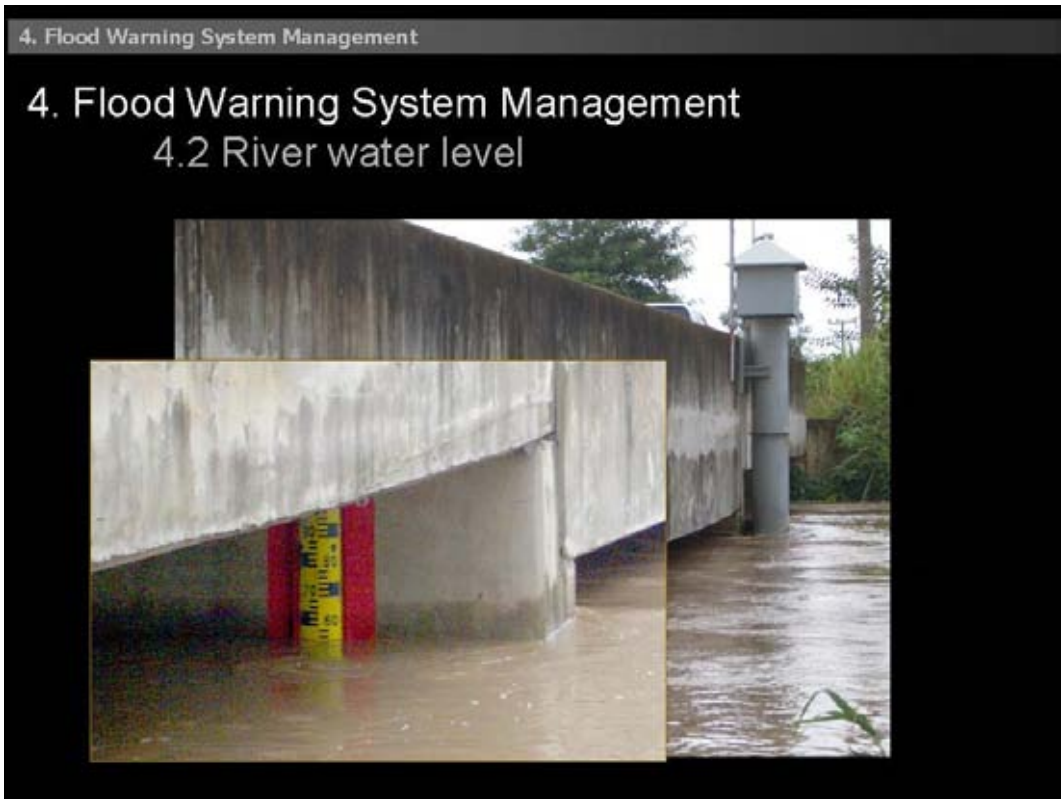


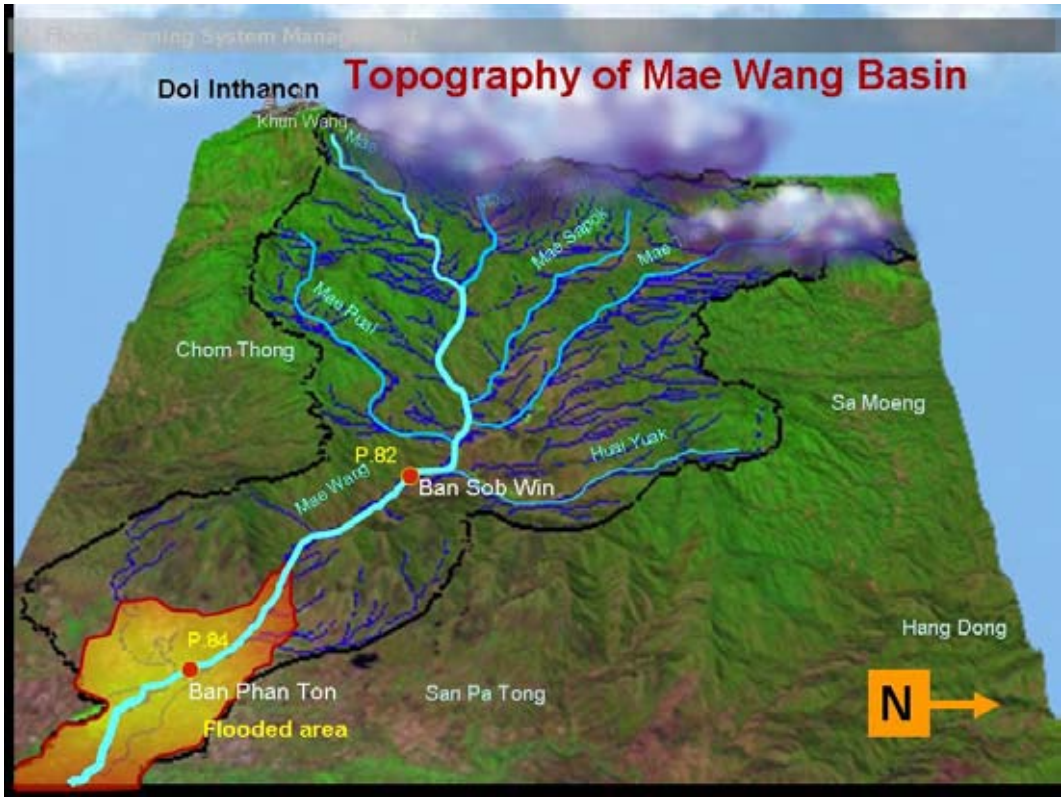

Pilot project GEOSS telemetry in Mae Wang Basin by the cooperation of Hydrology and Water Management Center and the University of Tokyo
: Tel-super
: Tel-rain
: Rain
Samoeng
Hang Dong
Mae Chaem
T. Don Pao
T. Ban Kad
T. Thung Pi
San Pa Tong
Chom Thong
Doi Loh
T. Thung Ruang Thong
Mae Wang
Thailand
Village
Amphoe Boundary
Tambol Boundary
Road
Year round Stream
Seasonal Stream
Basin Area
Out-basin Area


