

**Regional Workshop  
on  
'Impact-based Forecast in RA II (Asia)'  
07-09, November 2017  
Seoul, Republic of Korea.**

**Tropics: Weather Forecasting And  
Early Warning System in Bangladesh.**

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**BANGLADESH METEOROLOGICAL DEPARTMENT**

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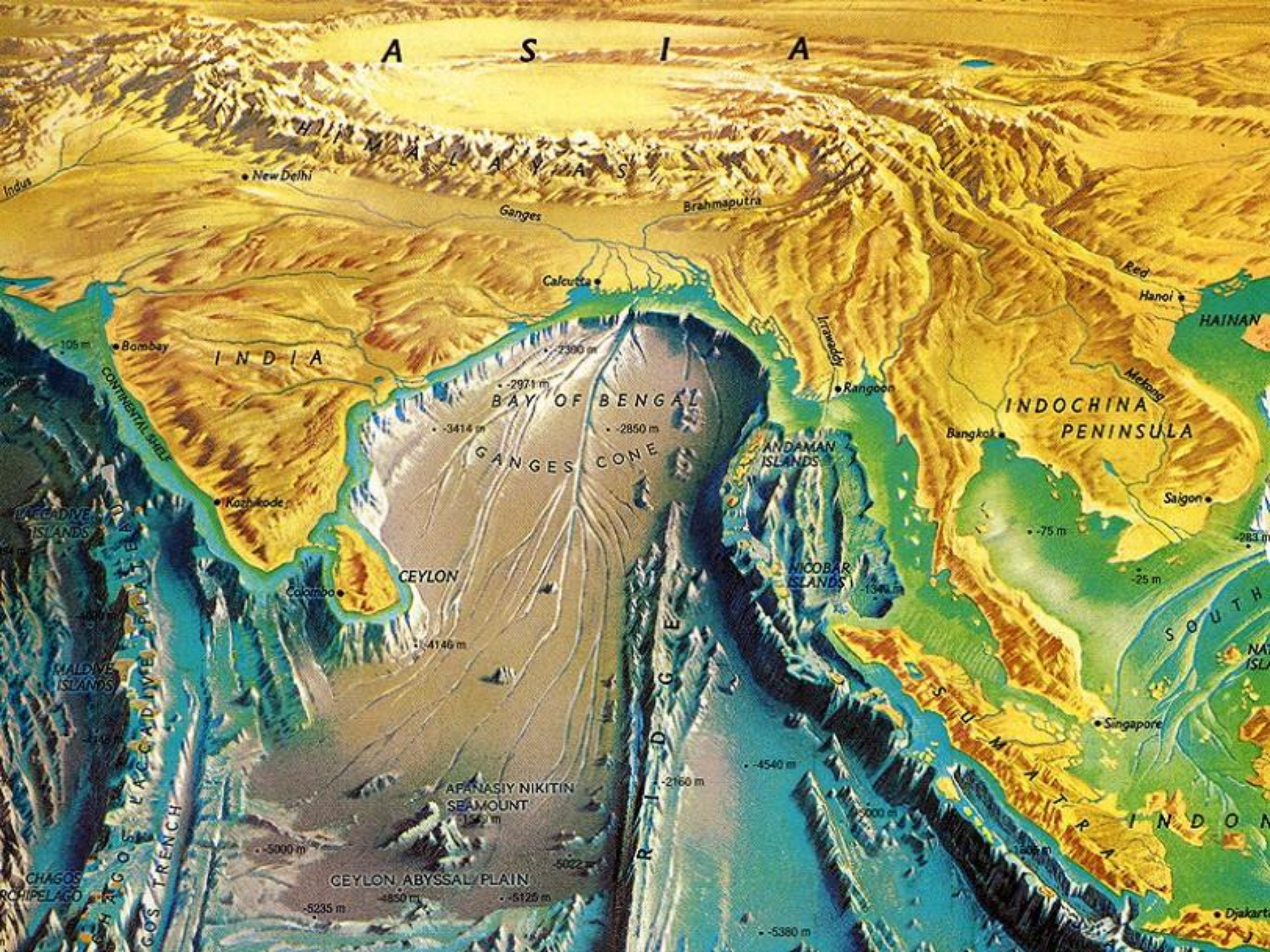
# Outline

- ❑ About BMD
- ❑ Forecasting Technique in BMD
- ❑ Analyzing Processes/Tools
- ❑ Warning & Signals System
- ❑ Satellite & Radar Animation of Cyclones
- ❑ Case study of Roanu
- ❑ Warning Dissemination System

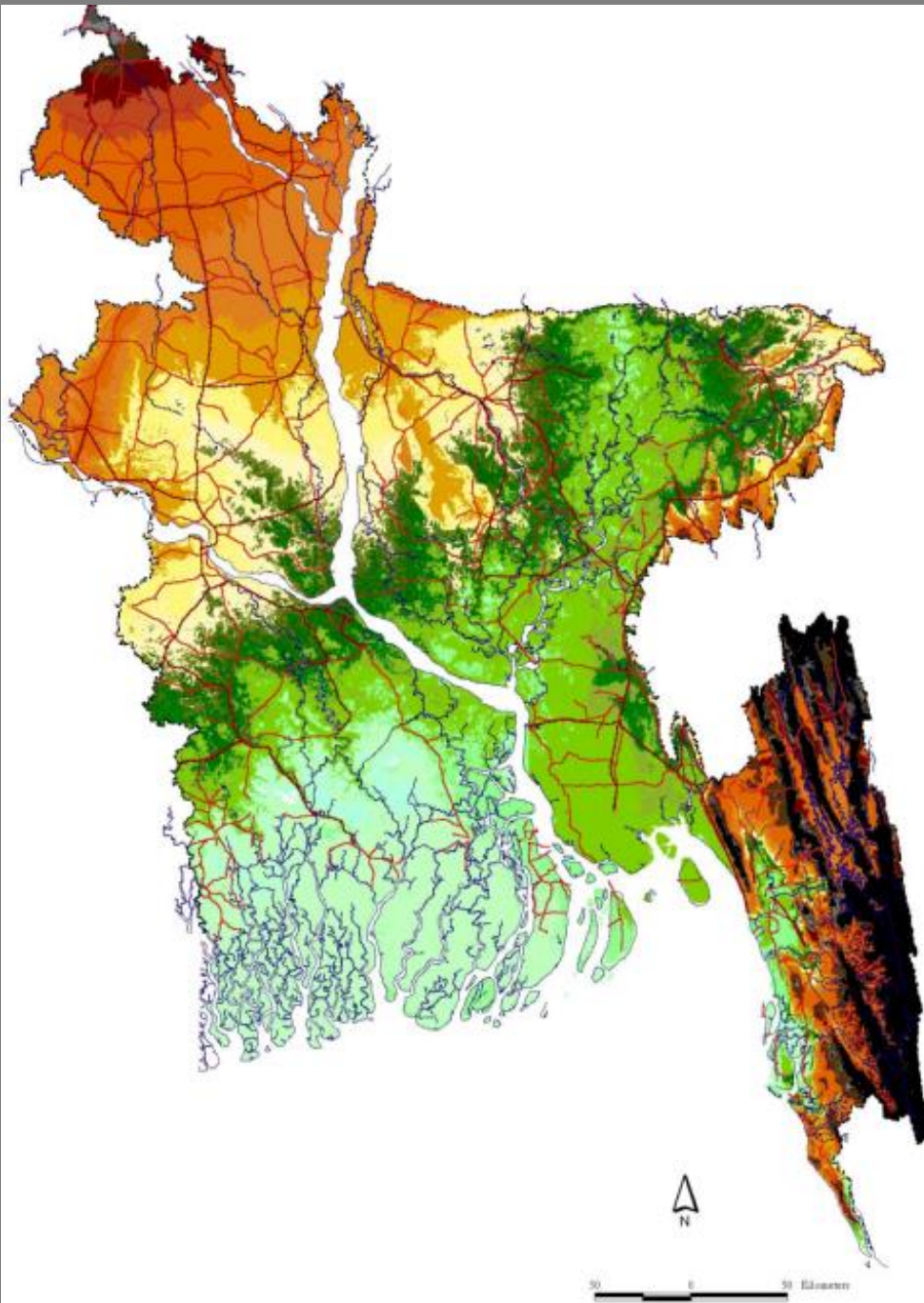


***BANGLADESH METEOROLOGICAL DEPARTMENT***









# Topography of Bangladesh

- Land elevation of 50% of the country is within 5 m of MSL
- About 68% of the country is vulnerable to flood
- 20-25% of the area is inundated during normal flood

■ Bangladesh is the most disaster prone area in the world. Most of these disasters are meteorological and hydrological in nature. Such as-

