

Participation of Bangladesh in AWCI/GEOSS

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Back ground behind GEO membership of Bangladesh

- It was in the middle of 2005, Dr Koike, head of the Department of Civil Engineering of Tokyo University, invited Mr. Shah Iqbal, Joint Secretary of Ministry of Defense and the Director of Bangladesh Meteorological Department(BMD) to attend a seminar on GEOSS (AWCI- Asian water cycle symposium).
- Bangladesh representative having learned from the symposium, the utility of GEOSS (to countries of the world) through this seminar immediately notified the government. As a consequence of this, the Bangladesh government became a member of the GEOSS on 2006.
- Later a number of teleconferences and meetings (total three) were held to identify the project for model river basin in various countries.

In this venture Bangladesh selected MEGHNA RIVER BASIN as model basin for Bangladesh.

The other departments working with this venture are Bangladesh University Of Engineering and Technology (BUET) and one NGO.

Nine Societal Benefit Areas of GEOSS

1. Reduction and Prevention of Disasters
2. Human Health and Epidemiology
3. Energy Management
4. Climate Variability & Change
5. Water Management
6. Weather Forecasting
7. Ecosystems
8. Agriculture
9. Biodiversity



**BANGLADESH
GEOSS/AWCI**

**National Committee
+
Working Group**

Food & Disaster

Water Resources

Climate

Agriculture

Health

CLIMATE CHANGE

**Flood Drought Cyclone Storm surge Fisheries Forestry
Salinity Sea-level rise River-Erosion Biodiversity Ecosystems**

Impacts of CLIMATE CHANGE in Bangladesh

Climate change is the global issue and Bangladesh is not out of its danger. In Bangladesh increasing trends of Rainfall and Temperature are very clear. Other climate change impacts are also visible. Some examples are here.