Pilot project GEOSS telemetry in Mae Wang Basin by the cooperation of Hydrology and Water Management Center and the University of Tokyo
: Tel-super
: Tel-rain
: Rain
Tele-super sites
4 stations = Mon Ya Tai, Sob Win, Huai Tong and Khun Wang
Tele-rain sites
10 stations = Huai Yuak, Phan Ton, Huai Sai, Huai Khao Leeb, Nong Tao, Doi Inthanon, Wang Pha Poon, Mae Mood, Huai Yao and Pong Noi Kao
Rain gage
2 Stations = Khun Mai and Pual Nua


Doi Inthanon
ต.แม่วิน
Watch out !!
The water level
now at P.82 is
reaching 3.80 m.
Oh, that means
4-5 hours later,
the water level here
at P.84 will also rise to
the critical point
at 4.00 m.!!
P.82
บ.สบวิน
B.SObWin
Mae Wang River
น.แม่วาง
ต.บ้านกาศ
P.84
บ.พันตน B.Phan Ton
ต.ทุ่งปี
บ.วังผาปุน
บ.ห้วยหยวก


7 5 2006


4. Flood Warning System Management
4. Flood Warning System Management
4.2 River water level


Topography of Mae Wang Basin
Doi Inthanon
Khun Wang
Mae Sapok
Mae Puai
Chom Thong
Sa Moeng
P.82
Ban Sob Win
Mae Wang
Huai Yuak
P.84
Ban Phan Ton
Flooded area
San Pa Tong
Hang Dong
N

4. Flood Warning System Management

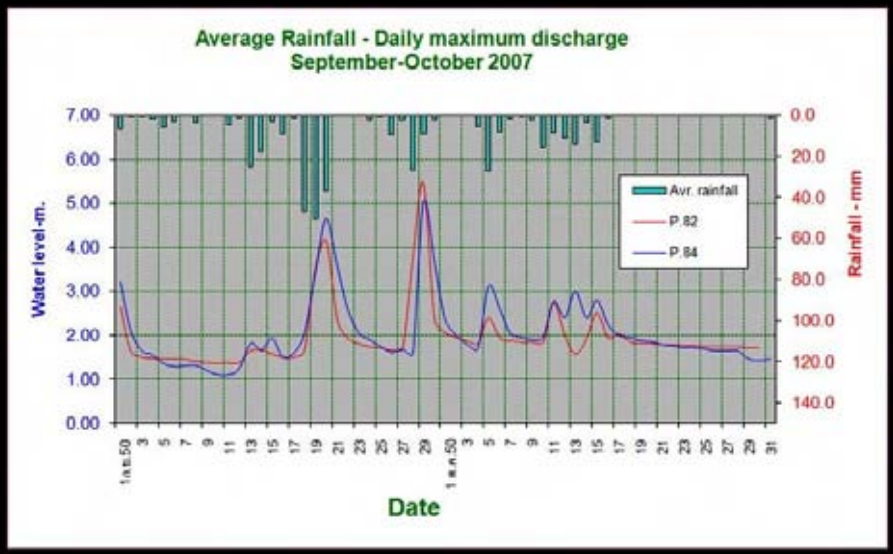
Manual measurement

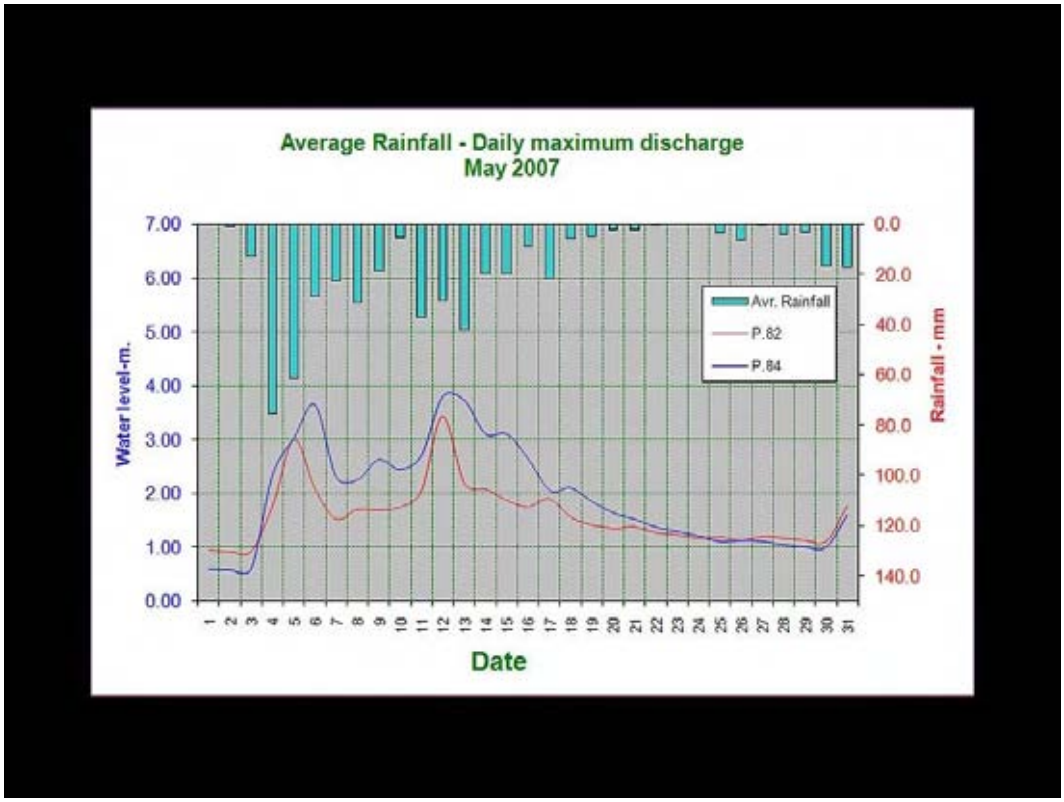
Discharge and water level measurement by hydrological stations