➤ Cyclone & associated Storm Surge

➤ Nor'westers/Tornadoes

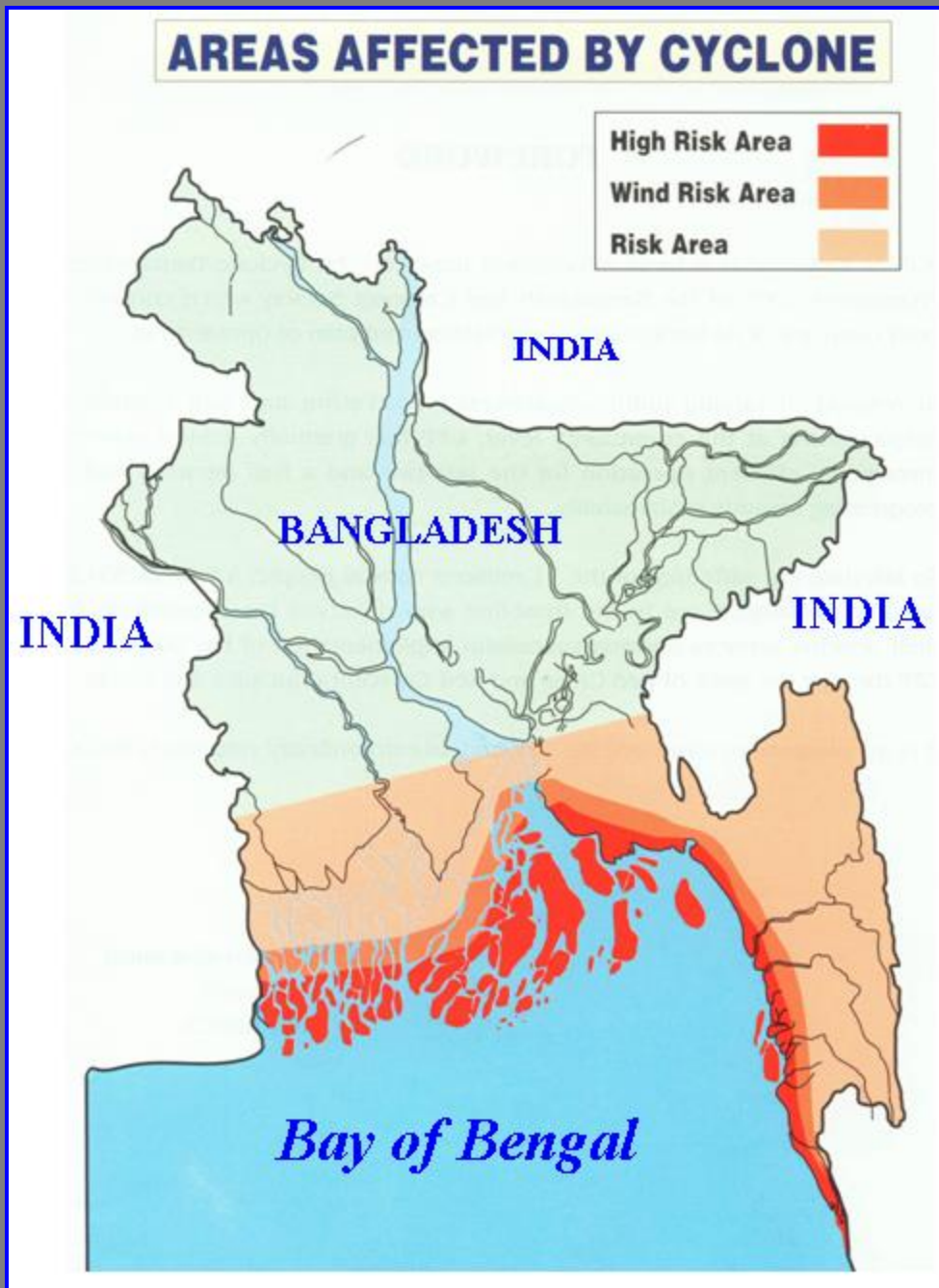
➤ Drought

➤ Floods and River Erosion

➤ Heat Waves and Cold Waves

➤ Earthquakes

➤ Land slide



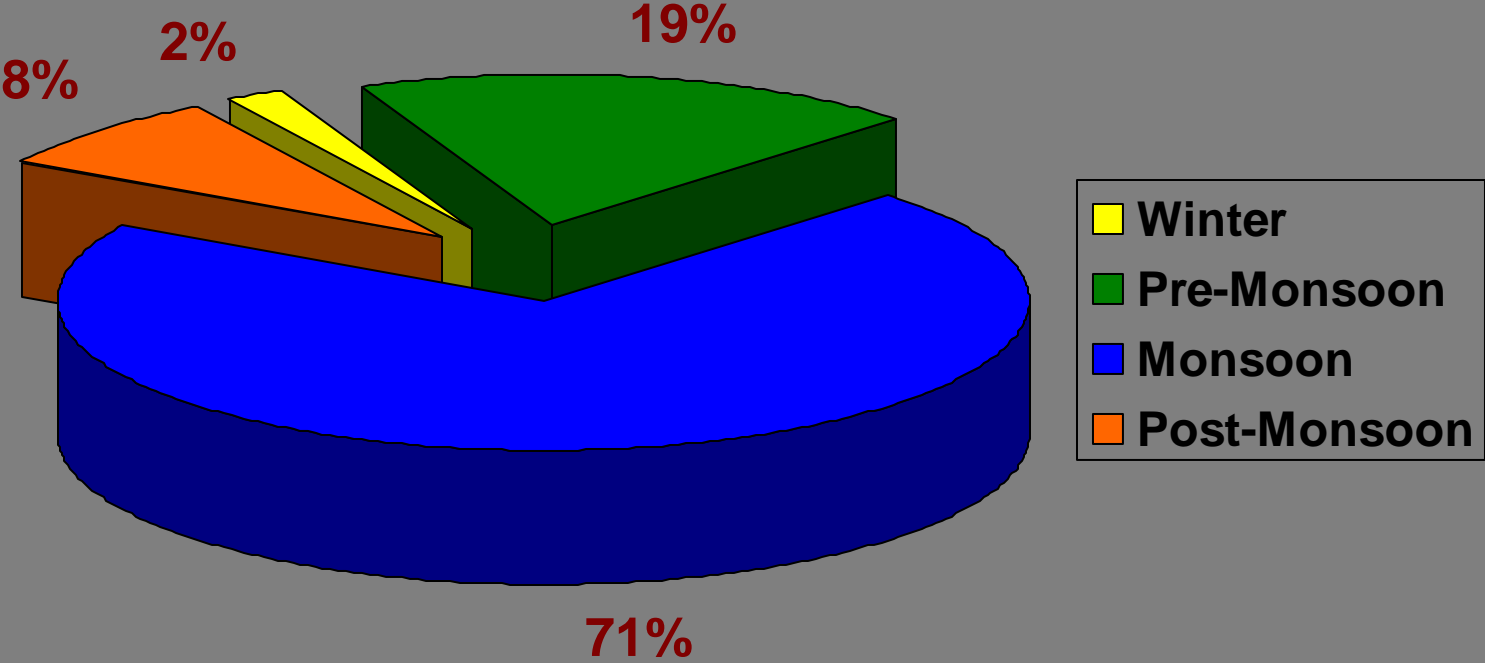


# ***CLIMATE OF BANGLADESH***

**Bangladesh is in the sub-tropical monsoon climate zone. Based on Pressure, rainfall and temperature, the climate of this country can be described under the following four seasons :-**

- a. Winter or North-East Monsoon : This season comprises of December, January and February : Average rain fall is about 1.5% of the total annual rainfall. Mean temp. is 18-21 deg. celcius**
- b. Summer or Pre-Monsoon : Consists of March, April and May. Mean temp. is 23-30 deg. Celcius and average rain fall is 17%.**
- c. South-West Monsoon or Monsoon : June, July, August and September are combined. Average rain fall of this season is about 72.5% of the total annual rainfall.**
- d. Autumn or Post-Monsoon : October and November and average rain fall receives in this season is about 9%.**

# SEASONAL RAINFALL DISTRIBUTION OVER BANGLADESH





# The Service provided by BMD

- ❑ To observe different meteorological parameters both for surface and upper air all over Bangladesh round the clock.**
- ❑ To prepare and analyze all weather charts and to make interpretation on the basis of analyses.**
- ❑ To provide weather forecasts for public, farmers, mariners and aviators on routine basis and also to issue warnings for severe weather phenomena such as tropical cyclones, tornadoes, nor'westers, heavy rainfall, etc.**
- ❑ To maintain surveillance of weather radars for probing impending tropical cyclones, nor'westers and tornadoes.**
- ❑ To exchange meteorological data, forecasts and warnings to meet national and international requirements.**