GeoFea

Position of Bangladesh

30N

TIBETAN PLATEAU

20N

INDIA

MYANMAR

10N

BAY OF BENGAL

EQ

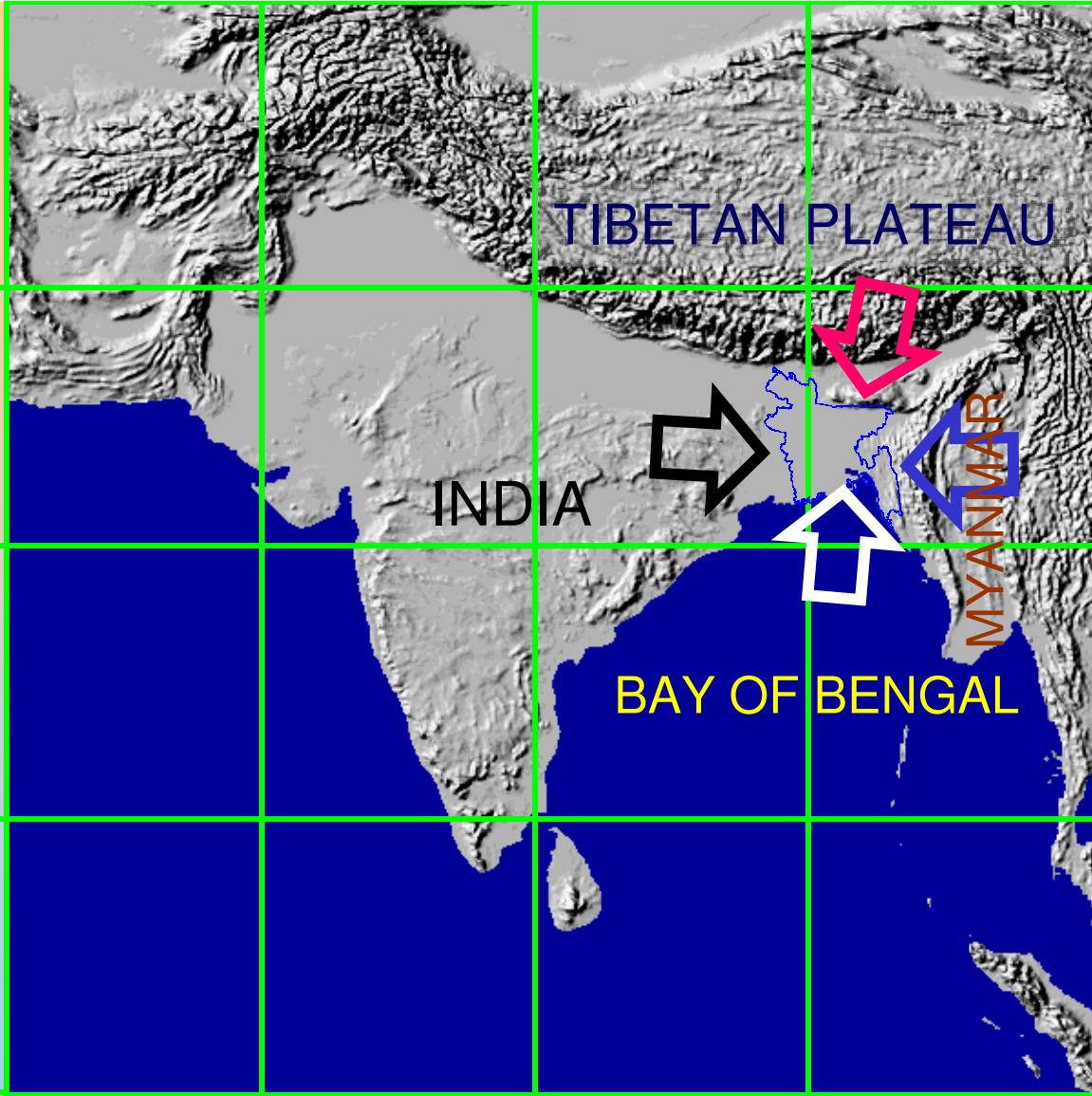
60E

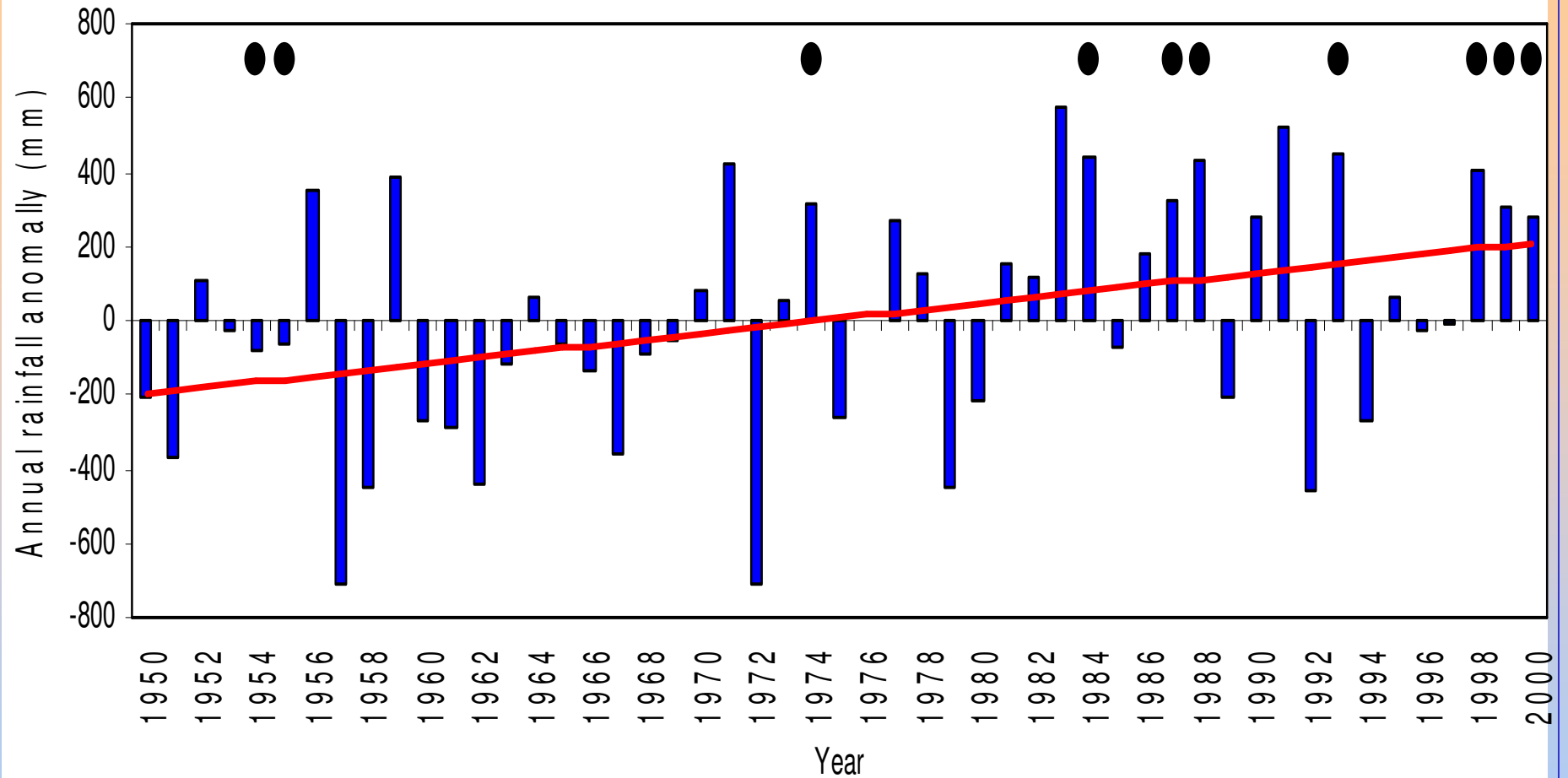
70E

80E

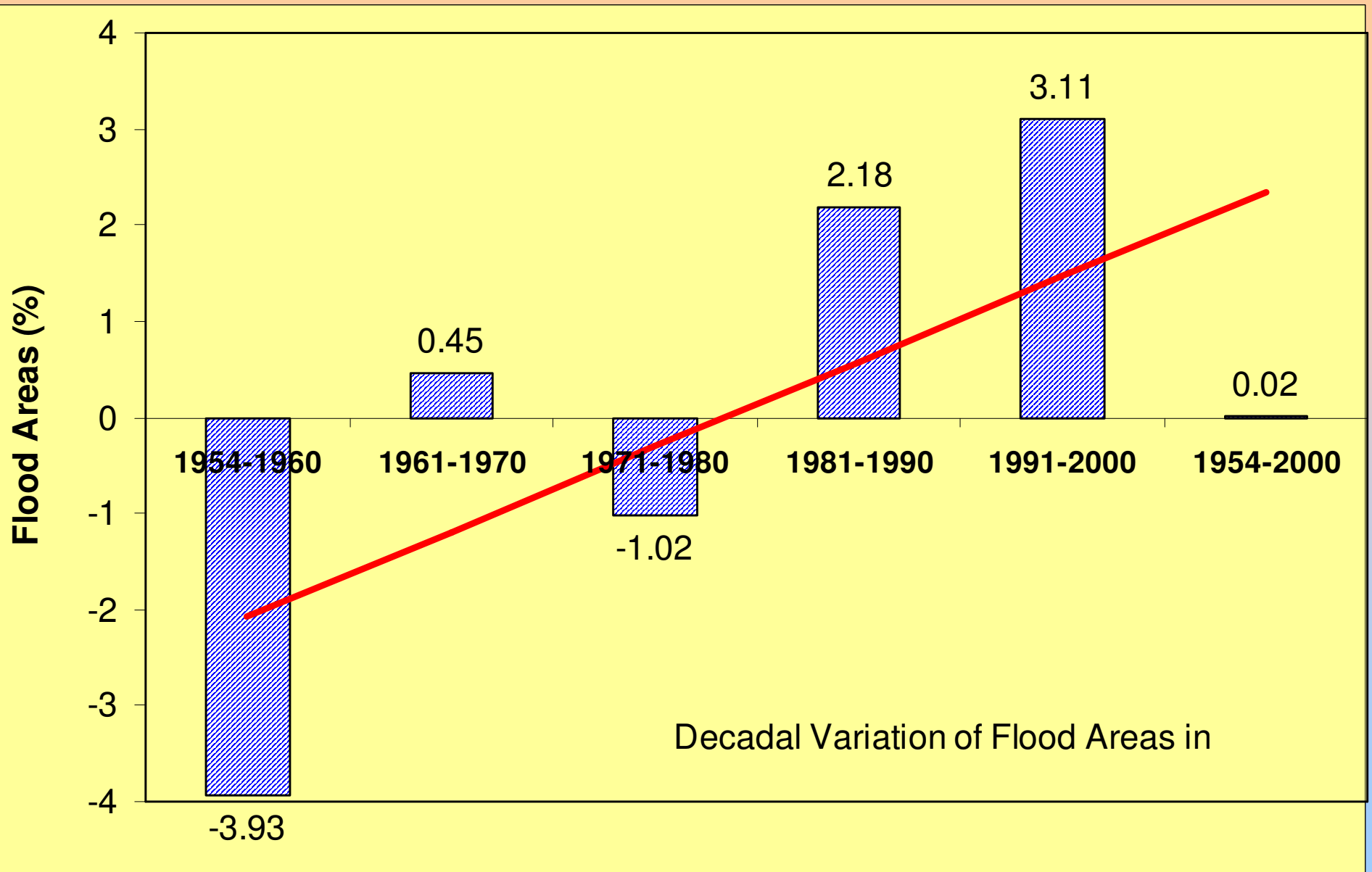
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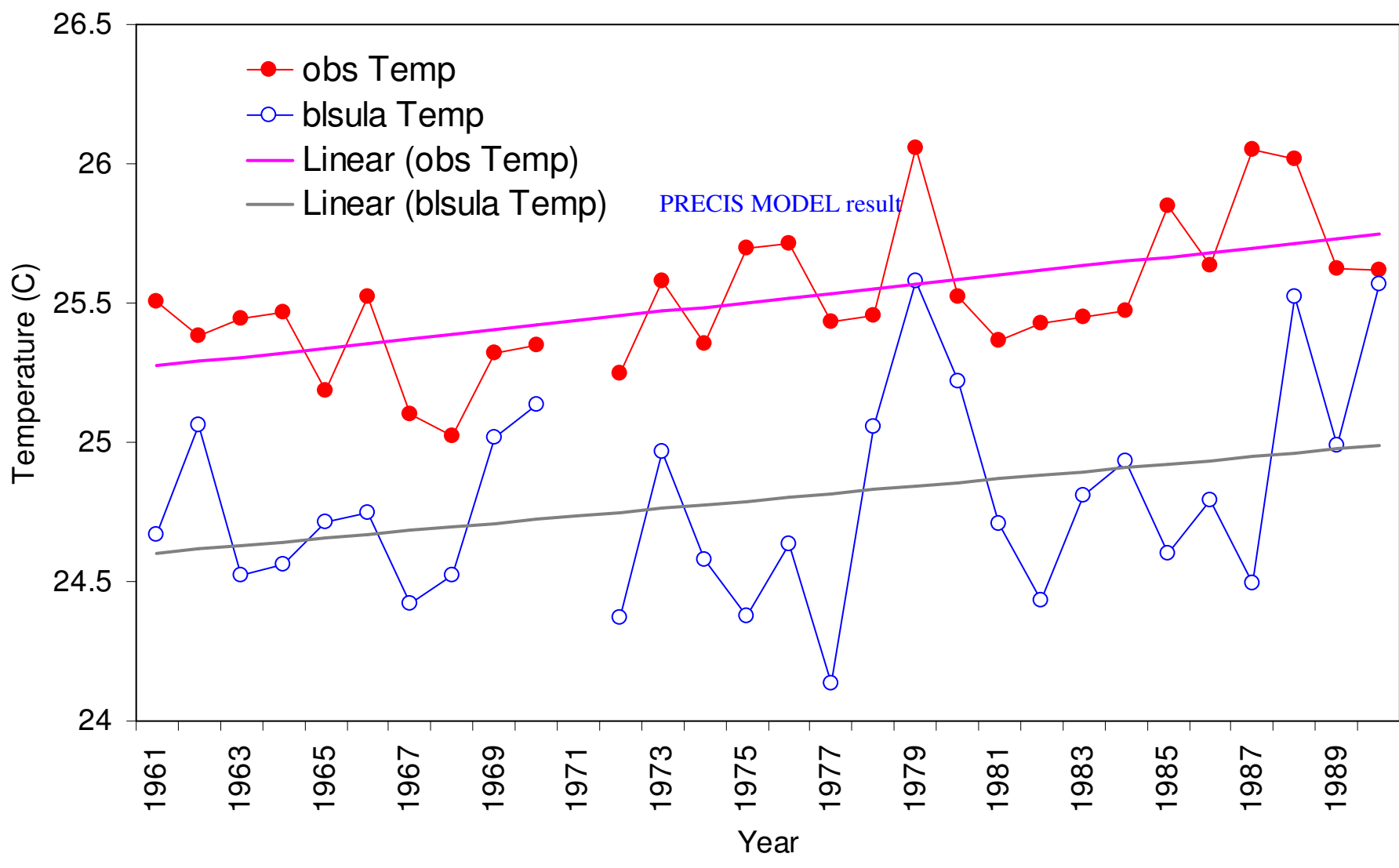
100E





Increasing Trend of Rainfall in Bangladesh





Increasing Trend of Temperature in Bangladesh

GANGES BRAHMAPUTRA MEGHNA BASINS



Bangladesh drains the combined water from catchment areas of the Ganges, Brahmaputra, and Meghna rivers, an area equivalent to 1.75 million square kilometers.