Station P.82 Ban Sob Win

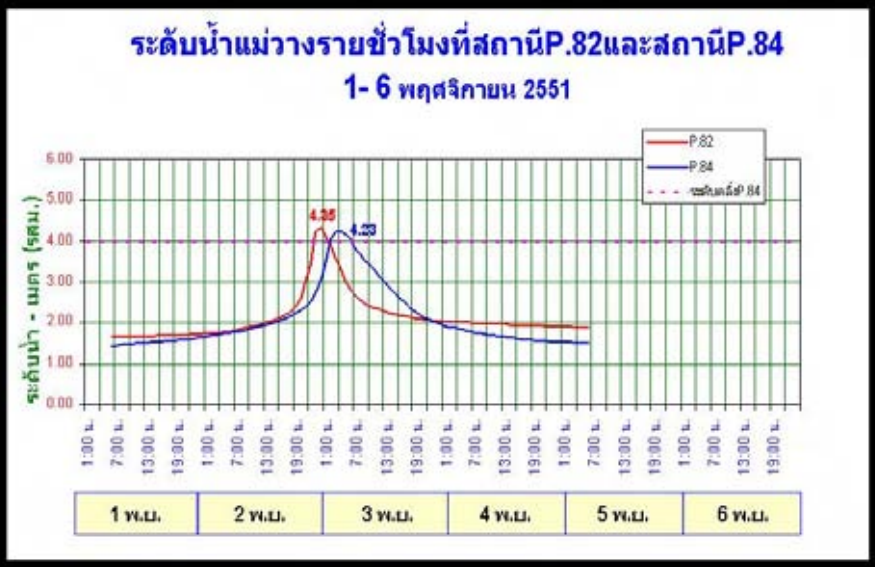
Station P.84 Ban Phan Ton

Hydrology and Water management Center
for Upper Northern Region



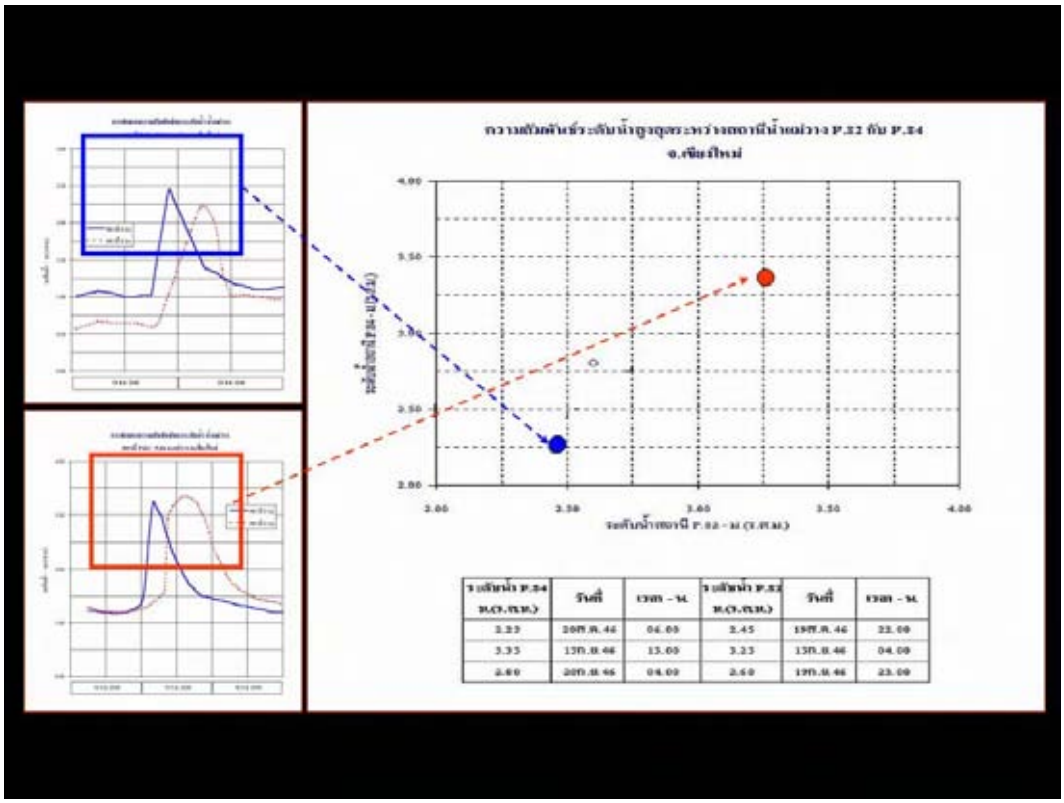

Average Rainfall - Daily maximum discharge
May 2007
Water level-m.
Rainfall - mm
Date
Avr. Rainfall
P.82
P.84
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