# Observational Facilities of BMD

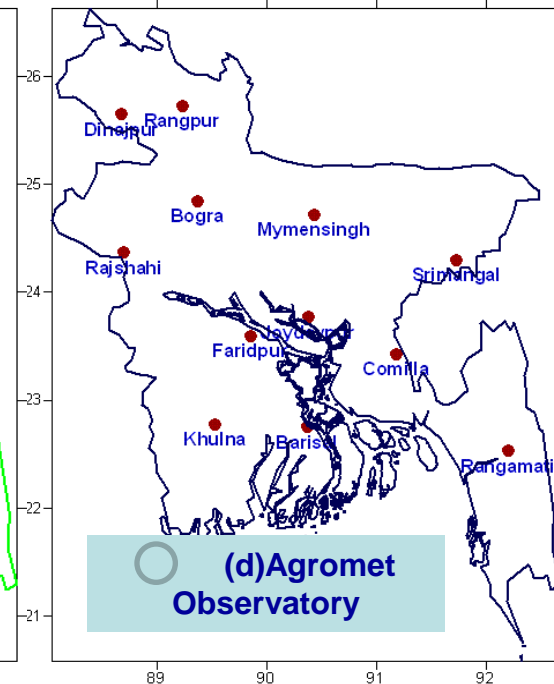
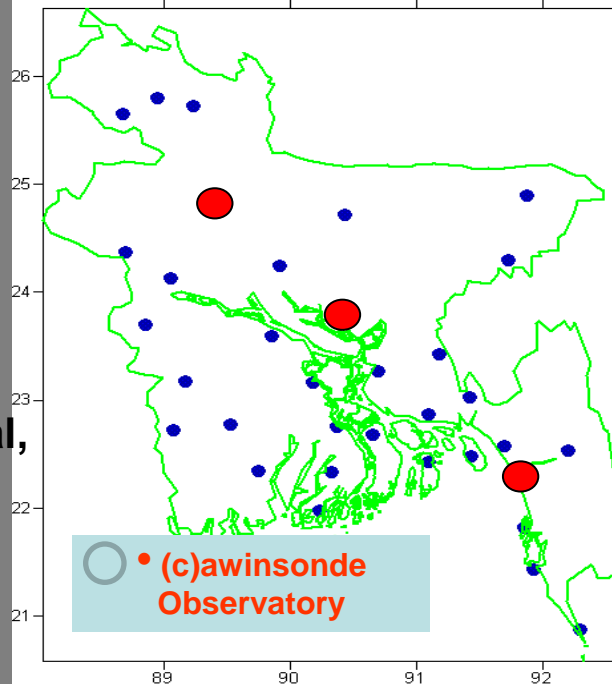
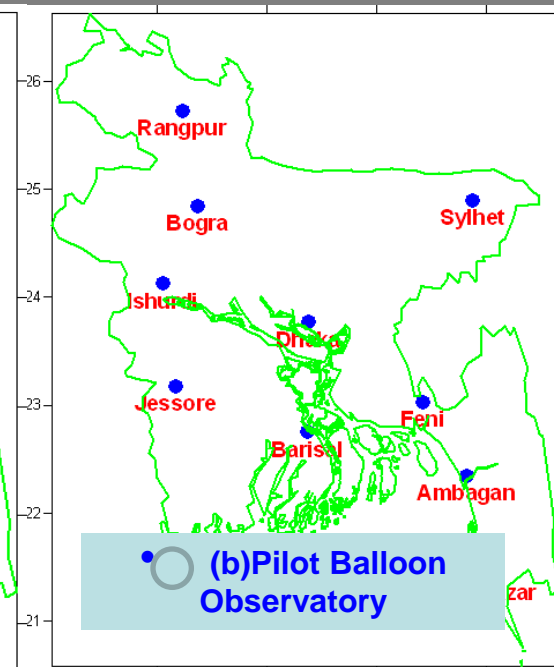
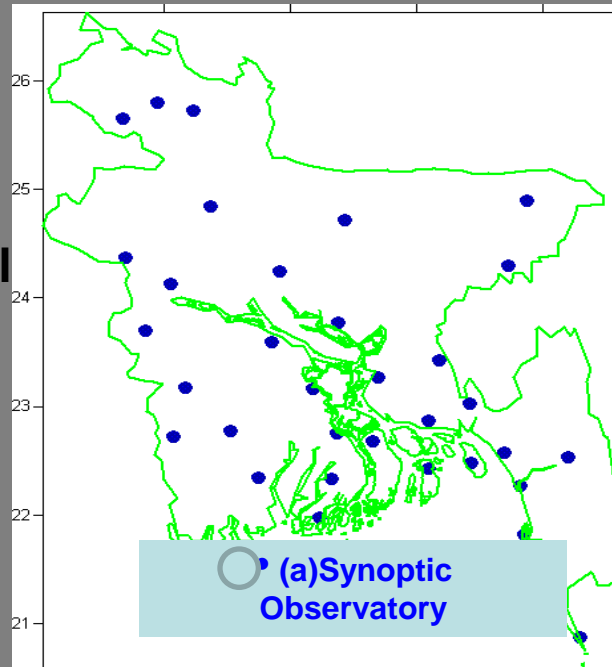
- ◆ **42 First Class Surface Observatories**
- ◆ **10 Pilot Balloon Observatories**
- ◆ **3 Rawinsonde Observatories**
- ◆ **12 Agromet Observatories**
- ◆ **Rainfall Measuring Stations (Existing 35 + 14 ongoing) & 4 Seismic Observatories**
- ◆ **5 Radar Stations at Dhaka, Rangpur, Mawlovibazar Cox's Bazar and Khepupara**
- ◆ **Satellite Ground Receiving Station of MTSAT.**



# Location of Observatories

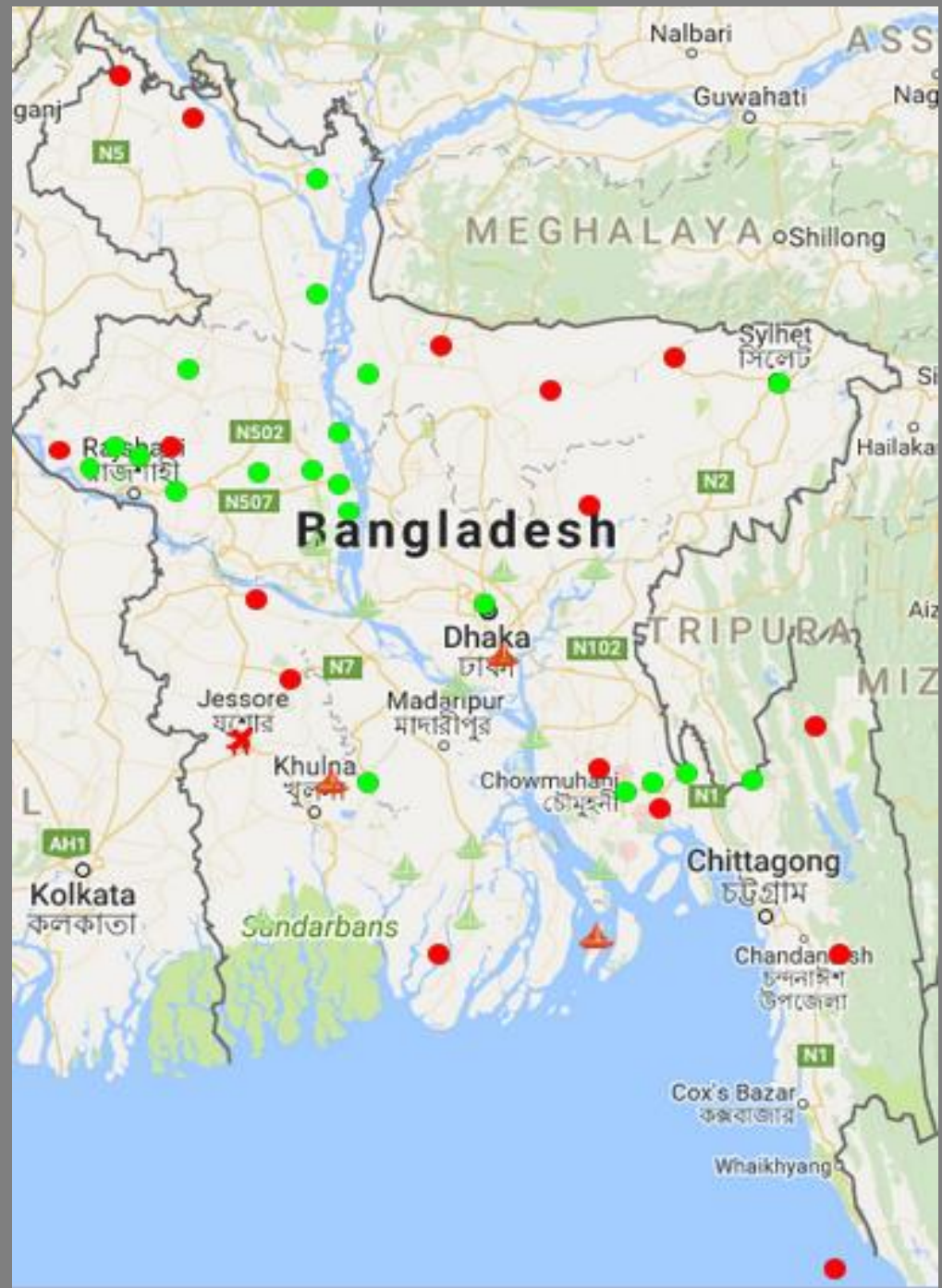
With the financial and technical support of **WMO** (24 observatories)

- a. Synoptic observatories : 42
- b. Pilot Observatories : 10
- c. Rawinsonde Observatories : 3
- d. Agromet observatories : 12
- e. Automatic Weather Station:60
- f. Earthquake Monitoring Stations: (4+6) = 10
- g. RADAR Stations: 5 (operational, out of 3 is Doppler Radar)