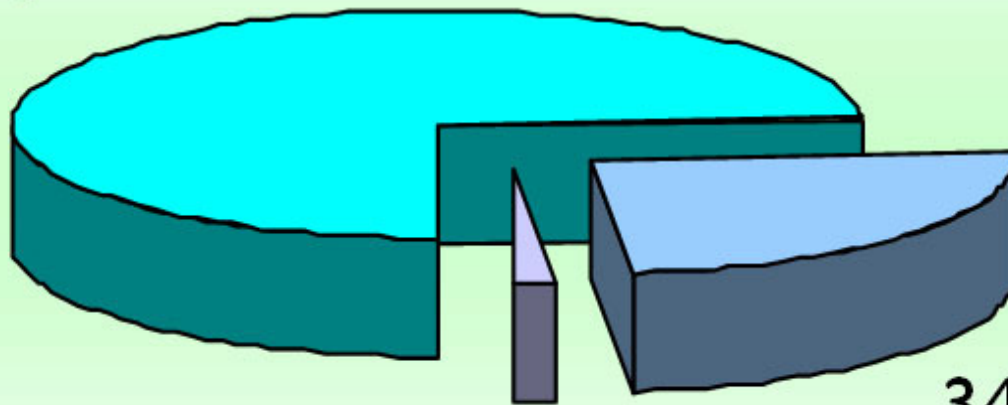
Sources of Water

Brahamaputra = 626 BCM
Ganges = 380 BCM
Meghna = 195 BCM

1200 BCM

- Trans-boundary
- Rainfall
- Ground water

76.5 %



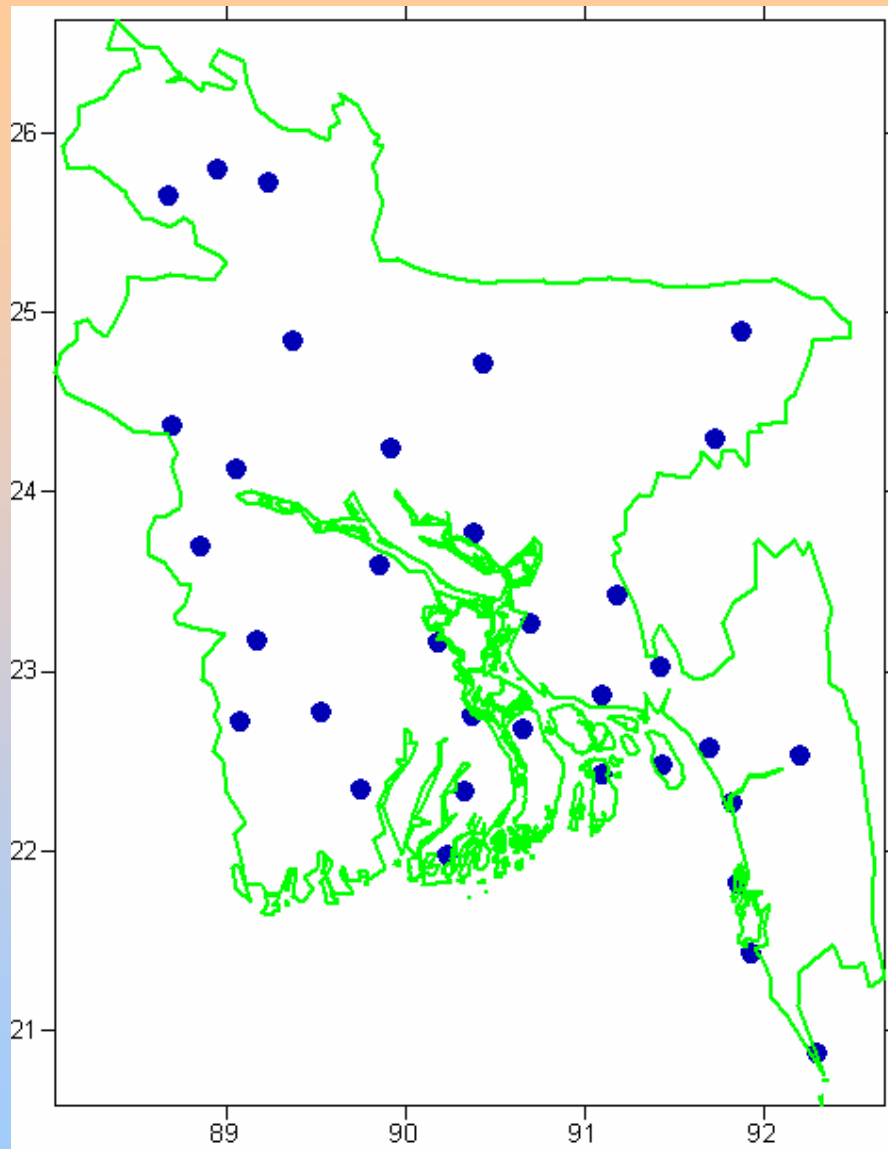
343 BCM

23 BCM

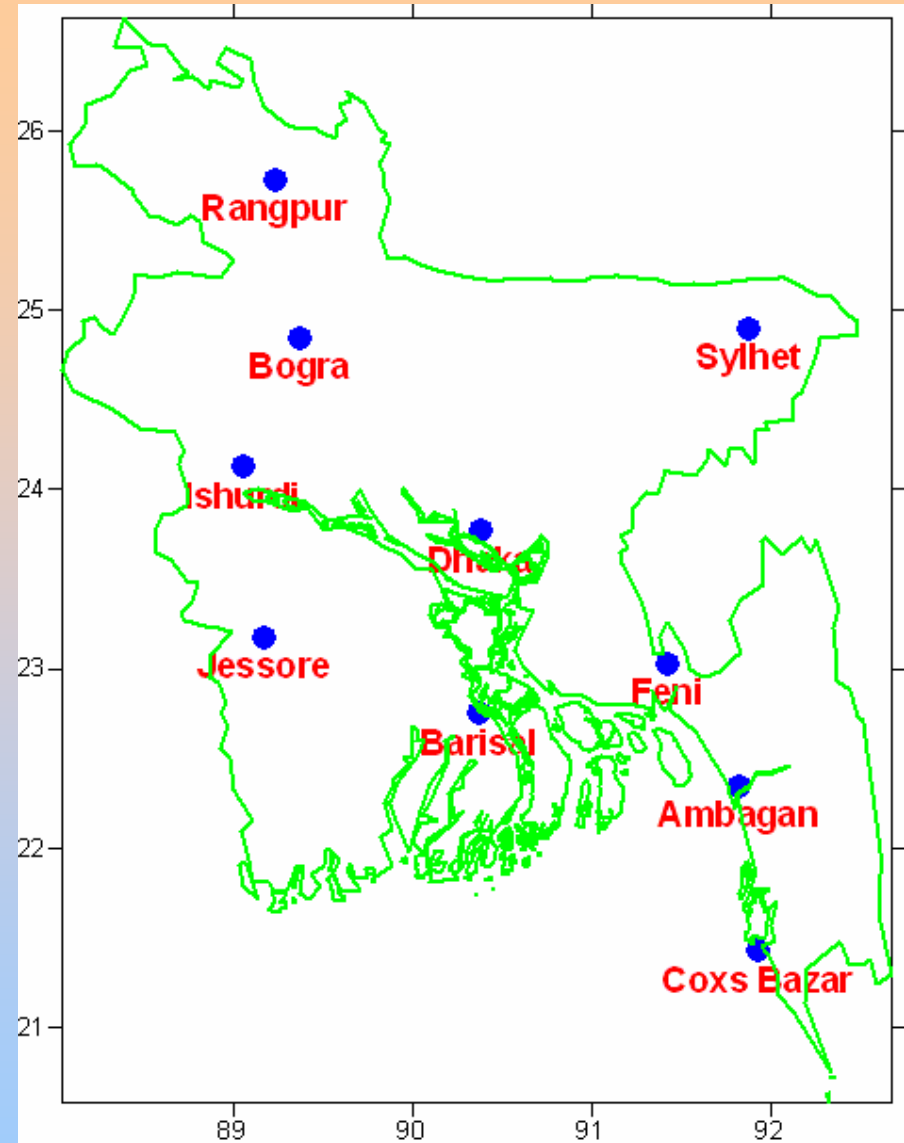
Cubic meter

22%

1.5 %

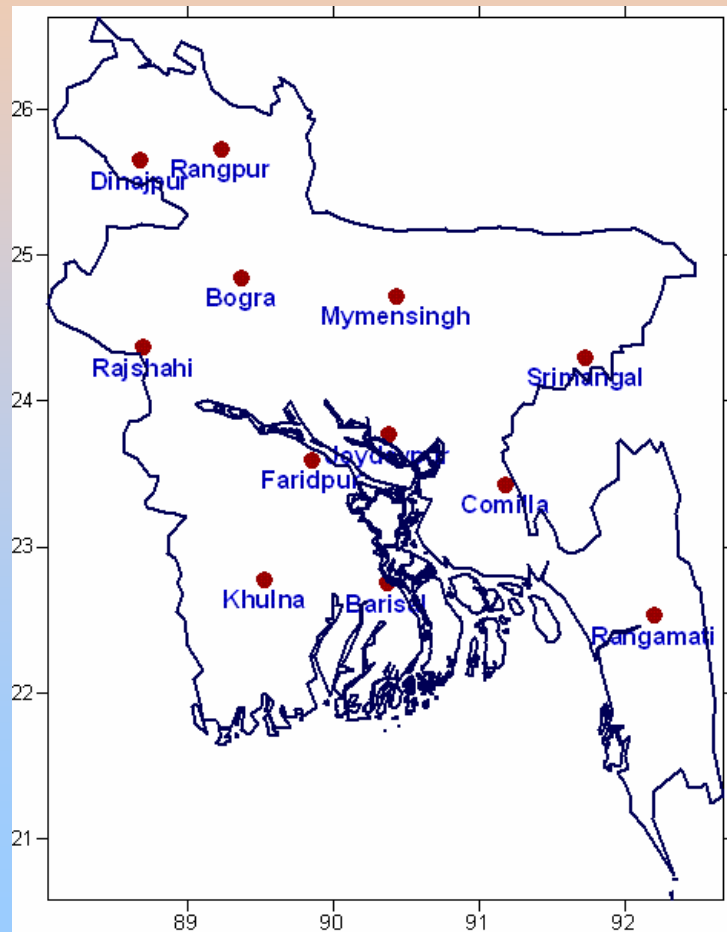


Location of operational **35 First Class Observatories** of BMD



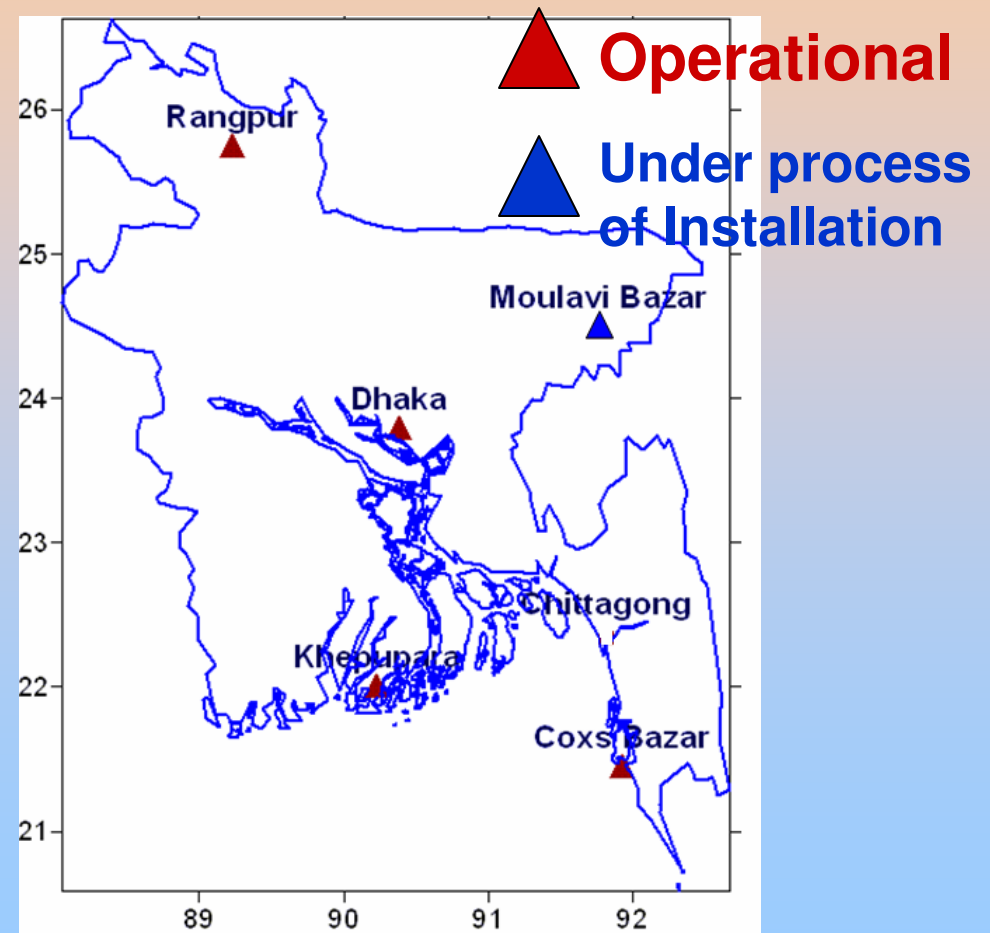
Location of operational **10 Pilot Balloon Observatories** of BMD