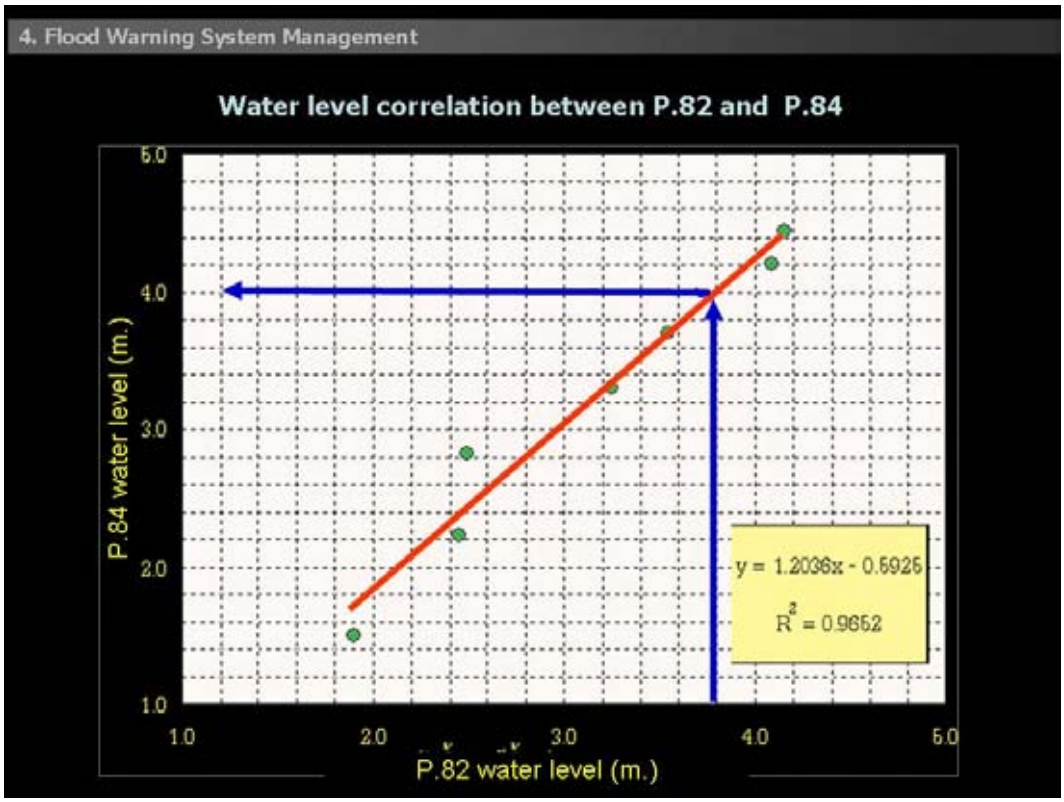
2-3 Nov 2008

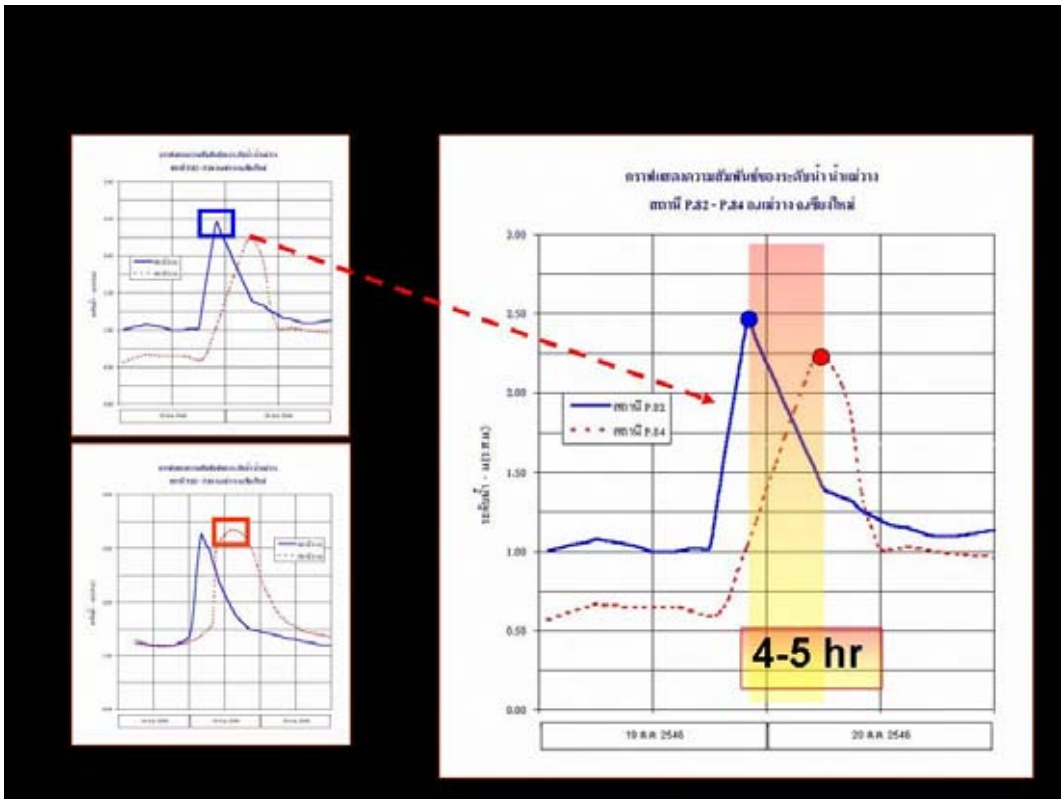


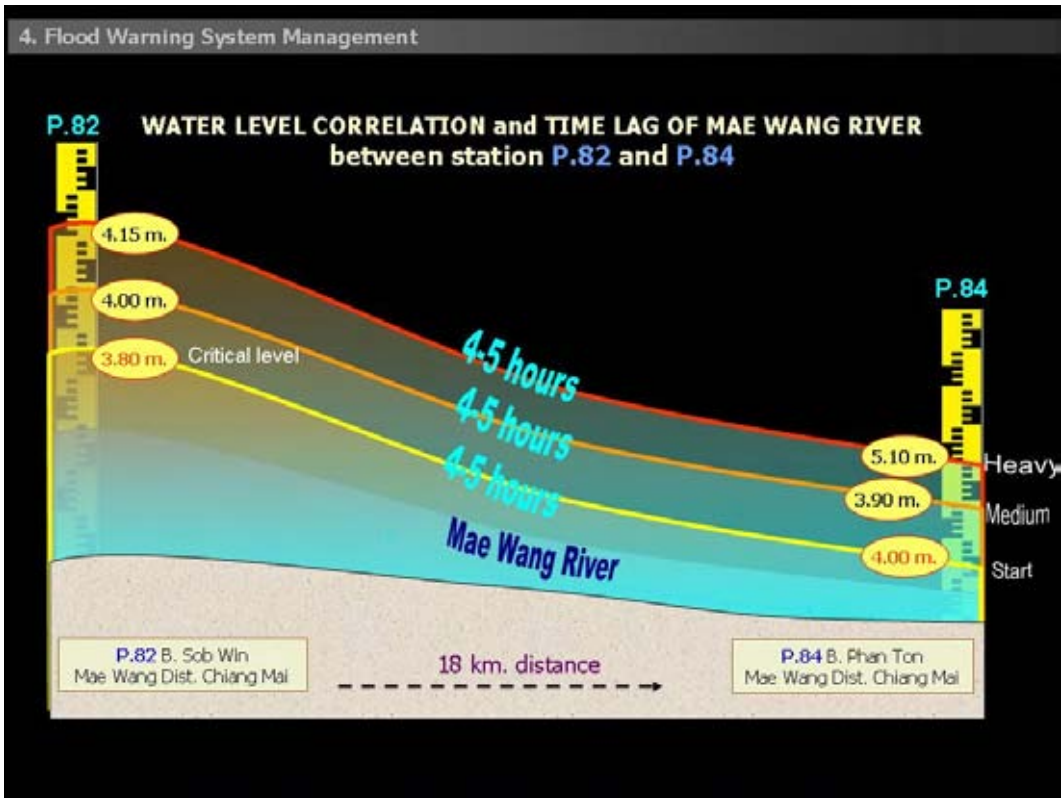
Flood peak record

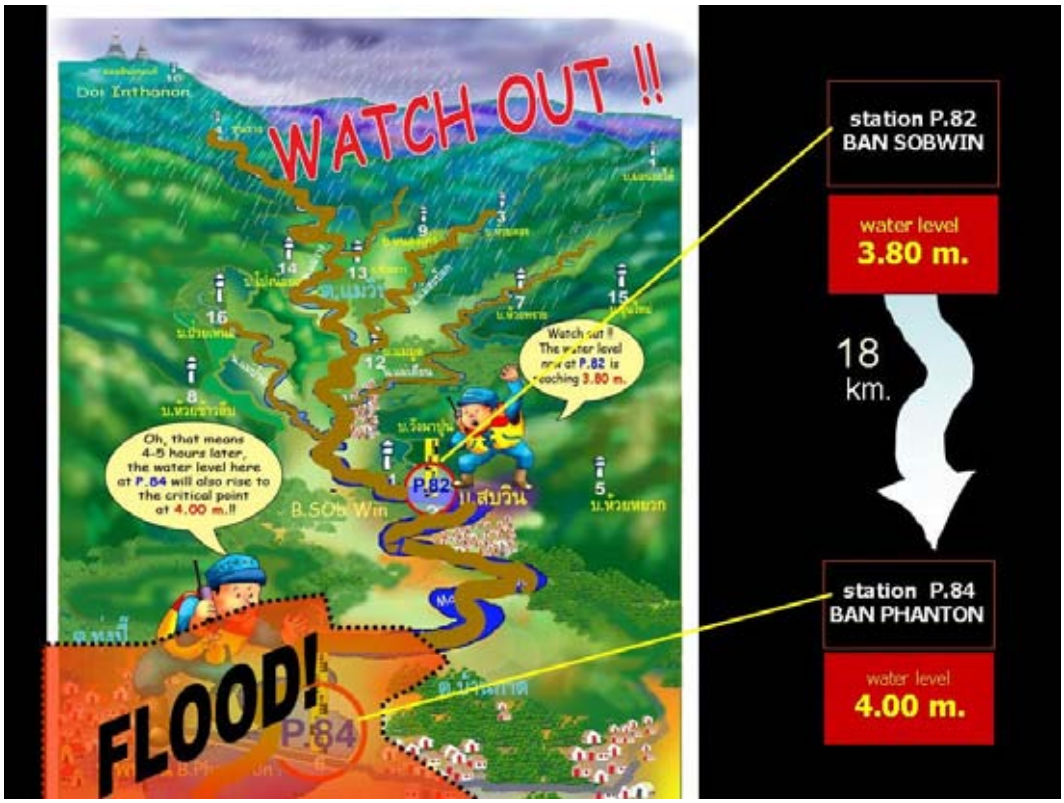
Station P.82 Water Level –m.	Date	Time-hr.	Station P.84 Water Level –m.	Date	Time-hr.
2.45	19 Aug 2003	22.00	2.23	20 Aug 2003	06.00
3.25	15 Aug 2003	04.00	3.30	15 Sept2003	01.00
2.50	24 Sept 2003	10.00	2.82	24 Sept 2003	15.00
1.90	11 Sept 2003	18.00	1.50	11 Supt 2003	03.00
3.55	1 Aug 2004	07.00	3.70	1 Aug 2004	09.00
4.09	18 Sept 2005	04.00	4.20	18 Sept 2005	10.00
4.15	10 Sept 2006	23.00	4.45	11 Sept 2006	04.00
5.44	29 Sept 2007	03.00	5.00	29 Sept 2007	04.00