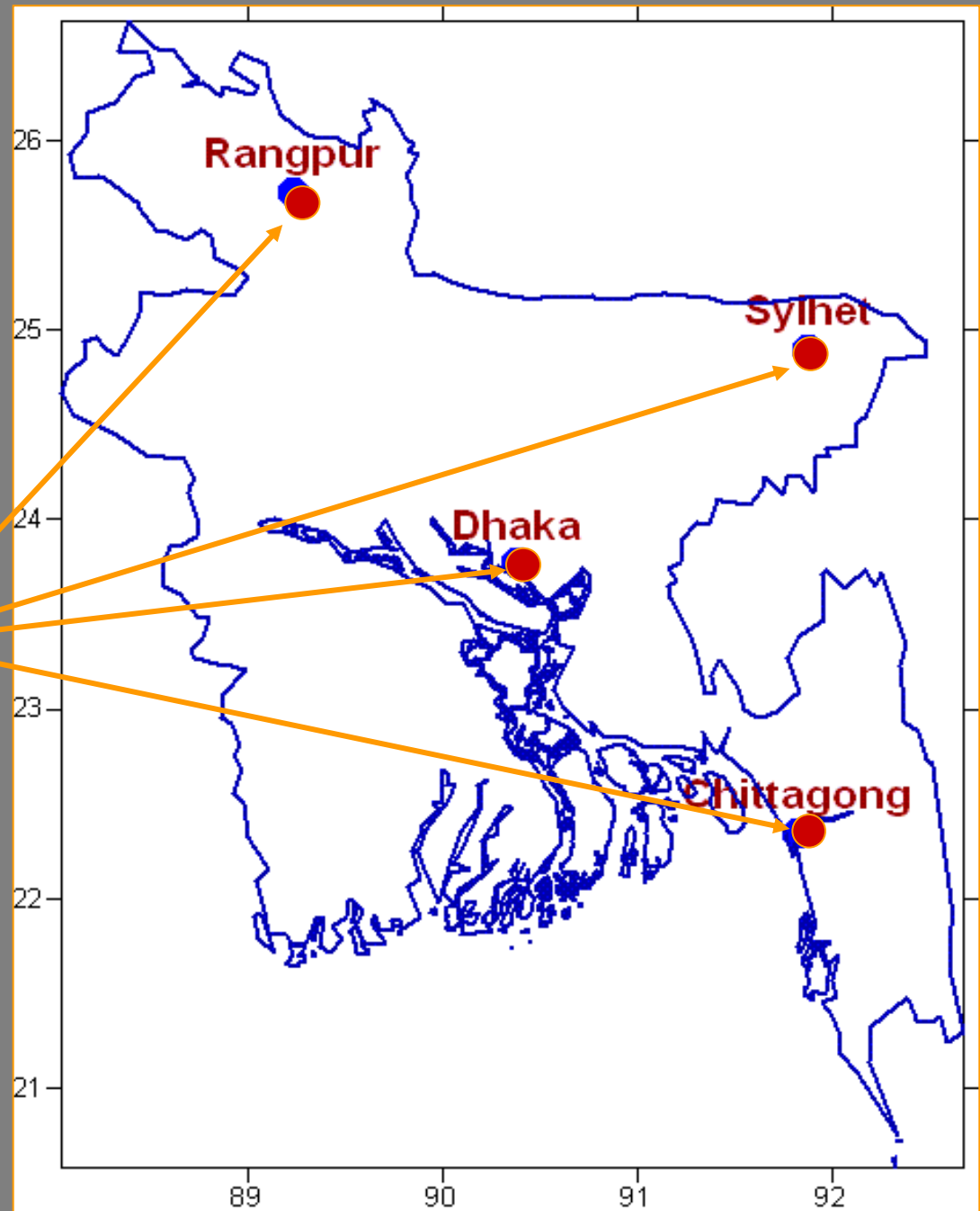


(e)

- AWS first phase
- AWS second phase
- ▲ AWS ongoing



**(f) Location of  
Seismic  
Observatories  
of BMD+06 new  
obs.**





**(g) Doppler  
Radar  
Facility:  
BMD**



**Moulvibazar  
Doppler Radar**



**Khepupra Radar**



**Cox's Bazar Radar**

**VSAT Antenna**



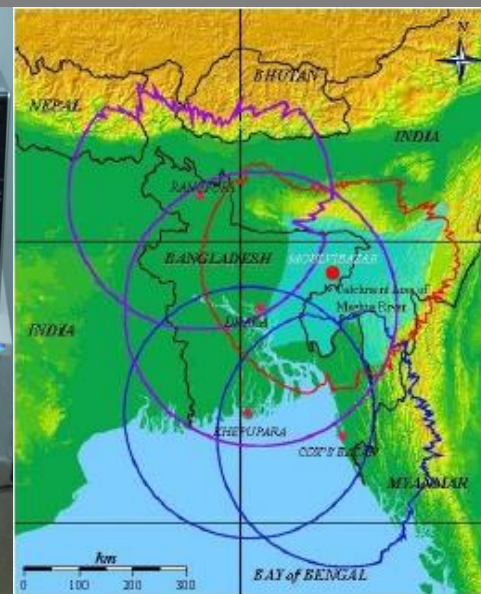
**Dhaka Radar**



**Rangpur Radar**



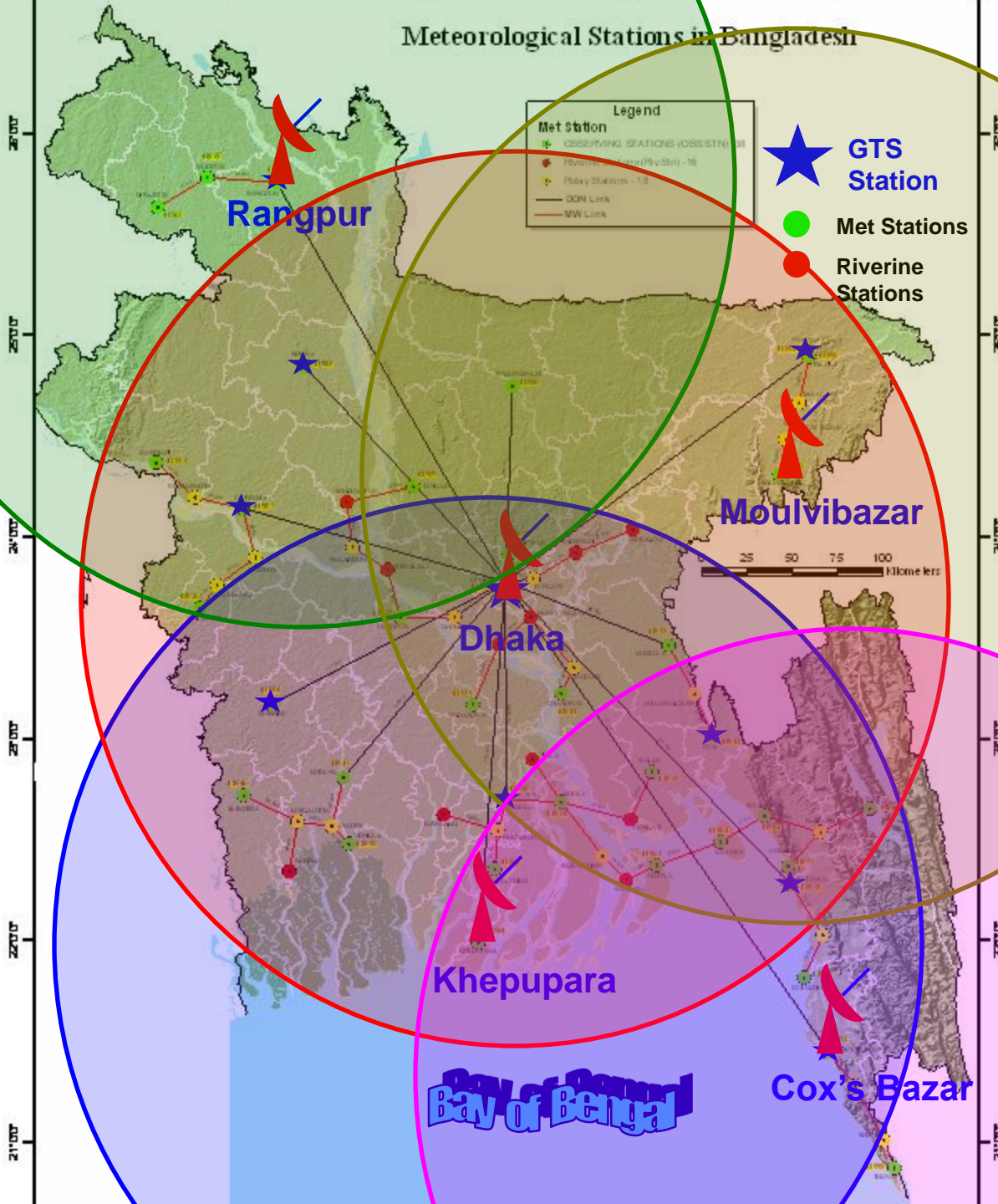
**Composite Radar  
Picture**



**Radar Coverage  
Picture**



# Meteorological Stations in Bangladesh



## Meteorological Observatories in Bangladesh

**Five RADAR Stations of BMD**

**10 GTS Stations:**

- ★ Dhaka
- ★ Chittagong
- ★ Cox's Bazar
- ★ Feni
- ★ Barisal
- ★ Bogra
- ★ Sylhet
- ★ Rangpur
- ★ Ishurdi
- ★ Jessore