Location of 12 Agromet Observatories of BMD

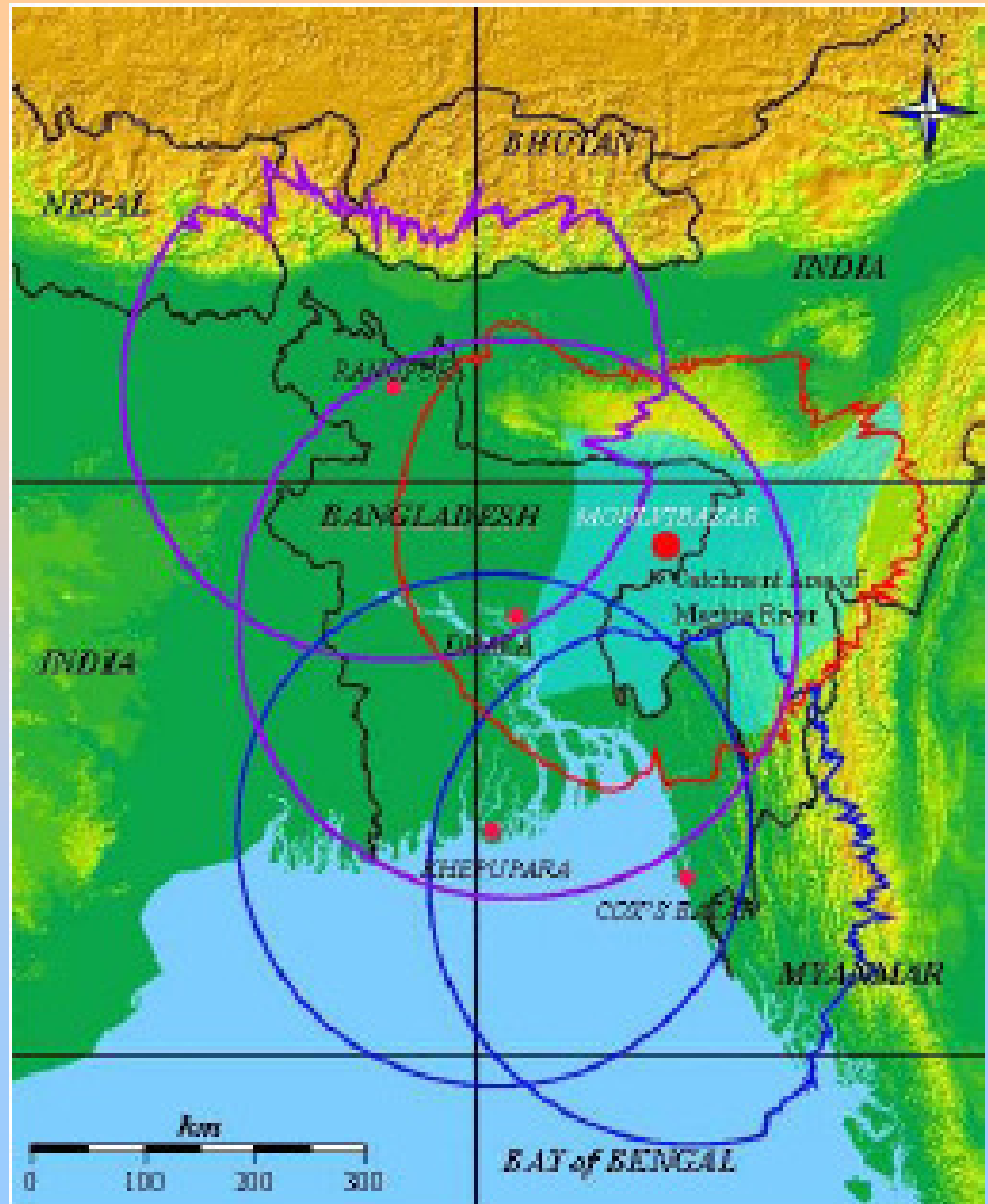


Location of RADAR Stations of BMD

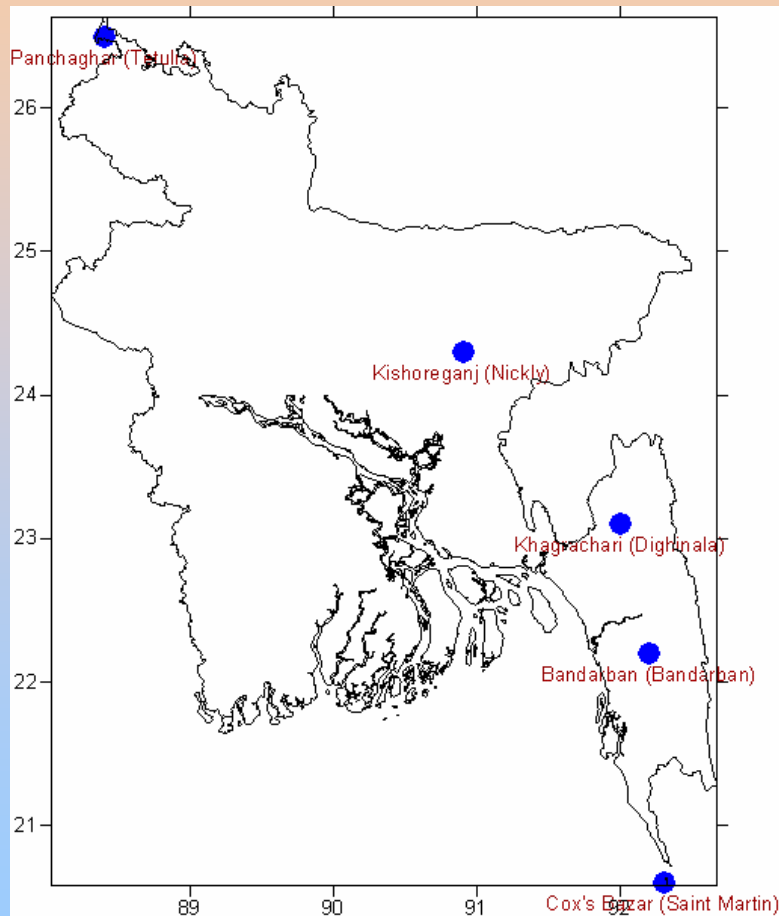
Legend



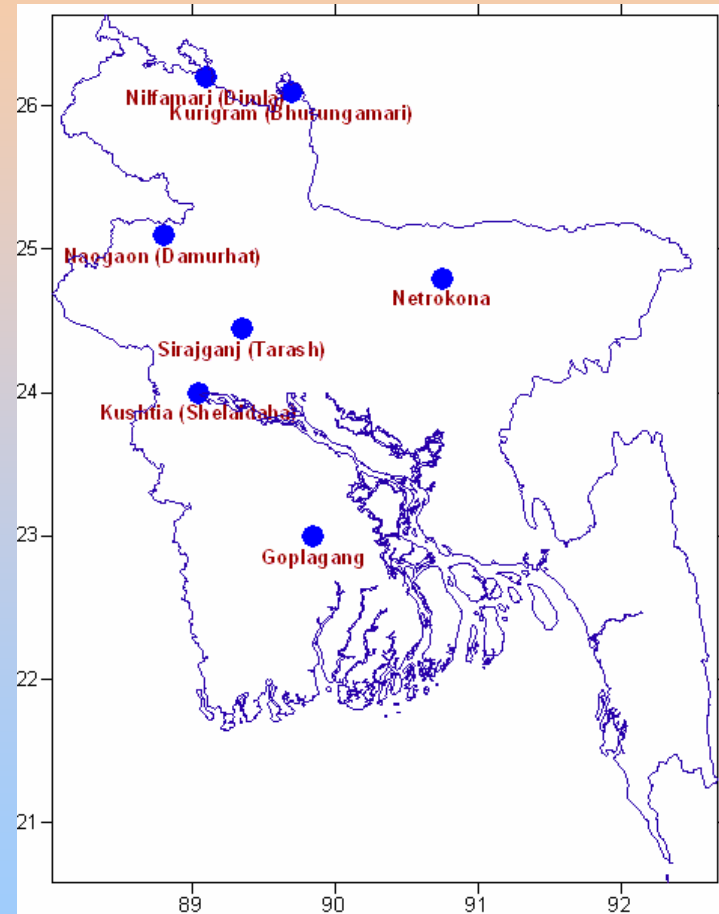
**Detection Range of
the Radar System
including the
Proposed one**



Bangladesh Meteorological Department has taken a project to establish 14 weather forecasting offices on the bank of different rivers for the reduction of accident of river-going vessels. The project is under process and is likely to be completed by June 2008. Besides,



BMD has taken up a project to establish 5 new First Class Observatories in addition to existing 35 First Class Observatories

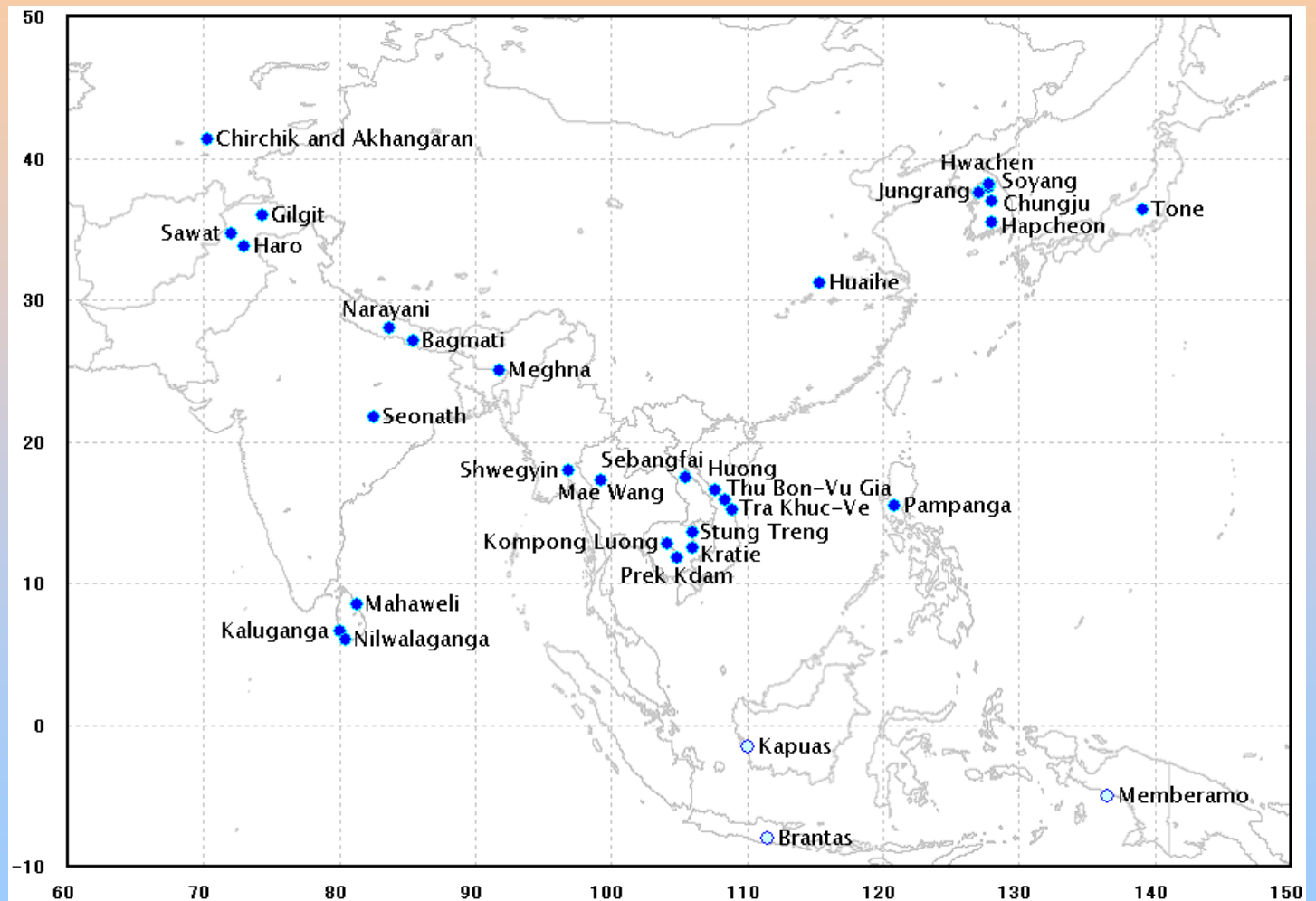


BMD has also taken up a project to establish 7 Agro-meteorological Observatories of BMD in addition to existing 11 Agro-meteorological Observatories of

GEOSS Asian Water Cycle Initiative (AWCI)

29 River Basins in 18 Countries

Bangladesh
has proposed
Meghna
River for
studying
water cycle
and flood.



WHY MEGHNA RIVER BASIN?

- In Bangladesh there are about 230 rivers including 3 major rivers (Ganges, Brahmaputra and Meghna). Trans boundary rivers affect climatic conditions of the country.
- Previously flood came at a greater time intervals (1954,1961,1974,1987,1988,1998,2004 and 2007) now the frequency is increasing with less time intervals.
- Certain infrastructural facilities in the form of rain gauges (digitized), establishment of Doppler radar(with Japanese assistance) and also data for rain and flood water are already available in this area.
- Moreover, this river although large but in comparison with other major rivers it is manageable. If we can make a humble effort in the flood forecast model of this river then it will also help us in flood forecast over the Brahmaputra to some extent.

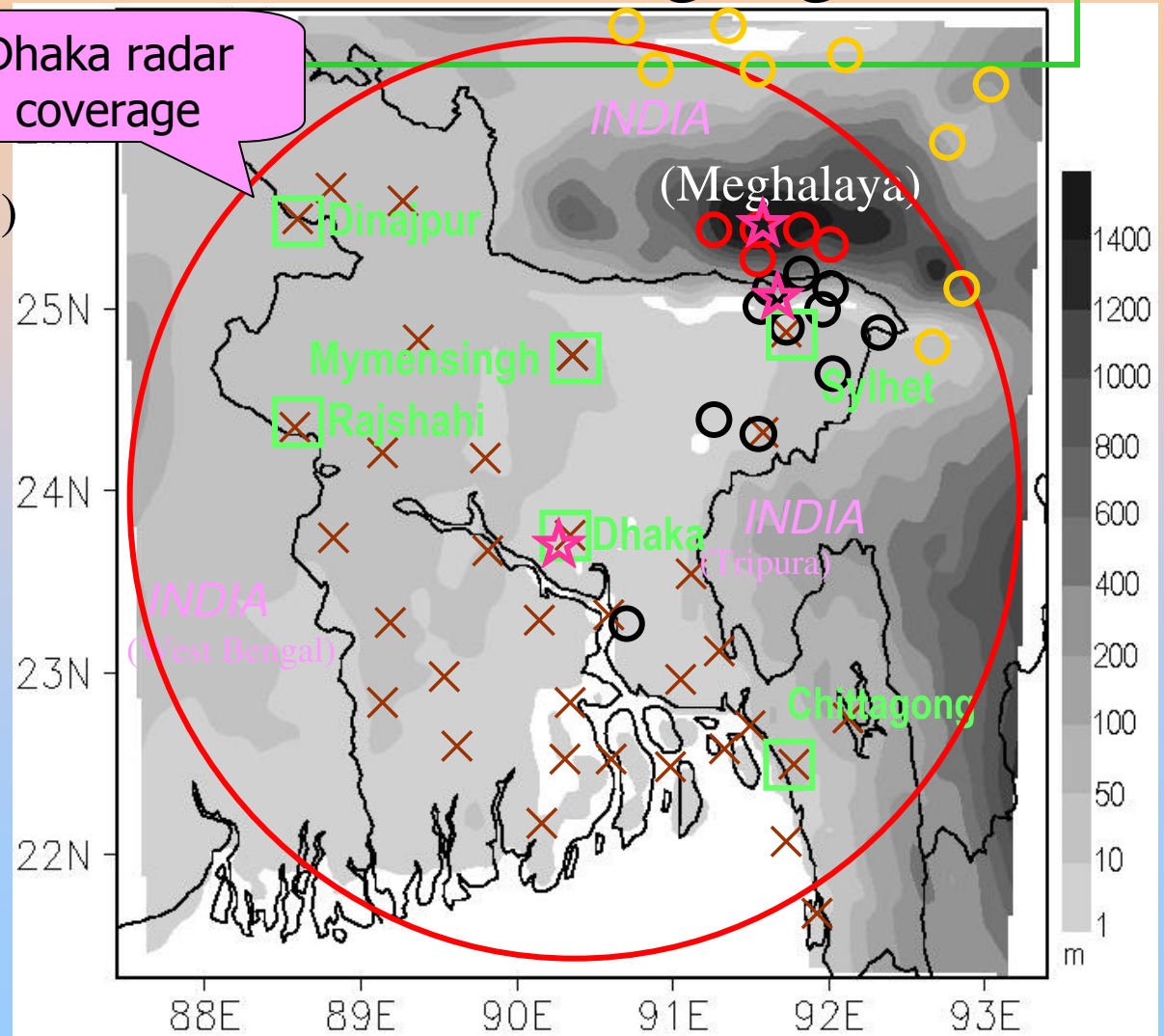
MAHASRI PROJECT

- Prof Hayashi of Kyoto University is carrying out a project under MAHASRI by establishing 10 automatic data logger for measuring rainfall over Sylhet region.
- This region has been selected because annual rainfall is maximum over this region due to orographic effects. Not only that, Sylhet region gets heavy rain within a short span of time, which causes flash flood during the pre-monsoon and southwest monsoon seasons.
- Prof Hayashi and his group also carried out upper air observations (Rawinsonde Observations) during the pre-monsoon and southwest monsoon seasons of 2007 in Bangladrsh.
- The data obtained will be very useful for the study of nor'westers, onset and on-going process of southwest monsoon.