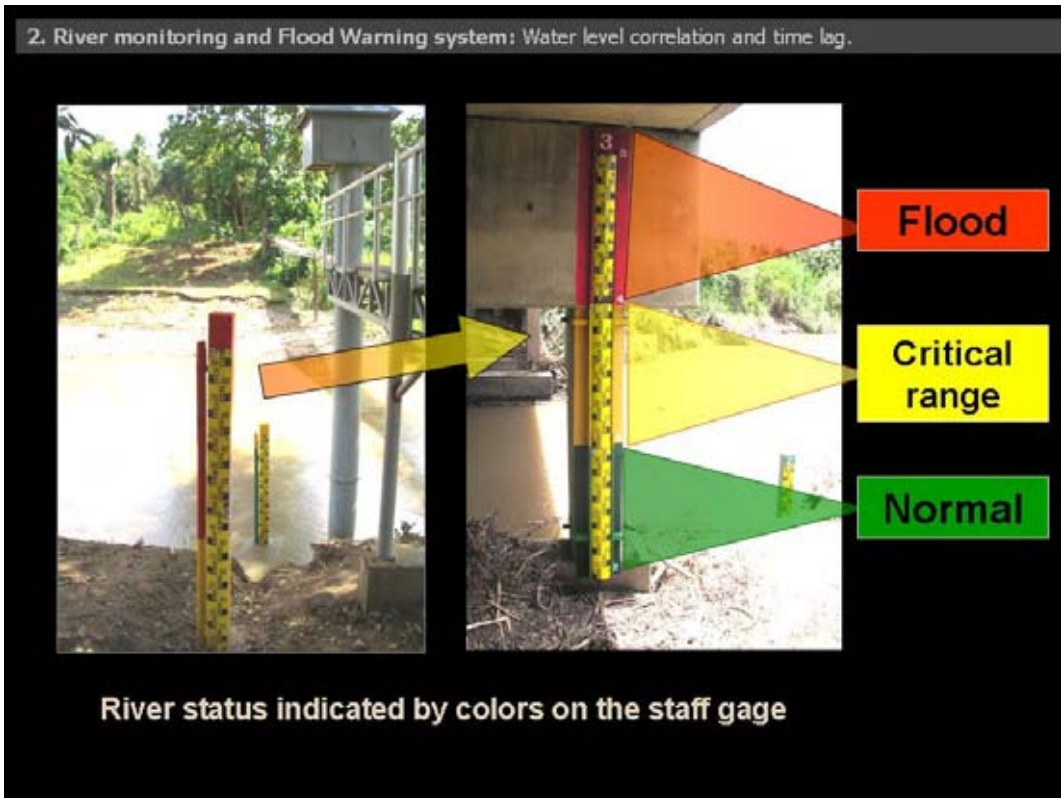


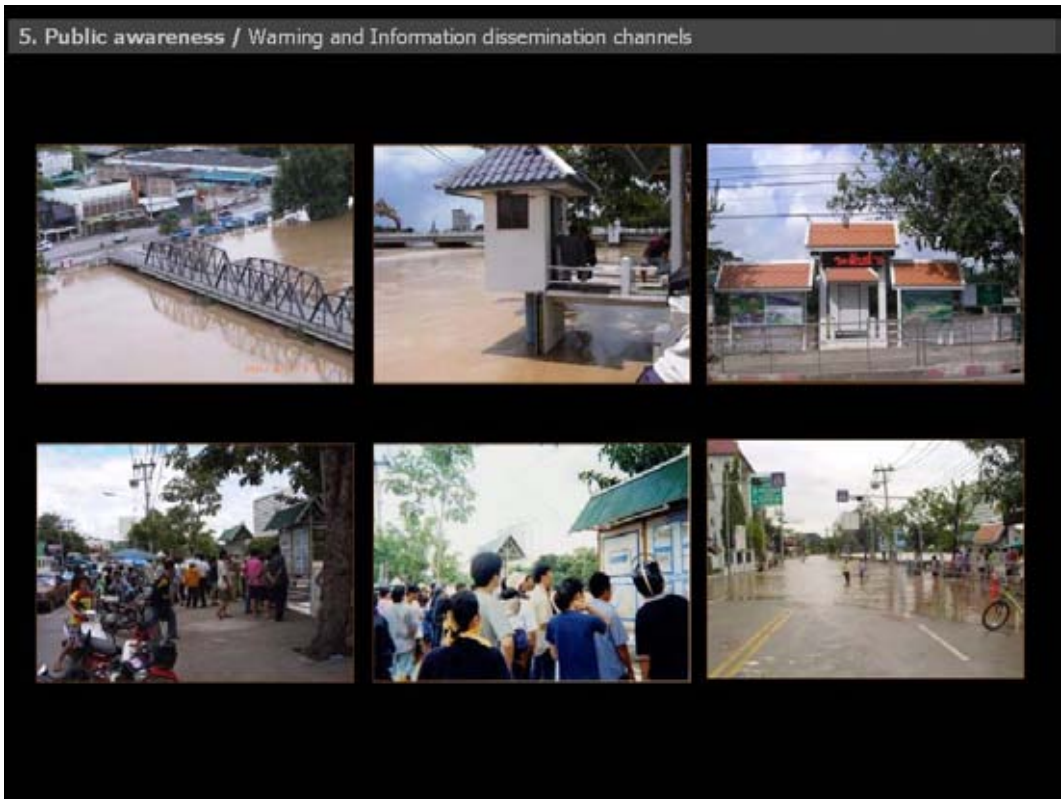

4. Flood Warning System Management
Water level correlation between P.82 and P.84
P.84 water level (m.)
P.82 water level (m.)
y = 1.2036x - 0.6925
R2 = 0.9652
1.0
2.0
3.0
4.0
5.0

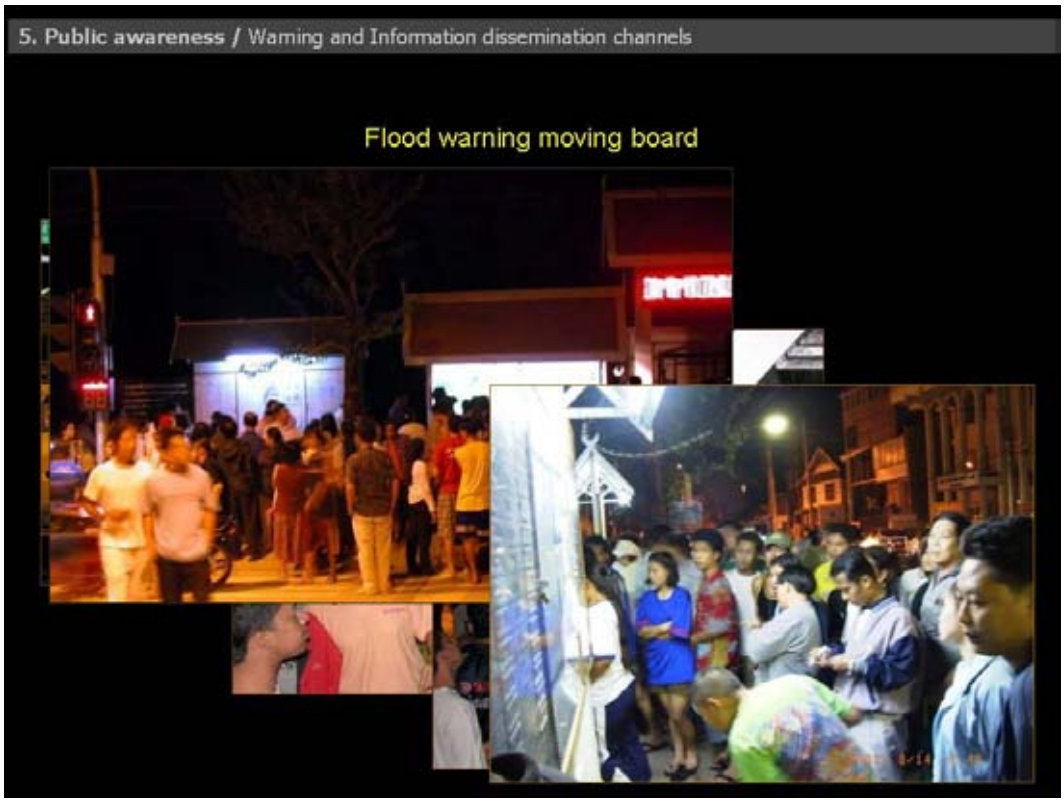

4-5 hr


4. Flood Warning System Management
P.82
WATER LEVEL CORRELATION and TIME LAG OF MAE WANG RIVER
between station P.82 and P.84
4.15 m.
4.00 m.
3.80 m.
Critical level
4.5 hours
4.5 hours
4.5 hours
Mae Wang River
P.84
5.10 m.
3.90 m.
4.00 m.
Heavy
Medium
Start
P.82 B. Sob Win
Mae Wang Dist. Chiang Mai
18 km. distance
P.84 B. Phan Ton
Mae Wang Dist. Chiang Mai


WATCH OUT !!
Doi Inthanon
Watch out ! The water level now at P.82 is reaching 3.80 m.
Oh, that means 4-5 hours later, the water level here at P.84 will also rise to the critical point at 4.00 m.!!
P.82
P.84
B.SOb Win
FLOOD!
station P.82
BAN SOBWIN
water level
3.80 m.
18
km.
station P.84
BAN PHANTON
water level
4.00 m.