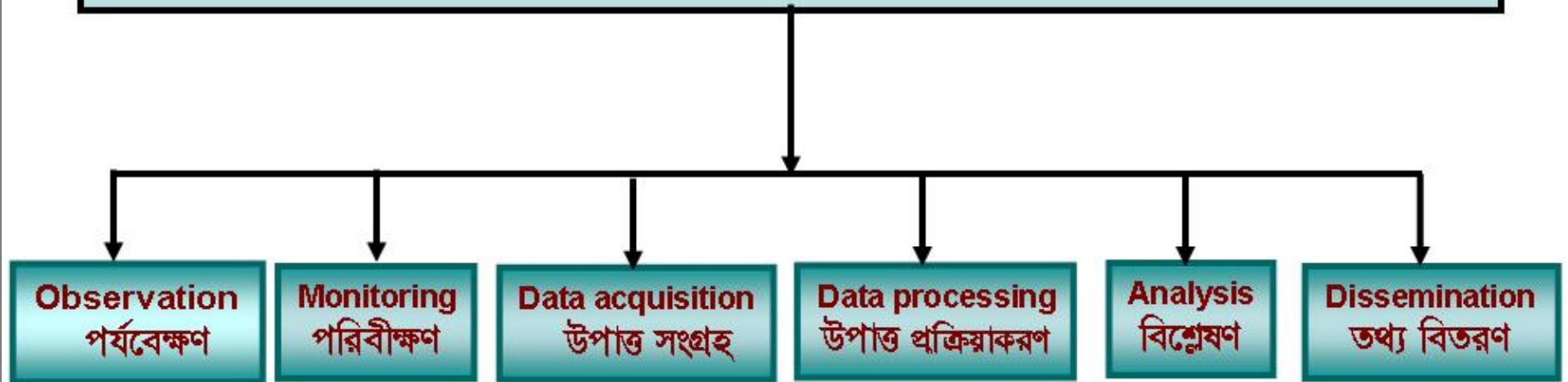
**RADAR Coverage**

**Forecasting Technique**

**in**

**BMD**

আবহাওয়া কার্যক্রমে সকল স্তরে তথ্য প্রযুক্তির ব্যবহার।  
ICT is used in each and every stage of Meteorology



Automatic  
Observatory



Data acquisition



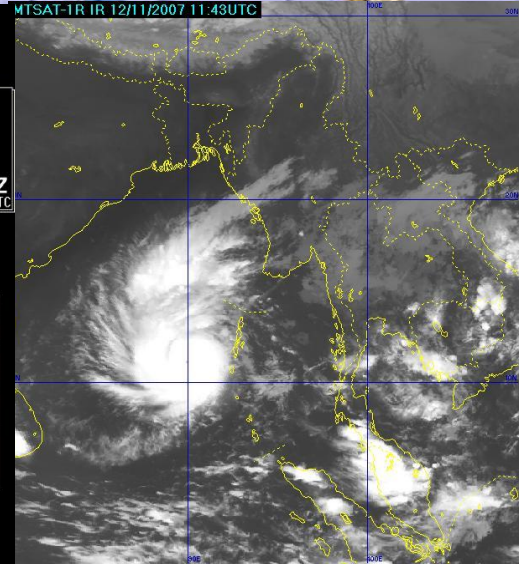
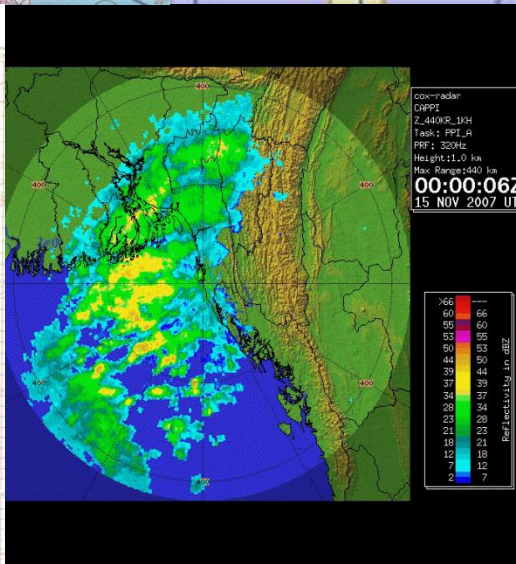
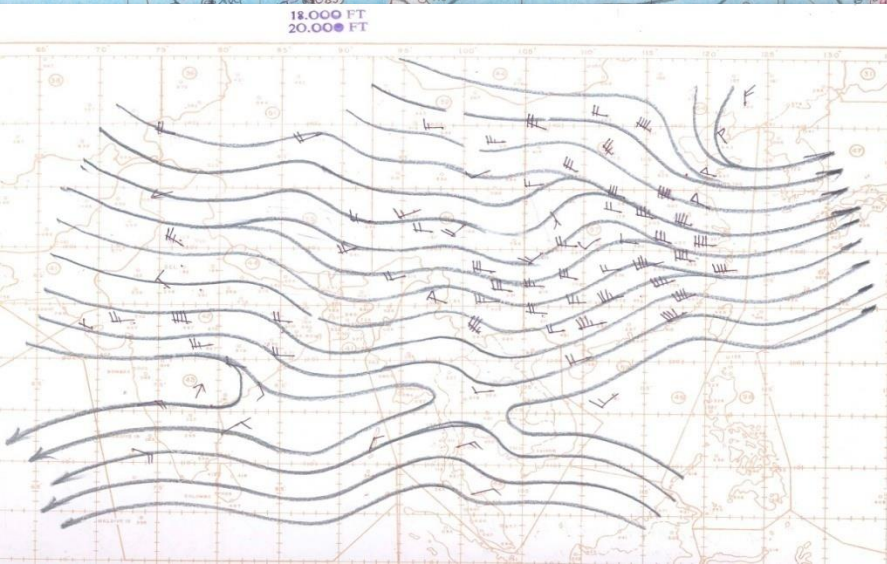
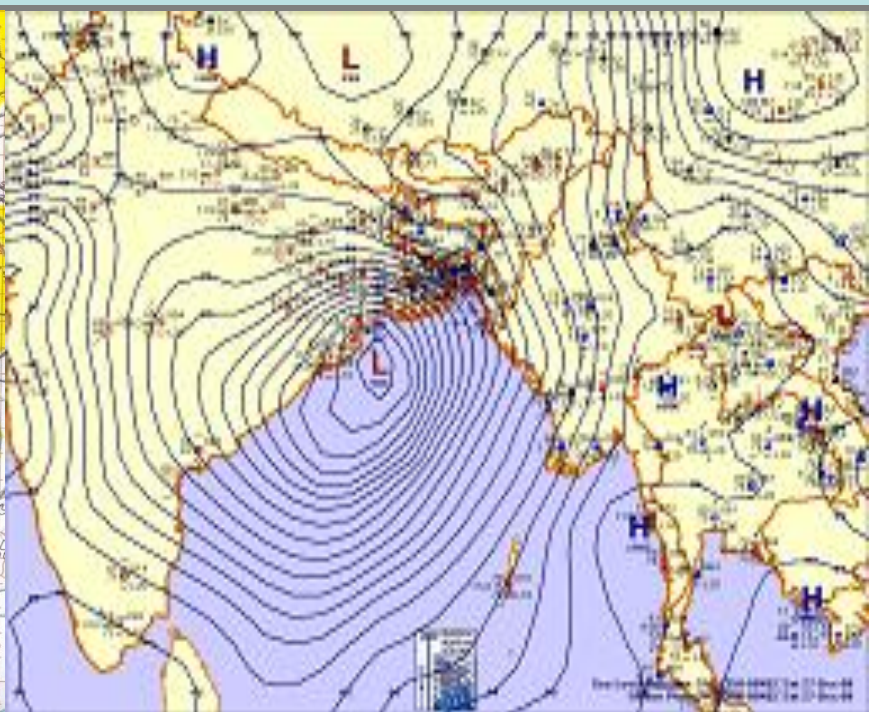
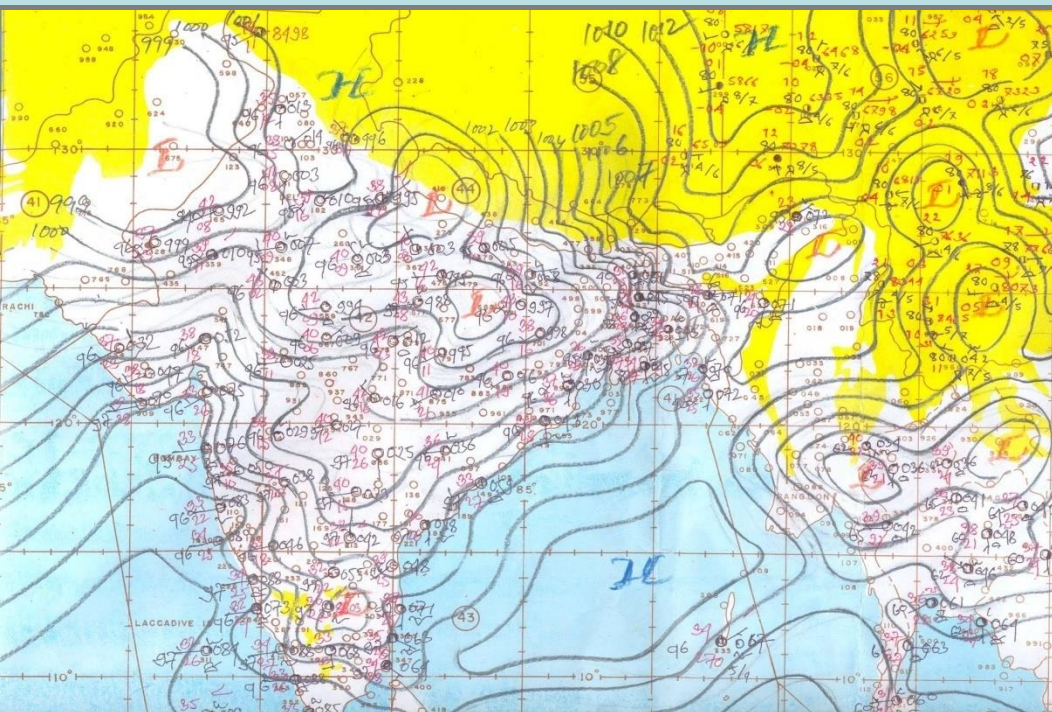
Analysis