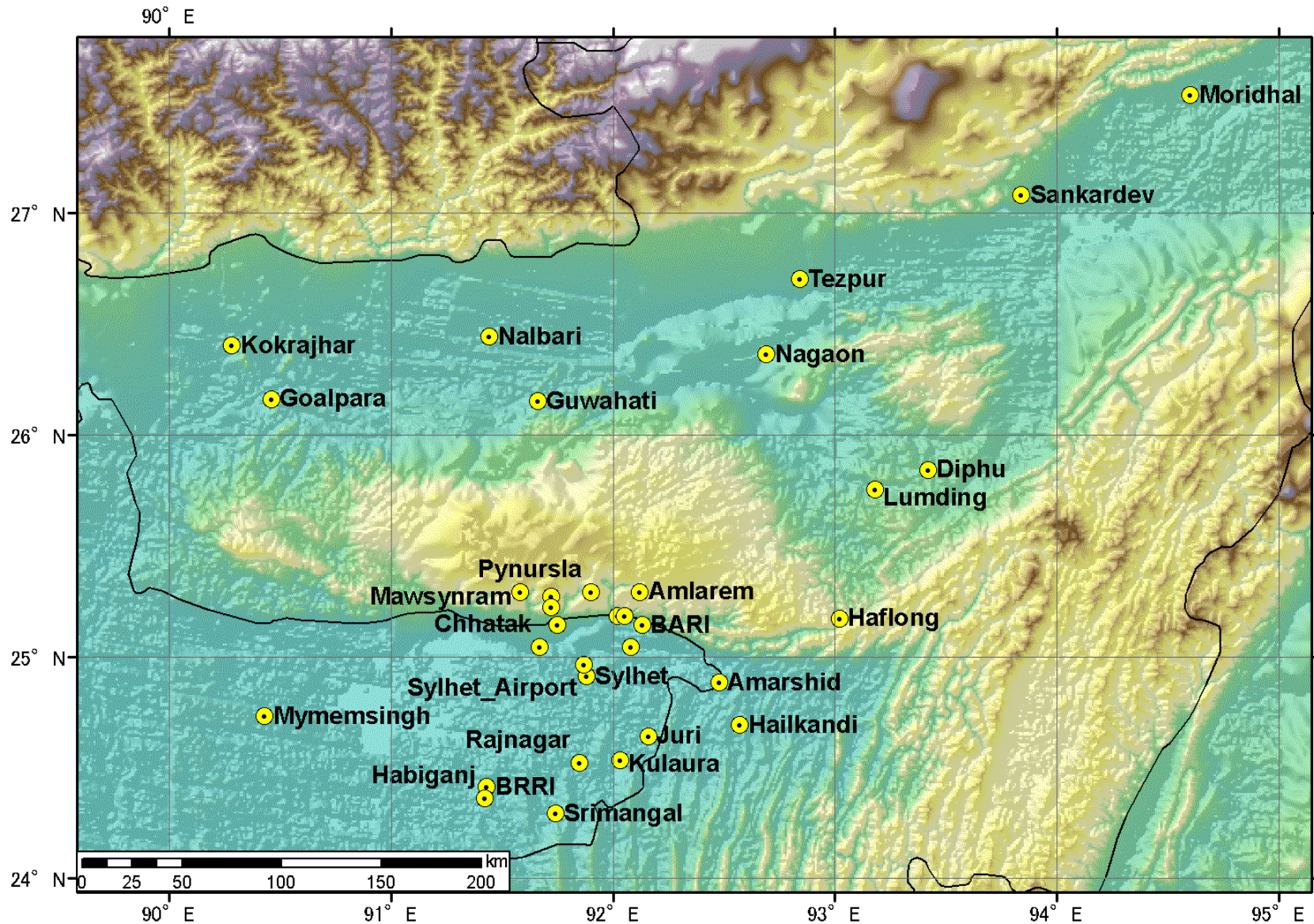
Locations of radar and raingauges

- AWS: ☆
 - Dhaka(ICDDR,B)
 - quasi-realtime
 - from 2004
 - Cherrapunjee, Sylhet
 - data logger
 - from 2007
- Raingauges
 - 6-gauges: □
 - 12-gauges: ○
 - 5-gauges: ●
 - 15-gauges: ○