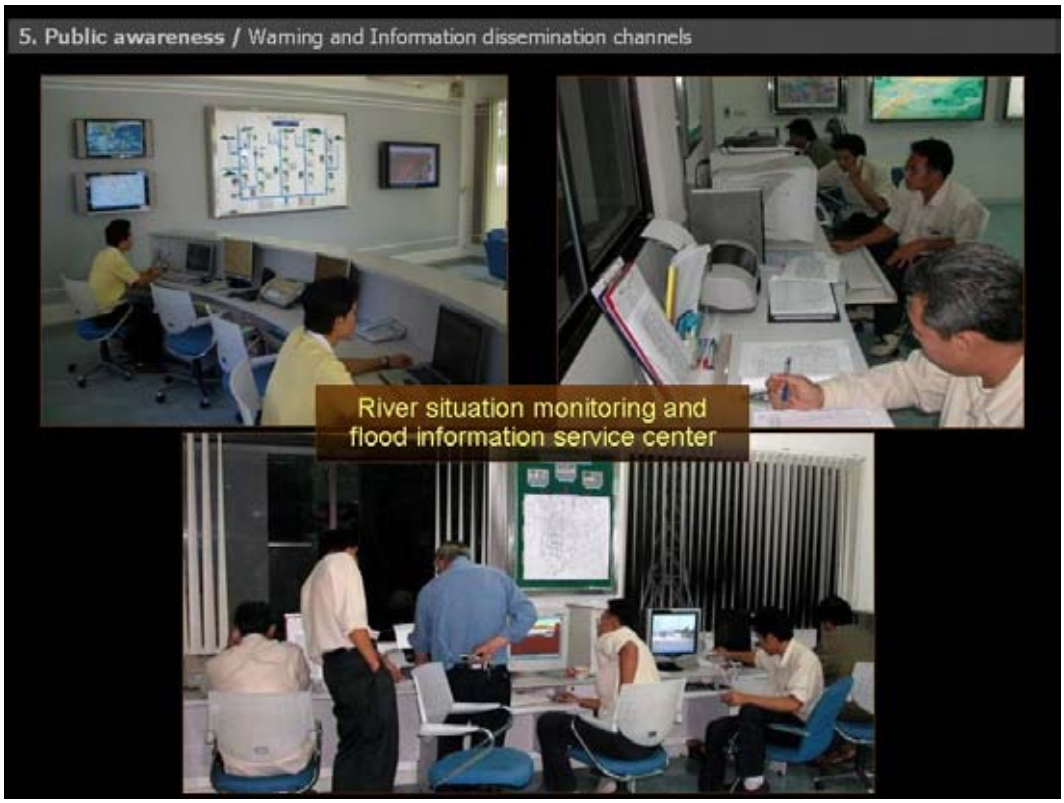

2. River monitoring and Flood Warning system: Water level correlation and time lag.
Flood
Critical range
Normal
River status indicated by colors on the staff gage

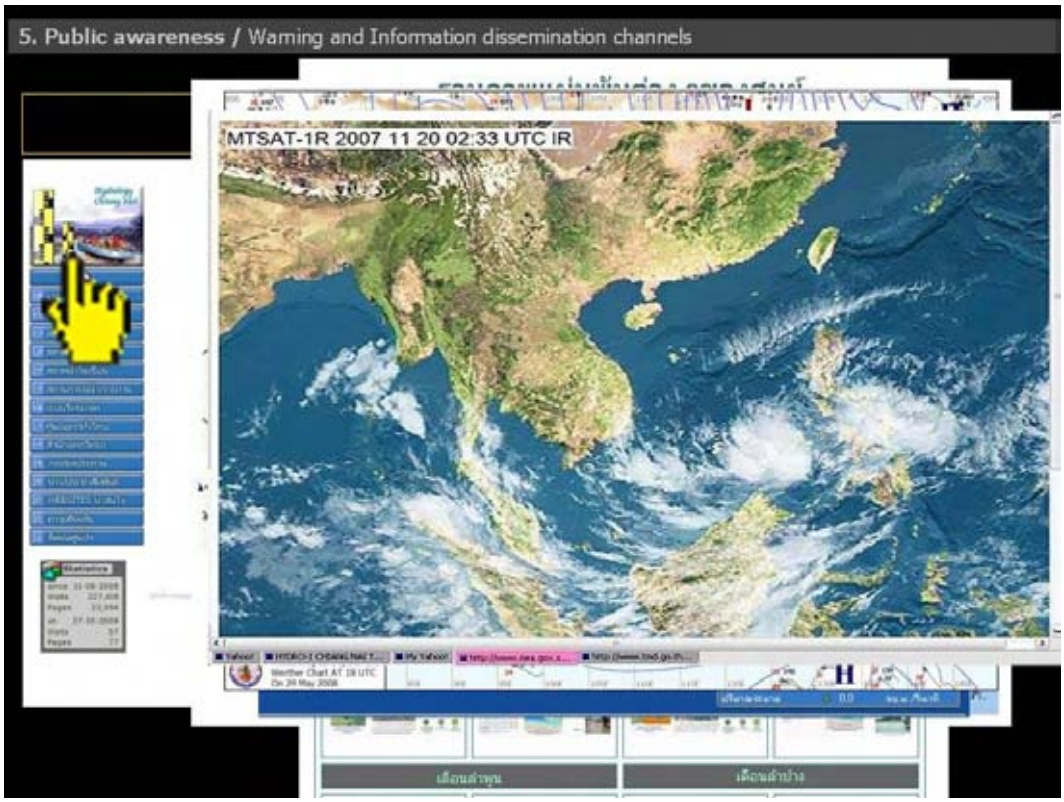

5. Public awareness / Warning and Information dissemination channels


5. Public awareness / Warning and Information dissemination channels
Flood warning moving board


6. Public awareness / Warning and Information dissemination channels
5. Public awareness
น้ำมาแล้ว !!
เตือนภัยน้ำท่วมลุ่มน้ำแม่วาง
P.82
P.84


28.08.2008 18:22


5. Public awareness / Warning and Information dissemination channels
River situation monitoring and
flood information service center


5. Public awareness / Warning and Information dissemination channels
MTSAT-1R 2007 11 20 02:33 UTC IR

Conclusion

1. The development of an integrated system of data collection and monitoring, followed by subsequent forecasting, transmission and warning through a suitable telemetering system for flood warning in the main basin as well as developing a flash flood warning system in the sub-basin.

2. Create an effective public announcement system to disseminate flood and debris flow forecasting information.

3. Select an appropriate technology and effective method suitable for each basin.

Thank you for your attention