Forecast



# Storm Warning Centre- So mZK©xKiY ≠K>`z<sup>a</sup>





# Analyzing Processes/Tools

# Analyzing Processes/Tools

## 1. Diagnostic charts

- a. **Surface Synoptic Chart-** every 3 hours or more frequent
- b. **Upper air pilot chart-** every 6 hours
- c. **Upper air constant pressure chart-** every 12 hours
- d. **Pressure change chart-** every 3 hours and more frequent

## Analysis System

- a. **Meteorological Information, Comprehensive Analysis and Processing System (MICAPS) of BMD**

## Analyzing Processes/Tools Cont.

### 2. Model Products

- a. Global Forecasting System (GFS) Model analysis from NOAA
- b. Limited Area Model (LAM) Products
- c. NWP output
- d. ECMWF NWP output products
- e. NCMRWF NWP products
- f. Track product by running STP & STEEPER Models of BMD
- g. Empirical and Numerical /Dynamical Storm Surge Models
- h. NWP Products of T213, HLAFS (China) received through PCVSAT at BMD

# Analyzing Processes/Tools

## 3. Satellite/Radar products and images

- a. MTSAT images (IR, VIS & WV) from BMD's MTSAT receiving system (Himawari)
- b. NOAA images from BMD's NOAA receiving system
- c. METEOSAT images (IR & VIS) from Dundee METEOSAT receiving system
- d. FY-2E,2G,2D Satellite images from China by CMAcast receiving system
- e. INSAT images through IMD
- f. BMD's RADAR Systems (both Doppler and Conventional)





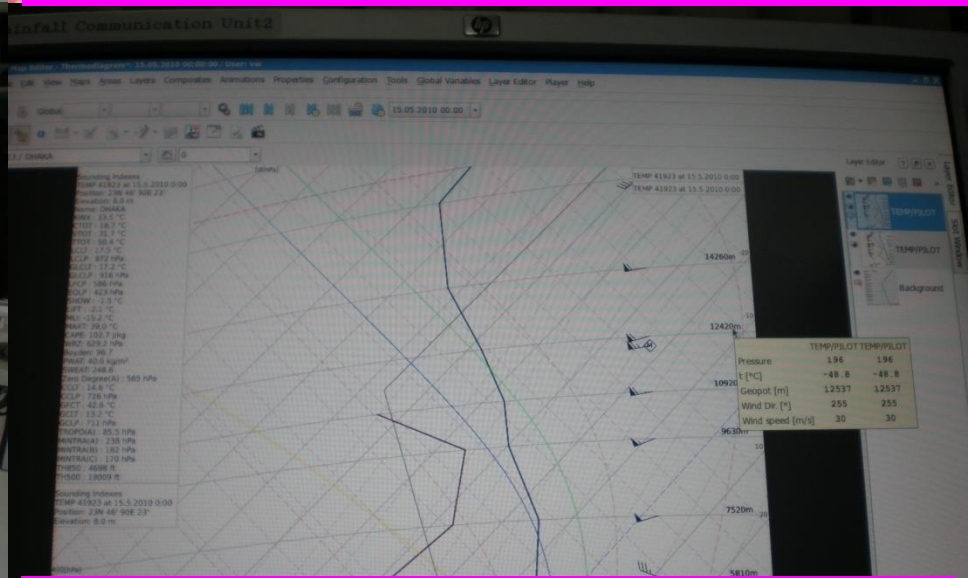
**Forecasters analyzing Radar observation**



**Forecasters analyzing Satellite observation**



**Forecasters analyzing NWP products from ECMWRF**

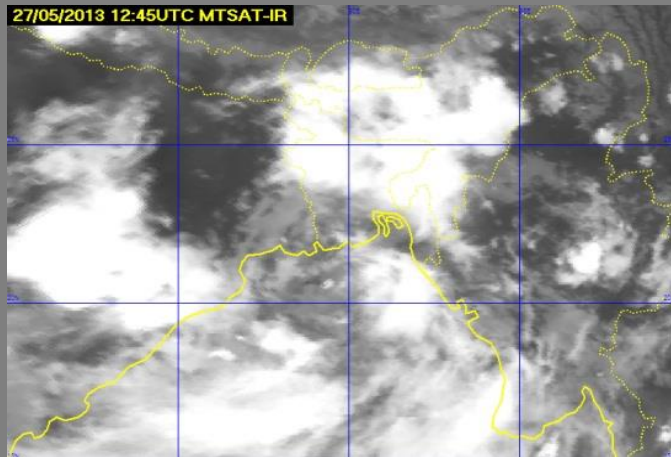


**Analyzed thermodynamic diagram using Visual Weather software**

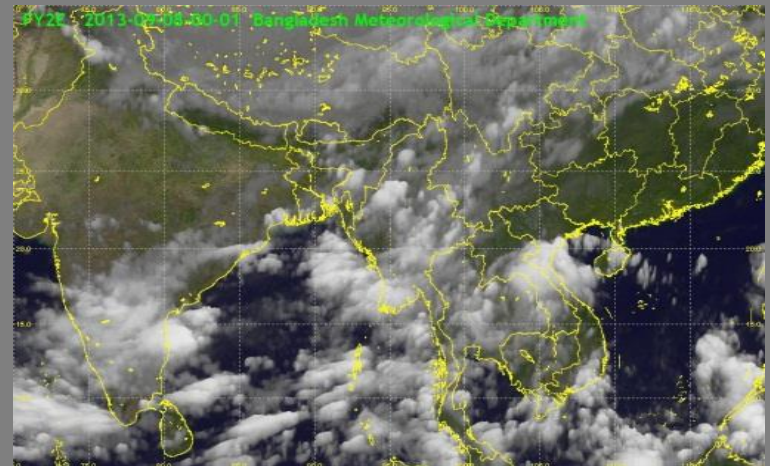
# Satellite products



**MTSAT (Himawari) Satellite Receiving System**



**MTSAT Satellite image**

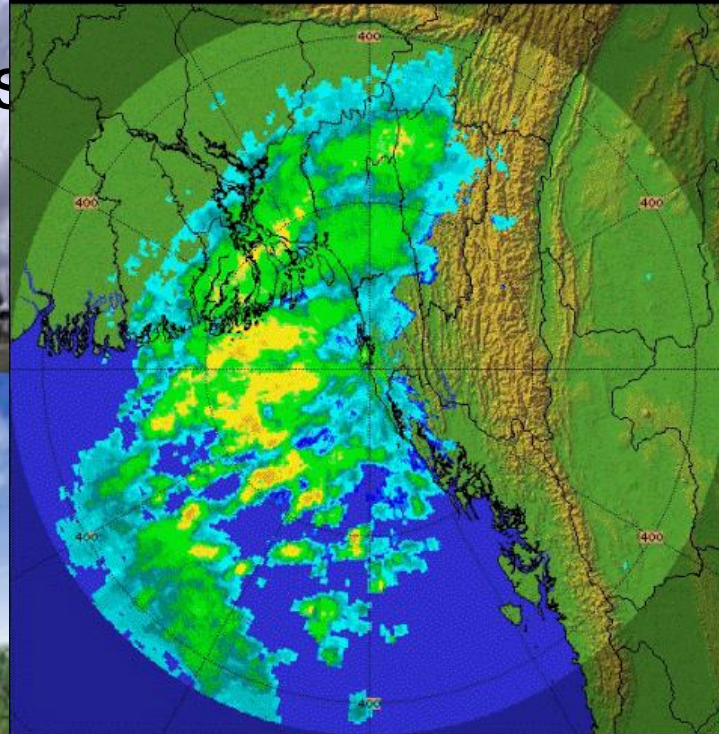
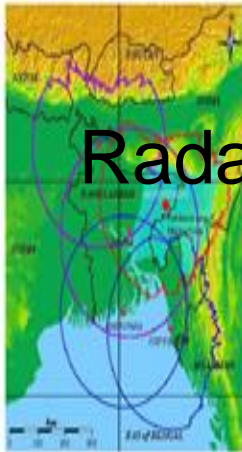