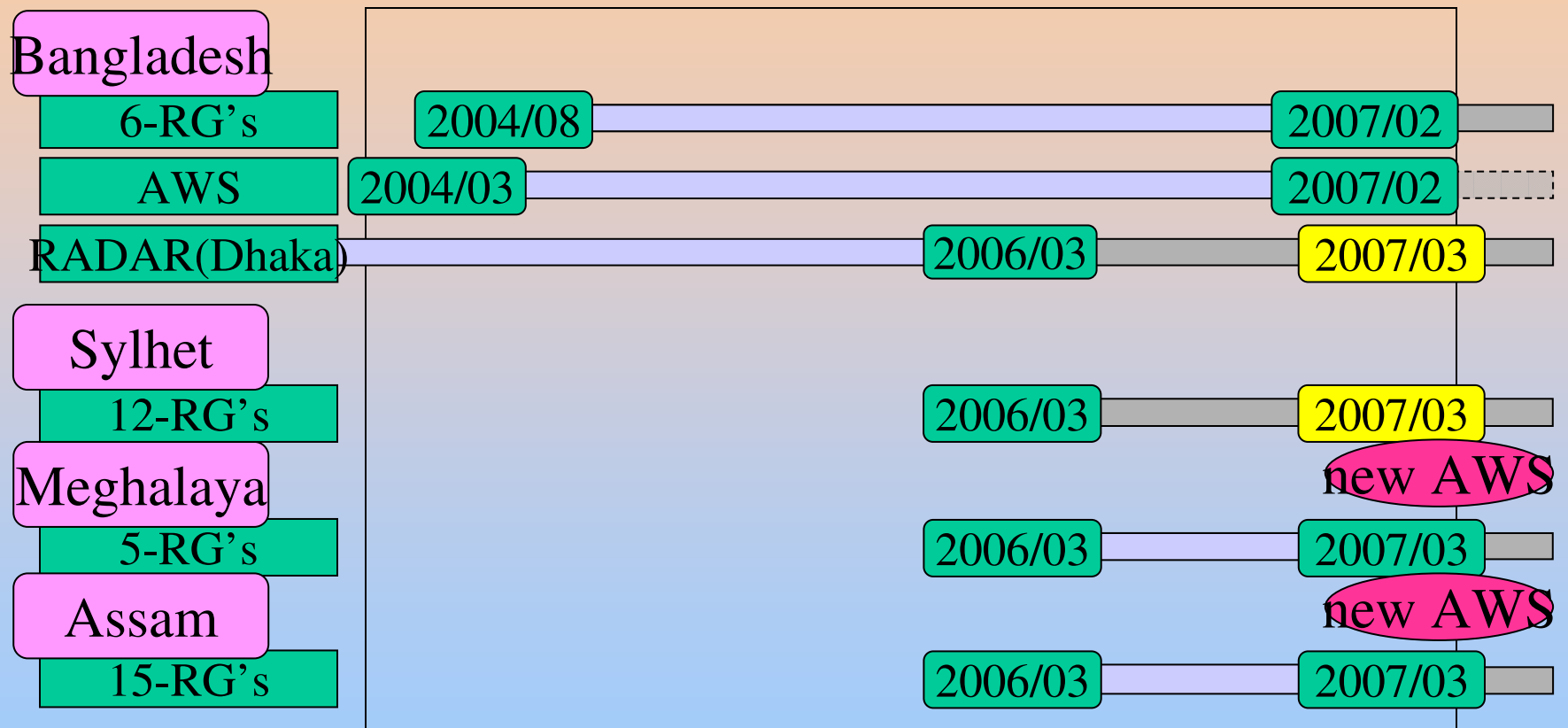
Dhaka radar coverage



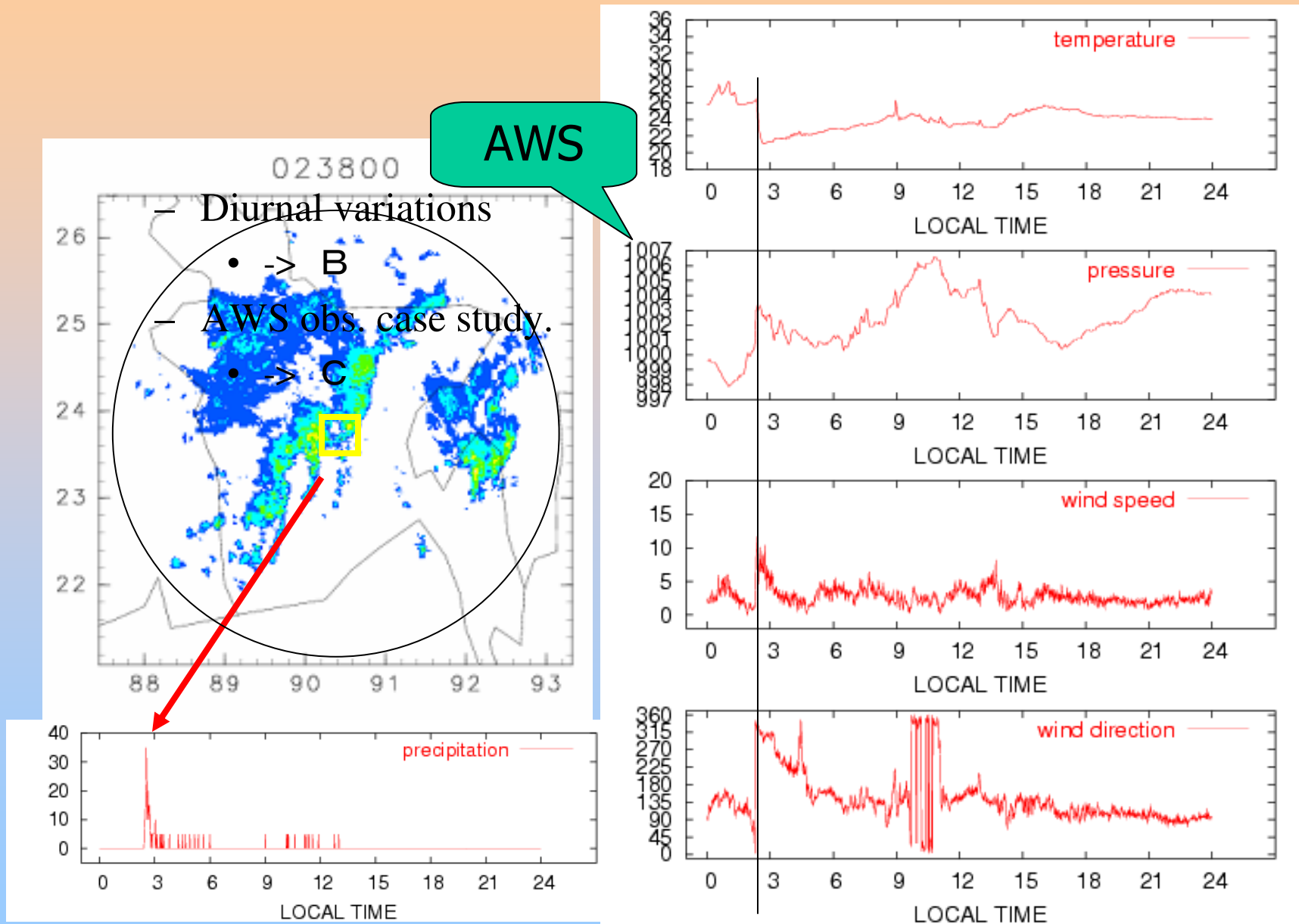
Locations of Rain Gauges



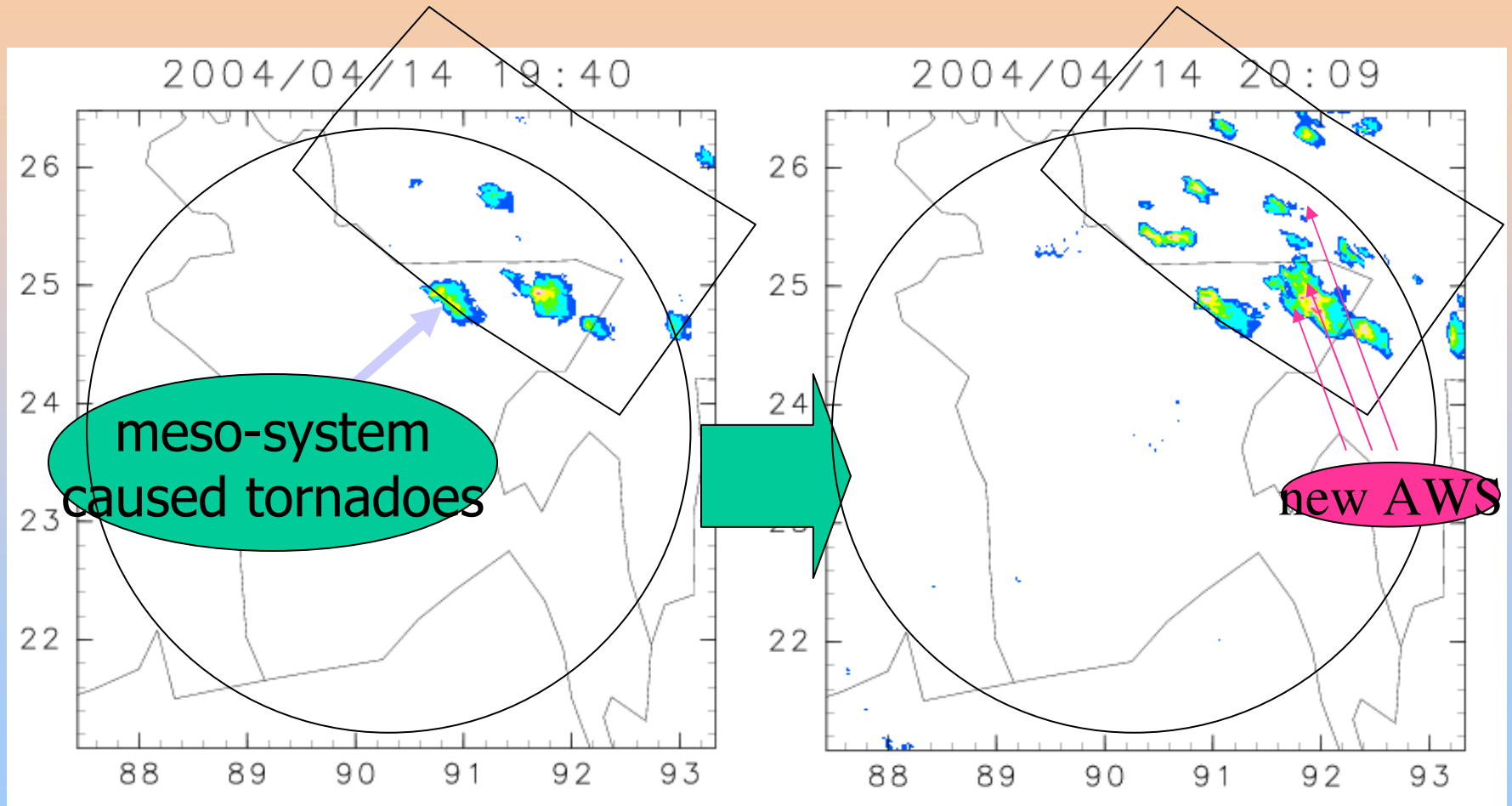
Data Coverage of RG's and AWS's



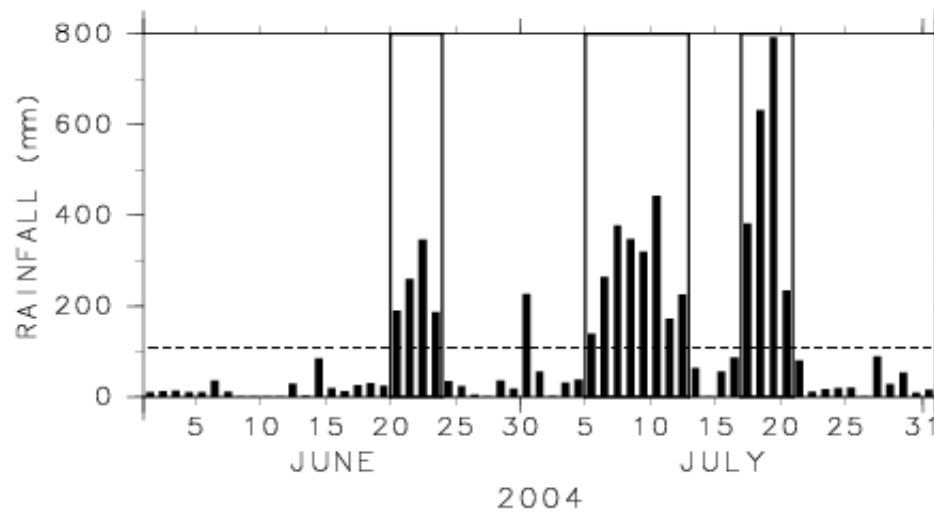
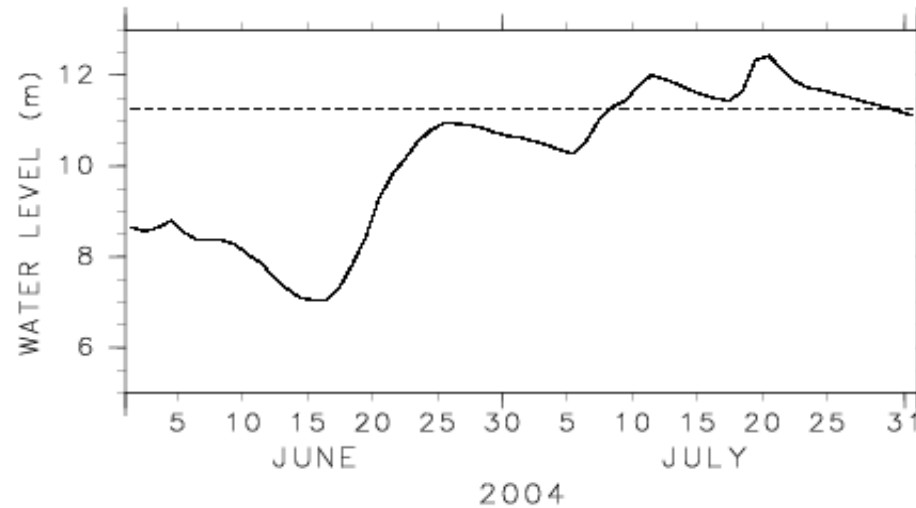
Analysis of data: Case study of pre-monsoon storm.