**FY-2G Satellite image**

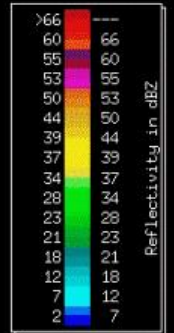


# Rader products

## Radar Stations



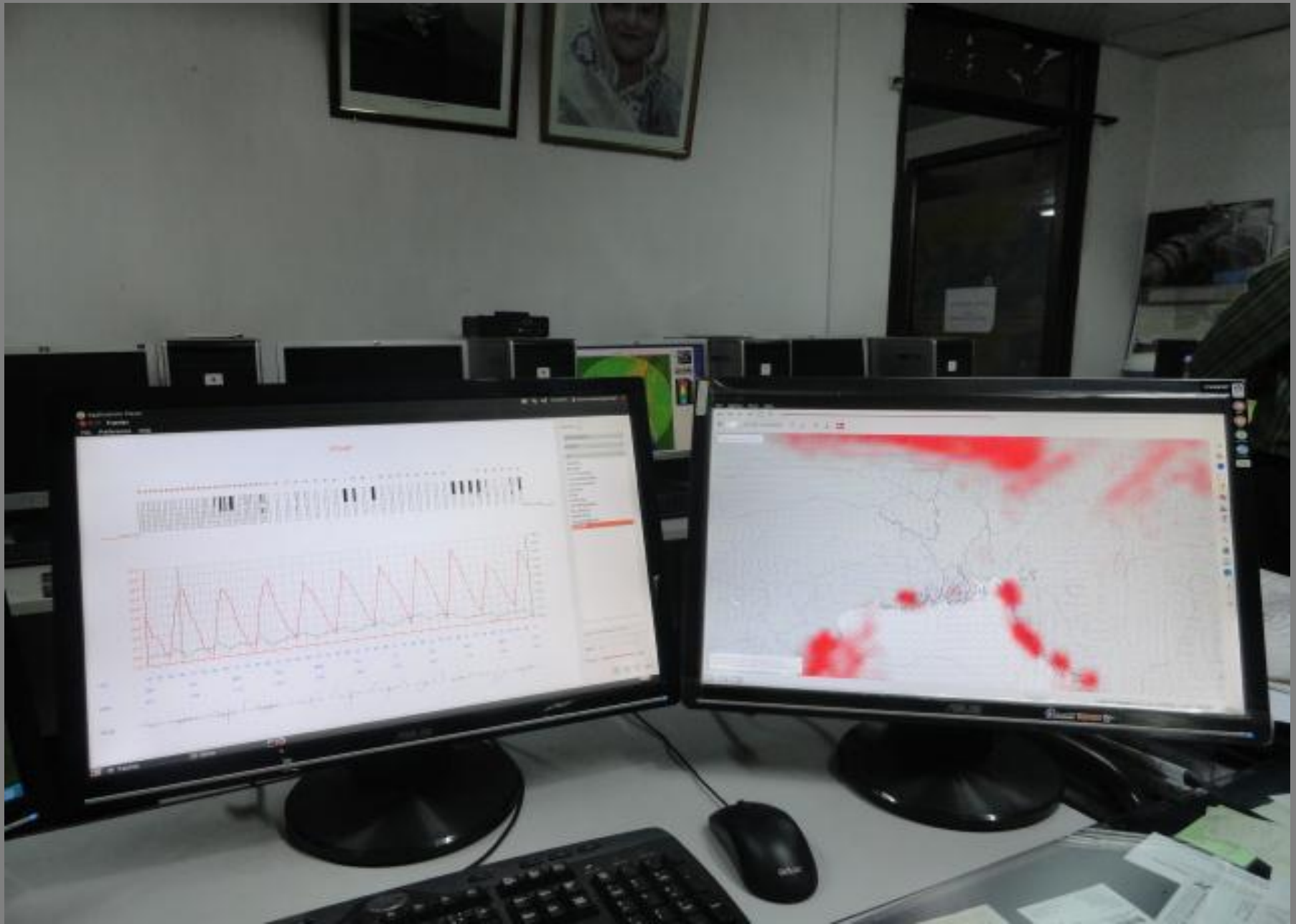
cox-radar  
CAPP1  
Z\_440KR\_1KH  
Task: PPI\_A  
PRF: 320Hz  
Height: 1.0 km  
Max Range: 440 km  
**00:00:06Z**  
15 NOV 2007 UTC



# Data Analysis & Visualization Software

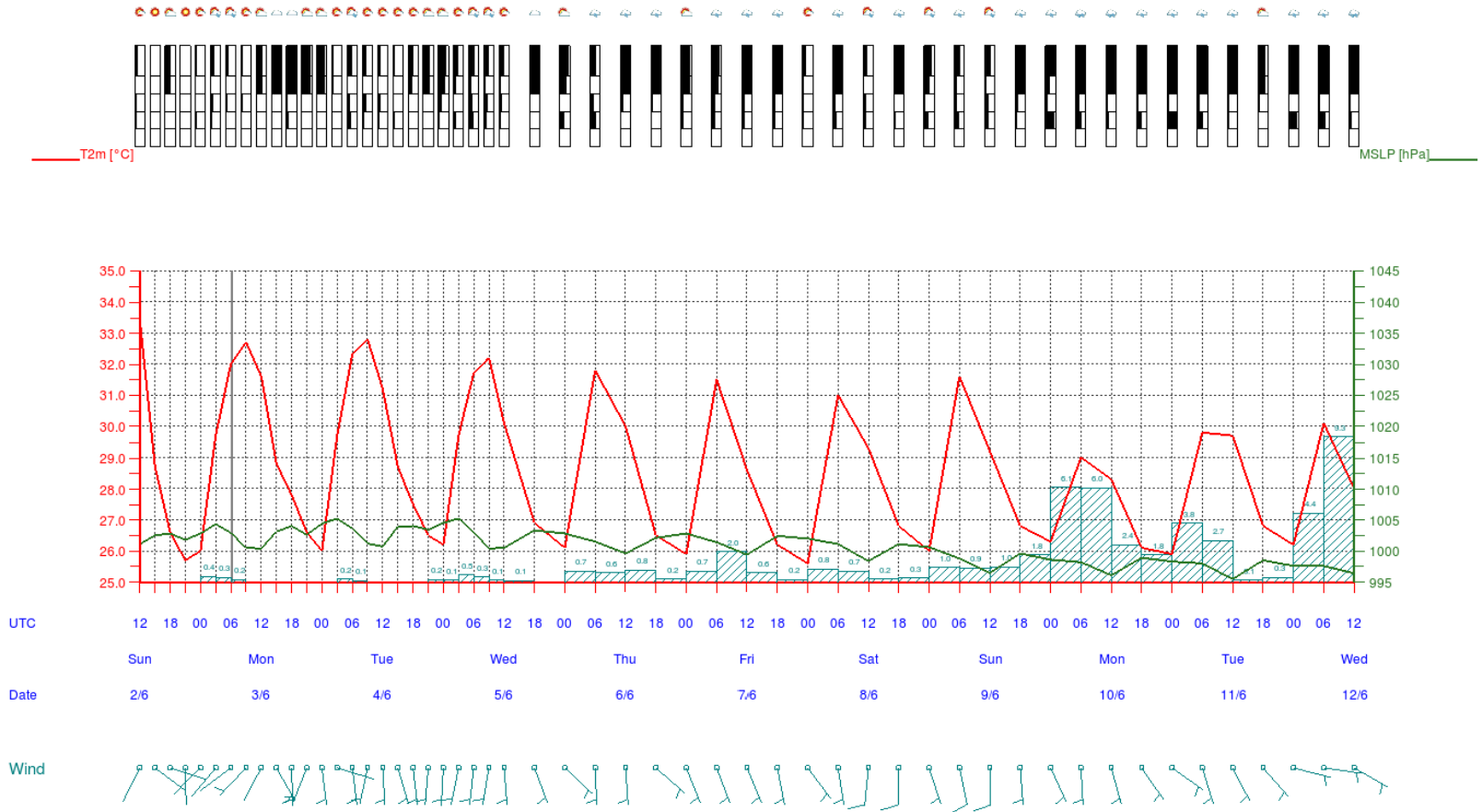
- DIANA (Digital Analysis)
- T-series
- RAOB
- Digital Atmosphere
- Visual Weather
- MICAPS





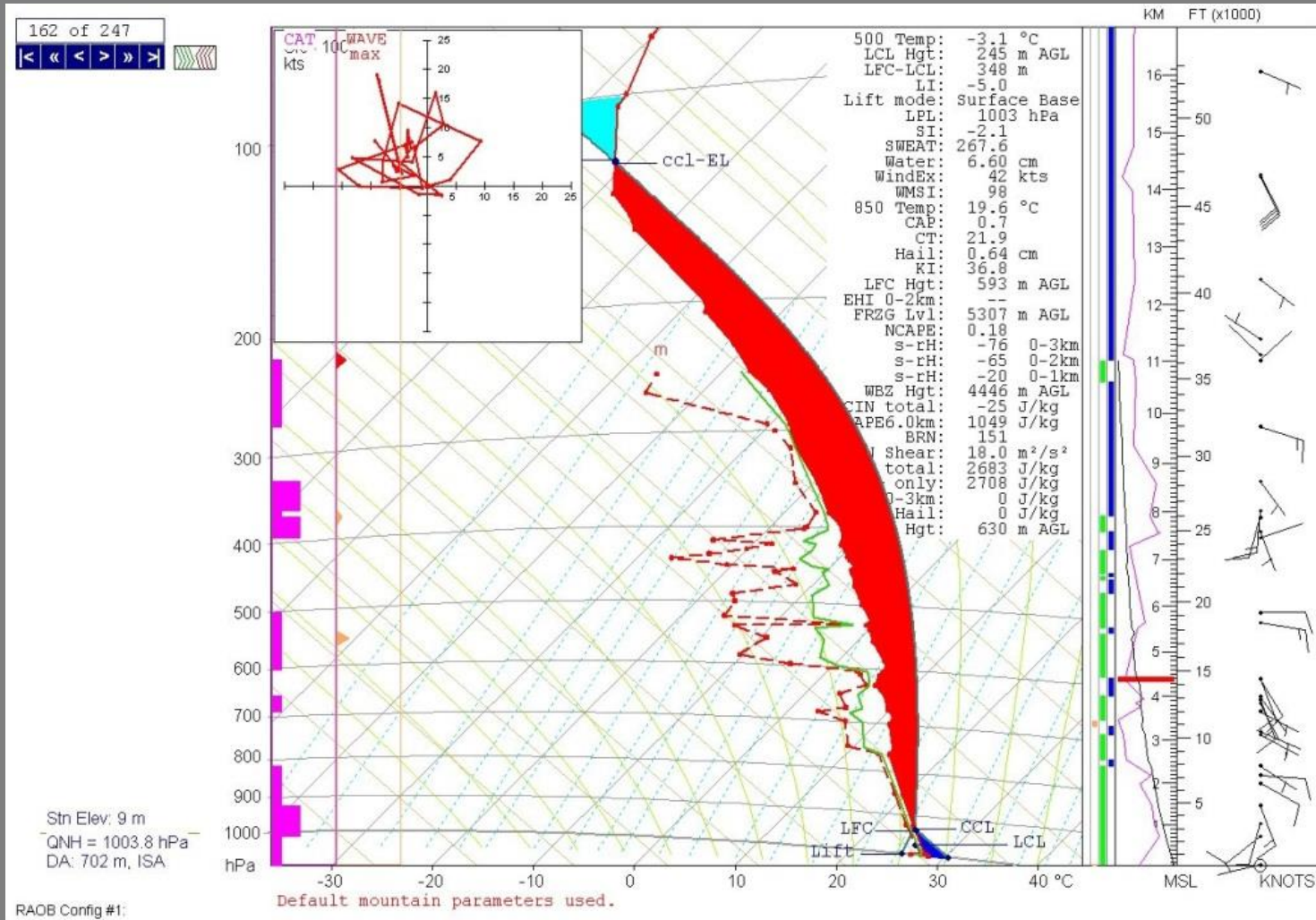
**Fig. DIANA (Digital Analysis) System**