RADAR echo assoc. with tornadoes



Relation with water level at Surma river at Sylhet

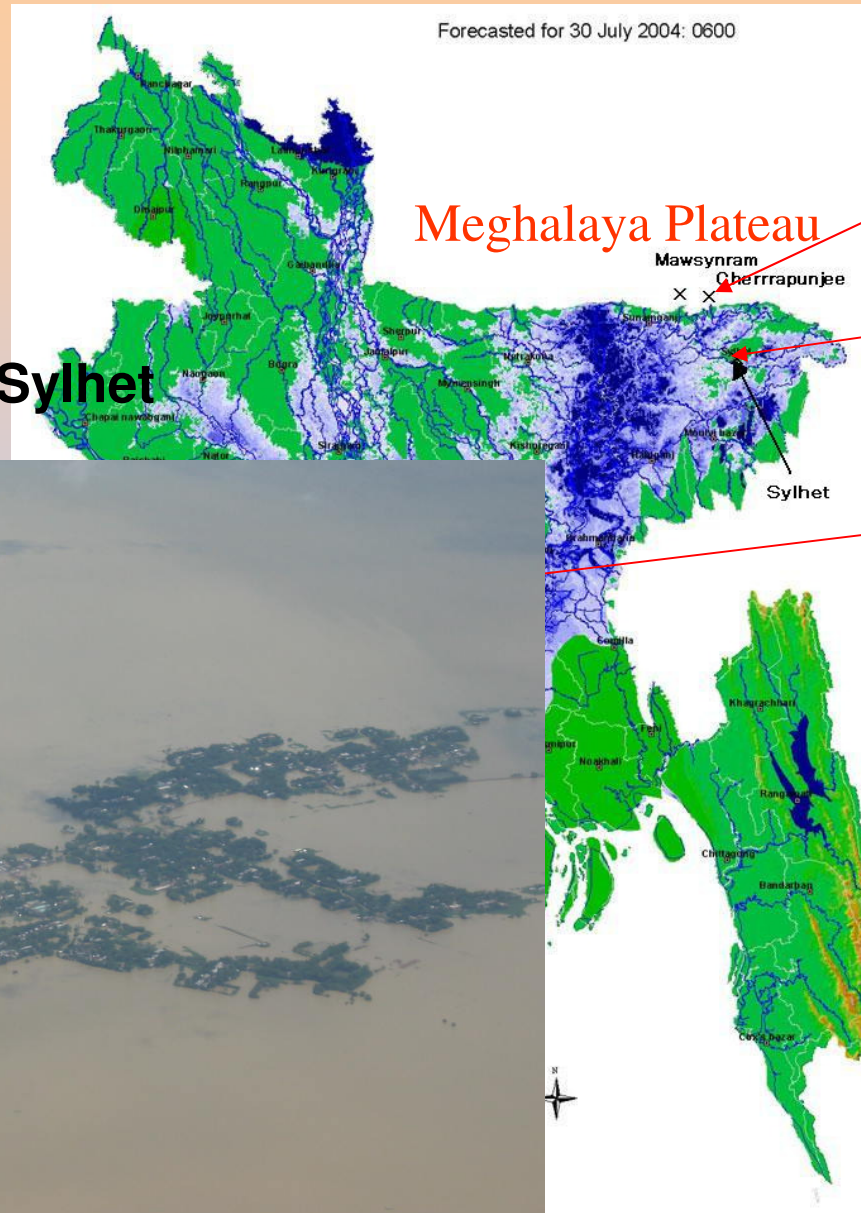


Flood in Capital Dhaka in 2004 & 2007

Summer



Inundation map in Bangladesh



Flood in Sylhet



30 July, 2004

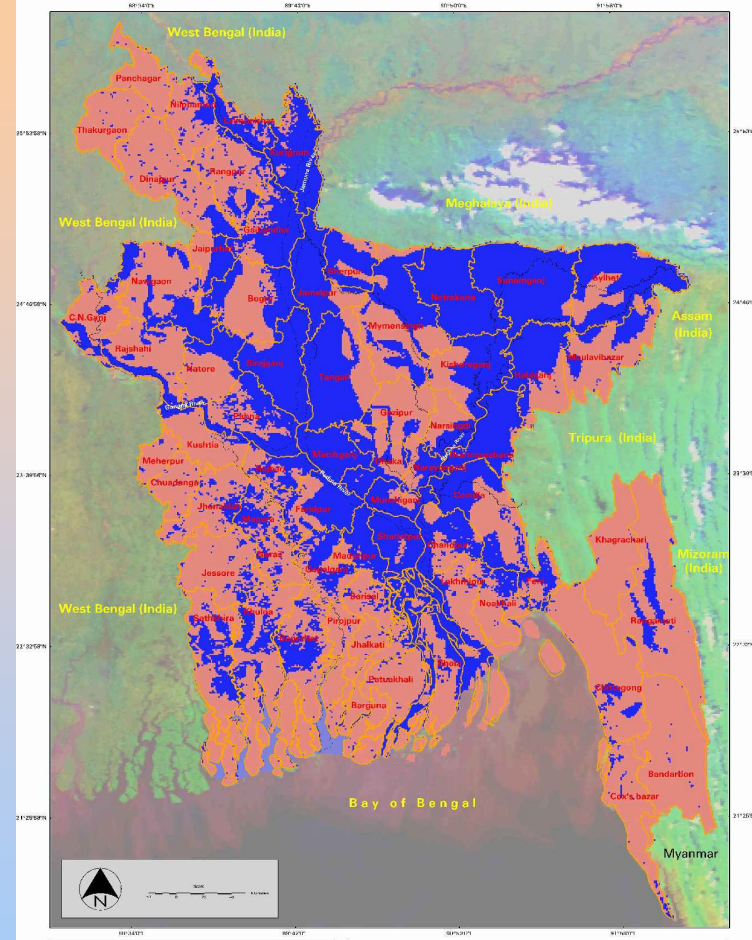
Cherrapunjee

Sylhet

Dhaka

Provided by
Flood forecasting
and warning center,
Bangladesh

MAP OF BANGLADESH SHOWING AREAS AFFECTED BY FLOOD - AUGUST, 2007
Based on NOAA AVHRR data series



Legend	
	Flood affected areas
	Areas not affected by flood
	Major rivers
	District boundary
	NOAA AVHRR Image

This map has been prepared using NOAA AVHRR data set received at satellite ground station of SPARRSO. The dates of the images used are August 02, 03, 04, 05, 07 & 08, 2007.



Prepared by SPARRSO

Flood 2007

How much is the world record?

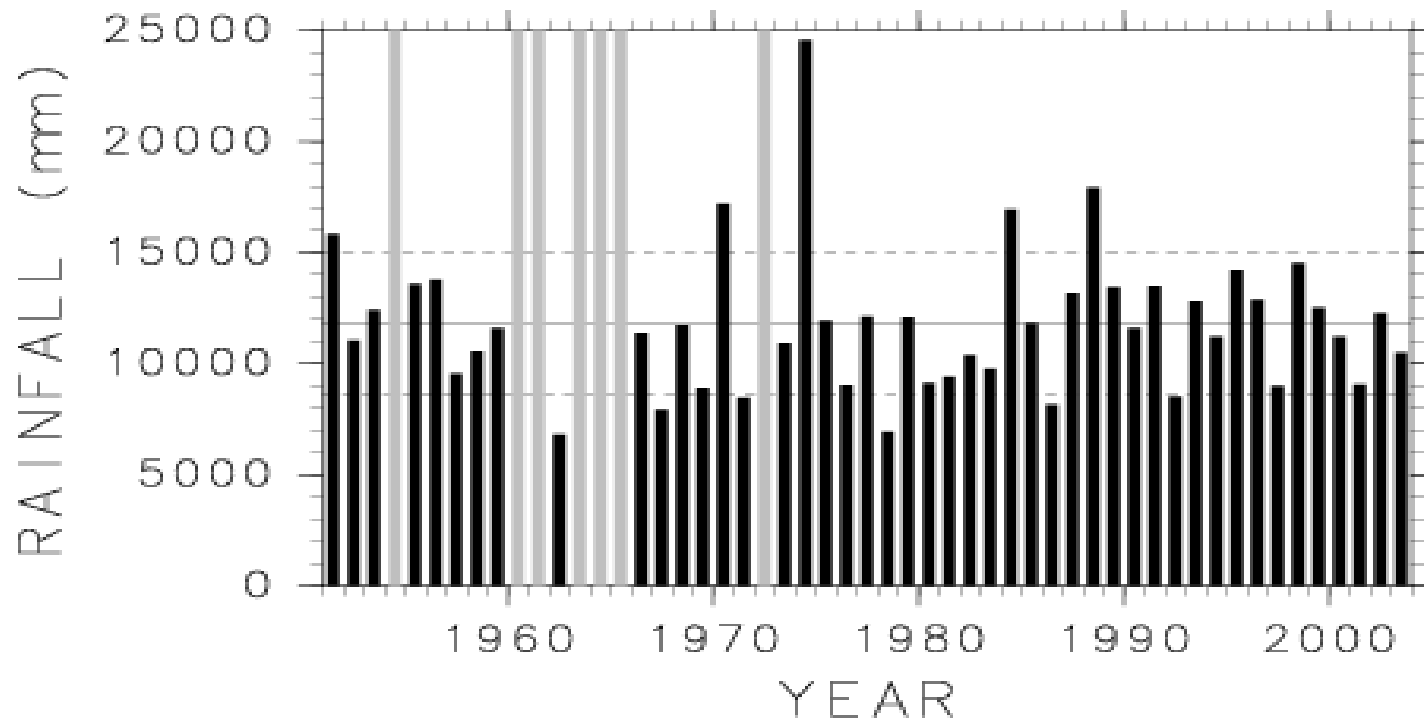
**26,461 mm @Cherrapunjee
(August 1860 – July 1861)**

**9,360 mm @Cherrapunjee
(July 1861)**

**11,870 mm @Mawsynram
(greatest annual rainfall
by Guinness record)**



Annual rainfall in Cherrapunjee (1951-2003)



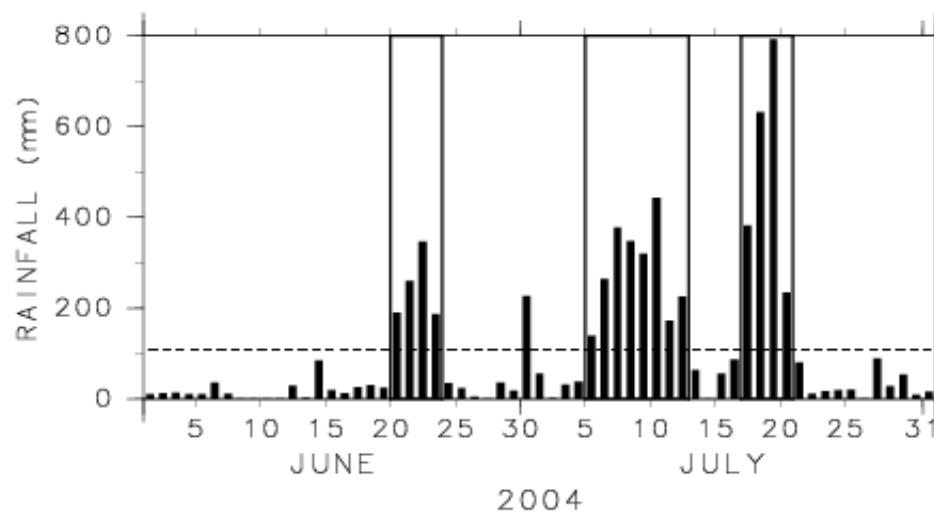
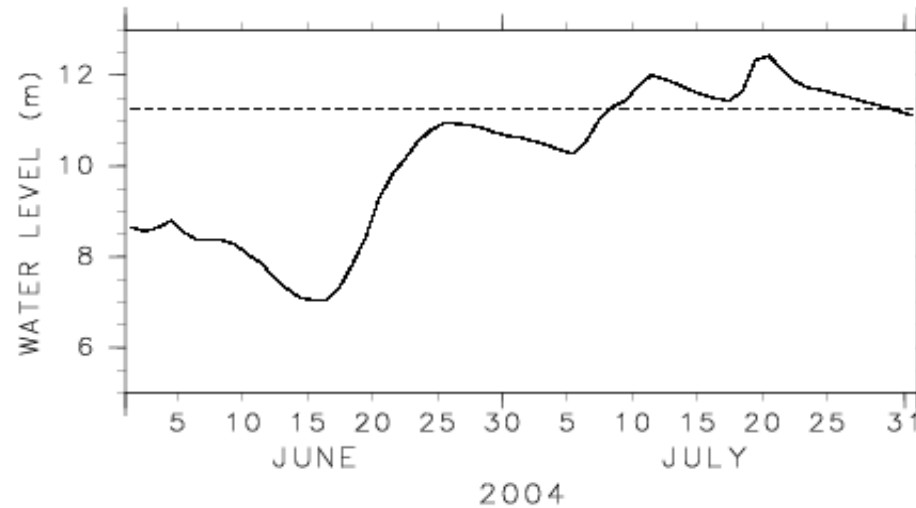
Cherrapunjee Holiday Resort

The Sylhet plains below Cherrapunjee
get flooded in June & July.

www.cherrapunjee.com

Copyright 2005 Cherrapunjee Holiday Resort

Relation with water level at Surma river at Sylhet

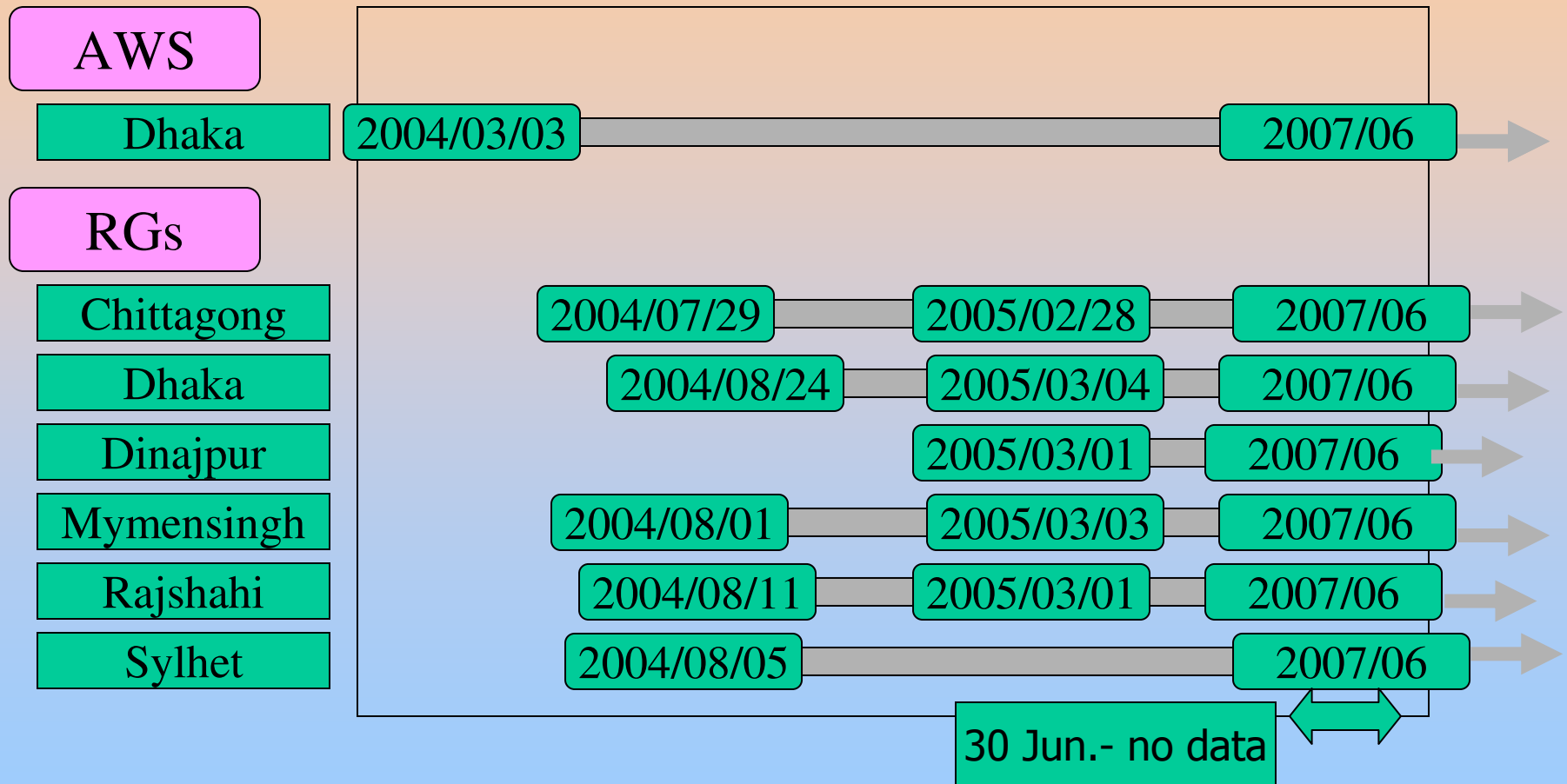


Border between Bangladesh and India 2006 May

Meghalaya Plateau



Obs. time table of Automatic Weather Stations and Rain Gauges



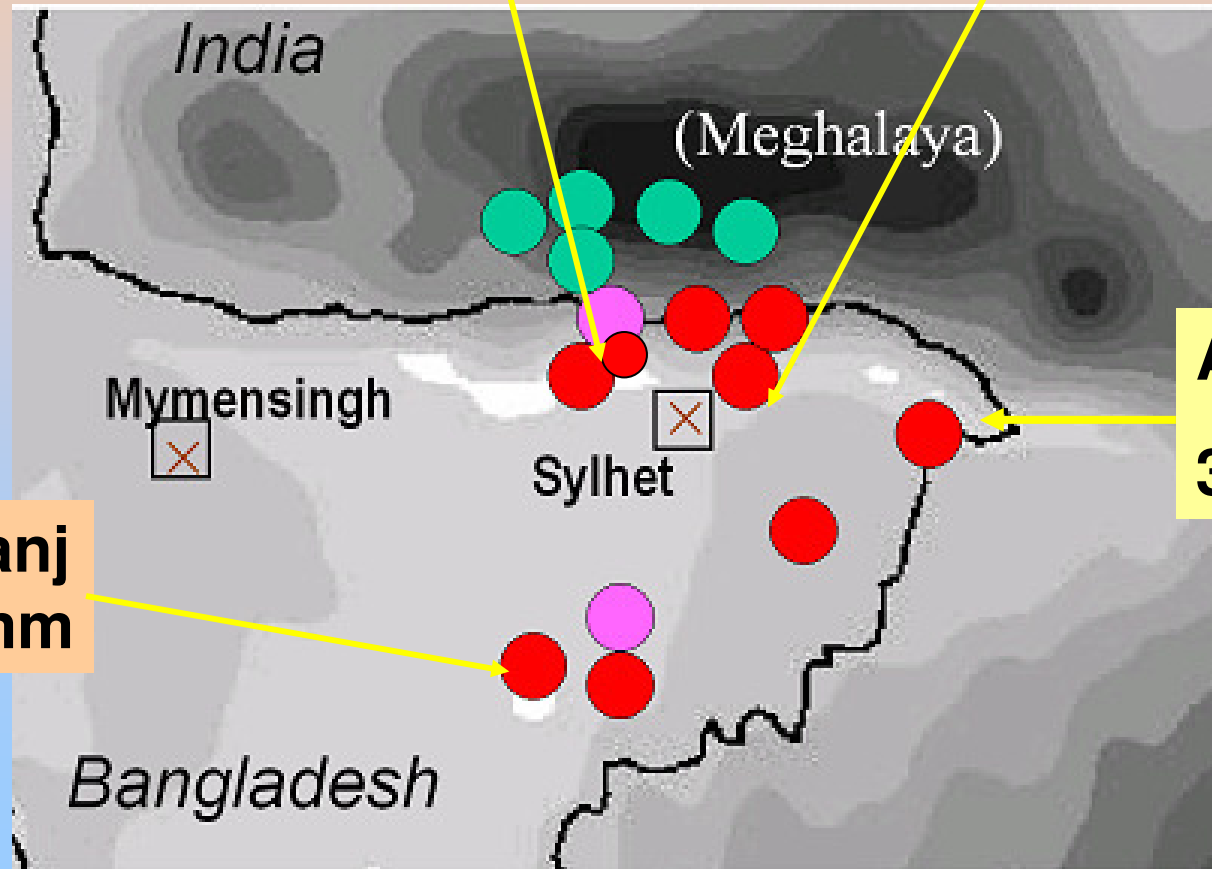
Rainfall Amount in 2006 Summer Monsoon

Chhatak
8,685mm

Netro Haor
8,409mm

Amalshid
3,451mm

Habiganj
4,394mm



Visit of Prof. Koike in Bangladesh

- As a follow up study, Prof. Dr. T. Koike and Dr. Oliver Saavedra visited Bangladesh on 3-4 August and 03-08 August 2007. They presented the aim of AWCI activities to the Bangladeshi Group in the Conference Room of SAARC Meteorological Meteorological Centre (SMRC) in presence of the Secretary, Ministry of Defence, Govt. of the People's Republic of Bangladesh.**
- They visited Bangladesh Meteorological Department (BMD). Director of BMD presented the activities and observational facilities of BMD.**
- Dr. Oliver Saavedra visited The Meghna River and the vegetation in different parts of Sylhet region on 5-7 August 2007 and obtained valuable data for developing flood model of the Meghna River.**

Dr. Koike's presentation



Dr. Oliver Saavedra's presentation

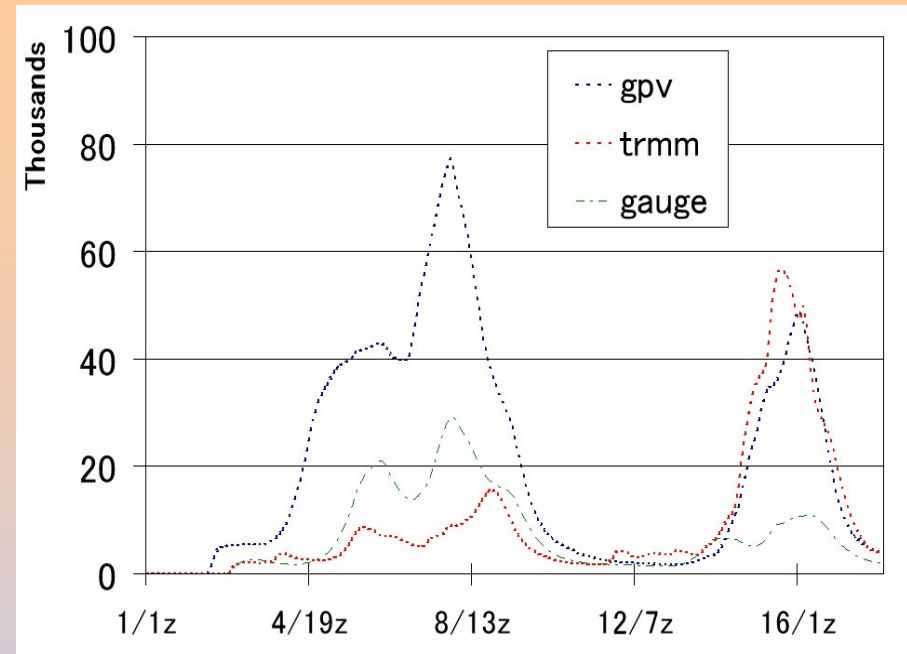
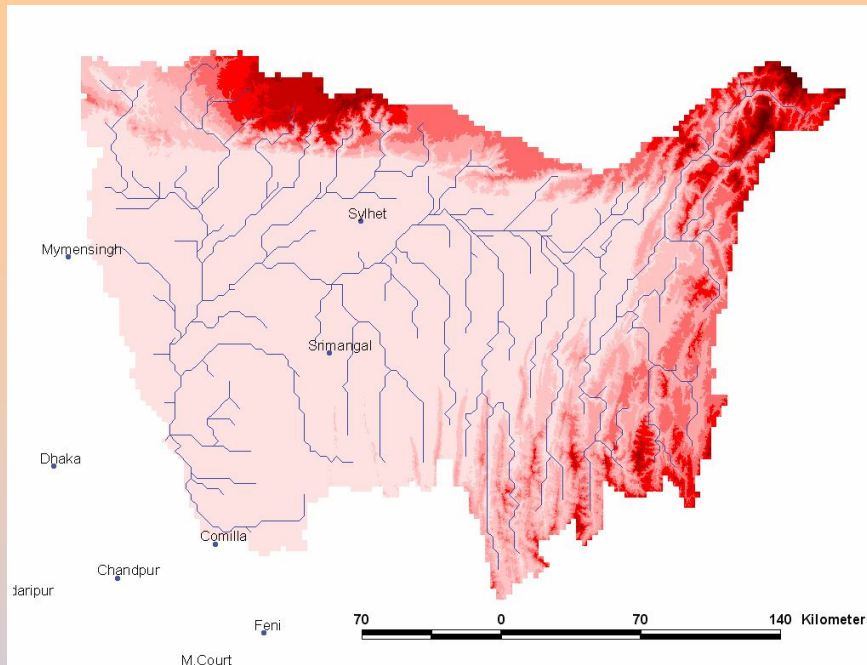


Group Photo with the Secretary, Ministry of Defence, Government of Bangladesh



Group Photo with the Director of Bangladesh Meteorological Department





Dr. Oliver used rainfall data of three rainfall sources: TRMM, GPV and rain gauge of BMD. He could track two peaks with different magnitudes.

Budget from the Government is limited and is mostly for routine work

For Scientific purpose and to meet/implement the Strategy of AWCI/GEOSS, financial assistance is essential for-

•Extensive observations.

-Setting up of 3 new Rawwinsonde observatories at Sylhet, Brahmanbaria and Chandpur and Synoptic stations with automation on the bank of the Meghna River.

-Automatic Weather Observing System (AWOS) at all stations with sensors for pressure, dry-bulb temperature, wet-bulb temperature, wind speed & direction and precipitation for Observation/ Data collection.

-Automatic water level and discharge monitoring system in the northern part of Bangladesh (Telemetric) should be established and the data of the upper catchments should be available in Bangladesh on real time basis.

Networking of the meteorological stations with Storm Warning Centre of BMD.

• Networking of the water level measuring stations with Flood Forecasting and Warning Centre of BWDB.

• Data Management and Distribution.

• Facility development for Researchers.

• Capacity building.

• Development of Early-warning system.

• Mechanism development for the engagement of End users.

Thank You