# DHAKA



## T-series (Time series)

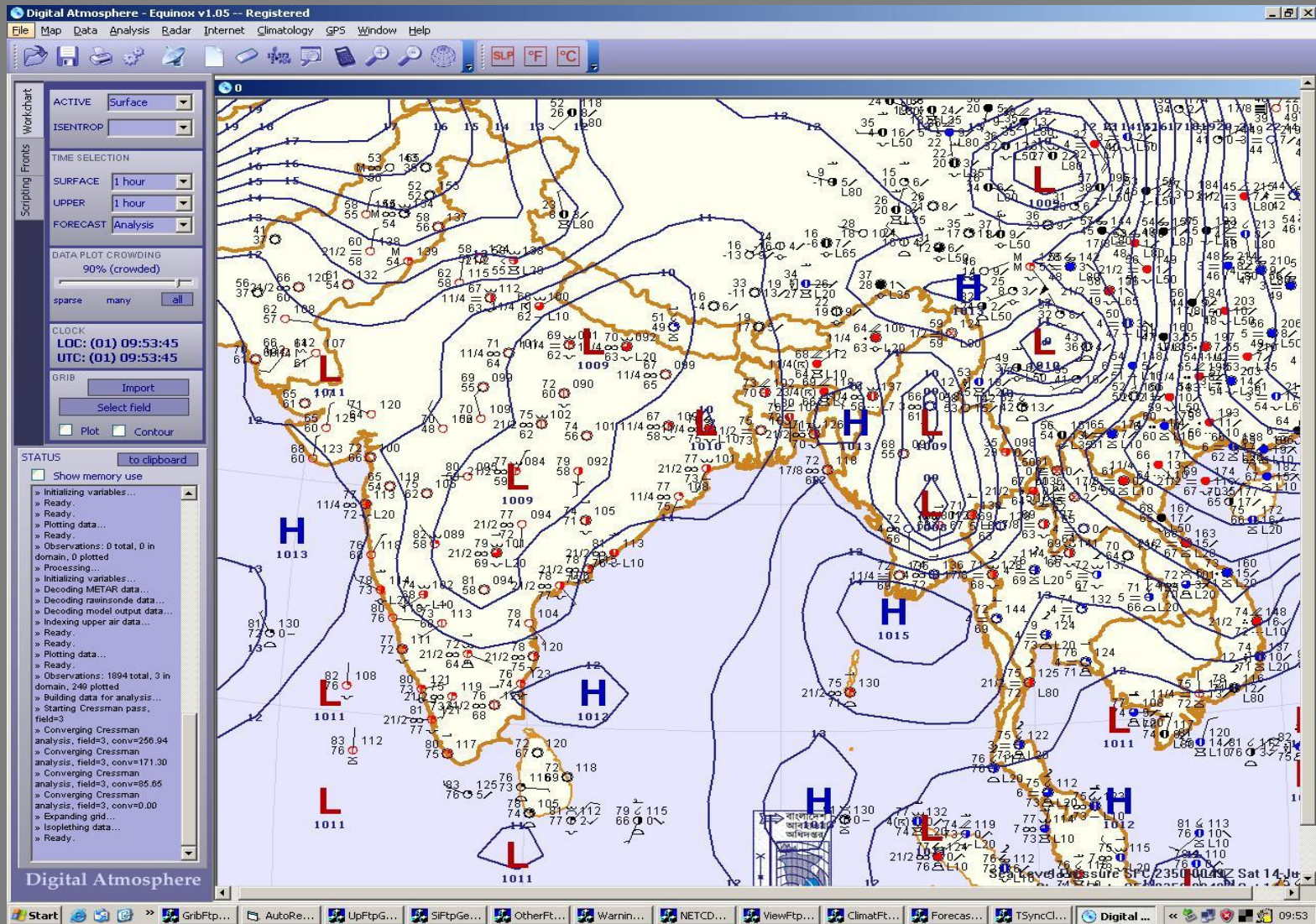
# RAOB



Analysis by RAOB



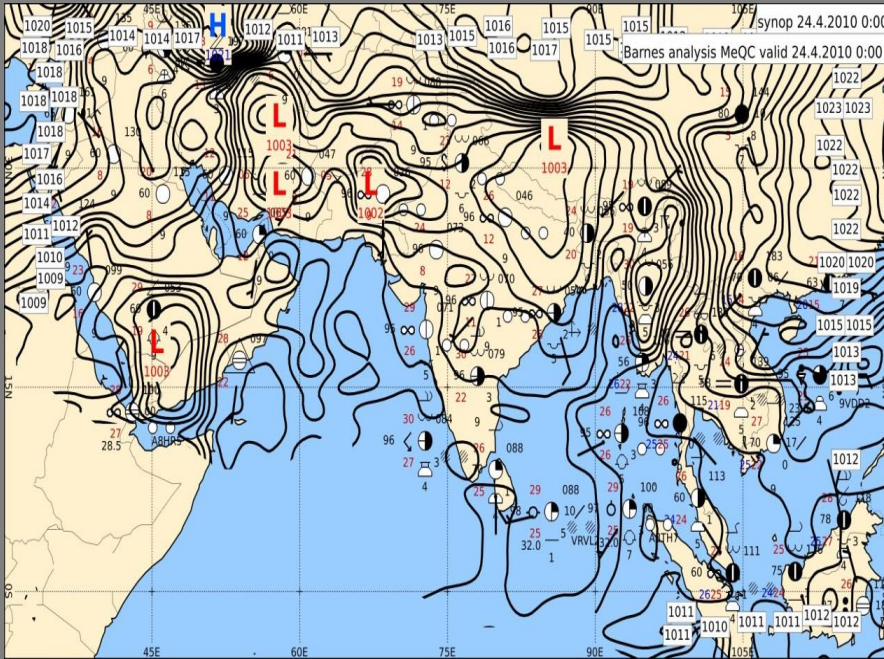
# Digital atmosphere



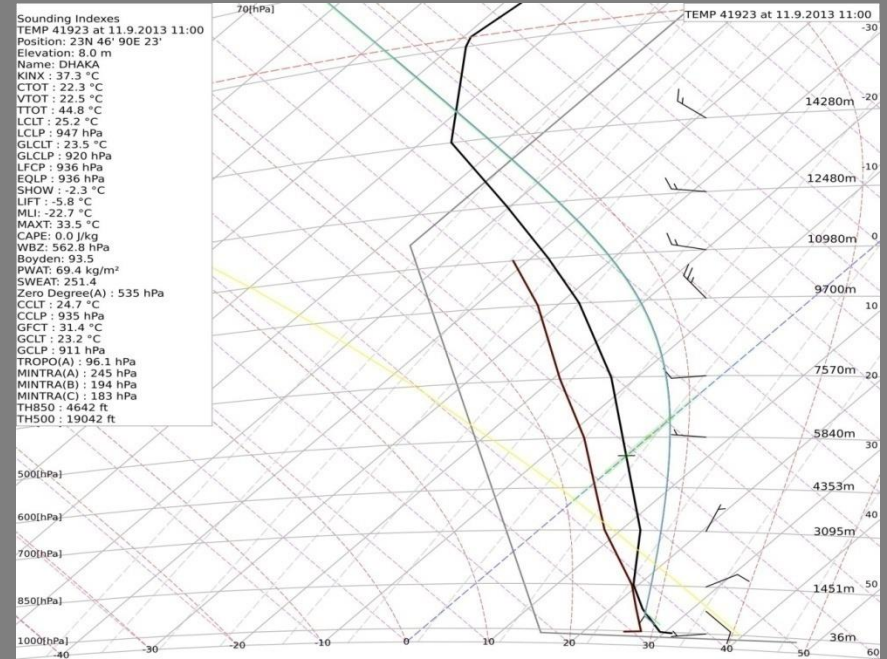
Analysis by Digital Atmosphere



# Visual Weather



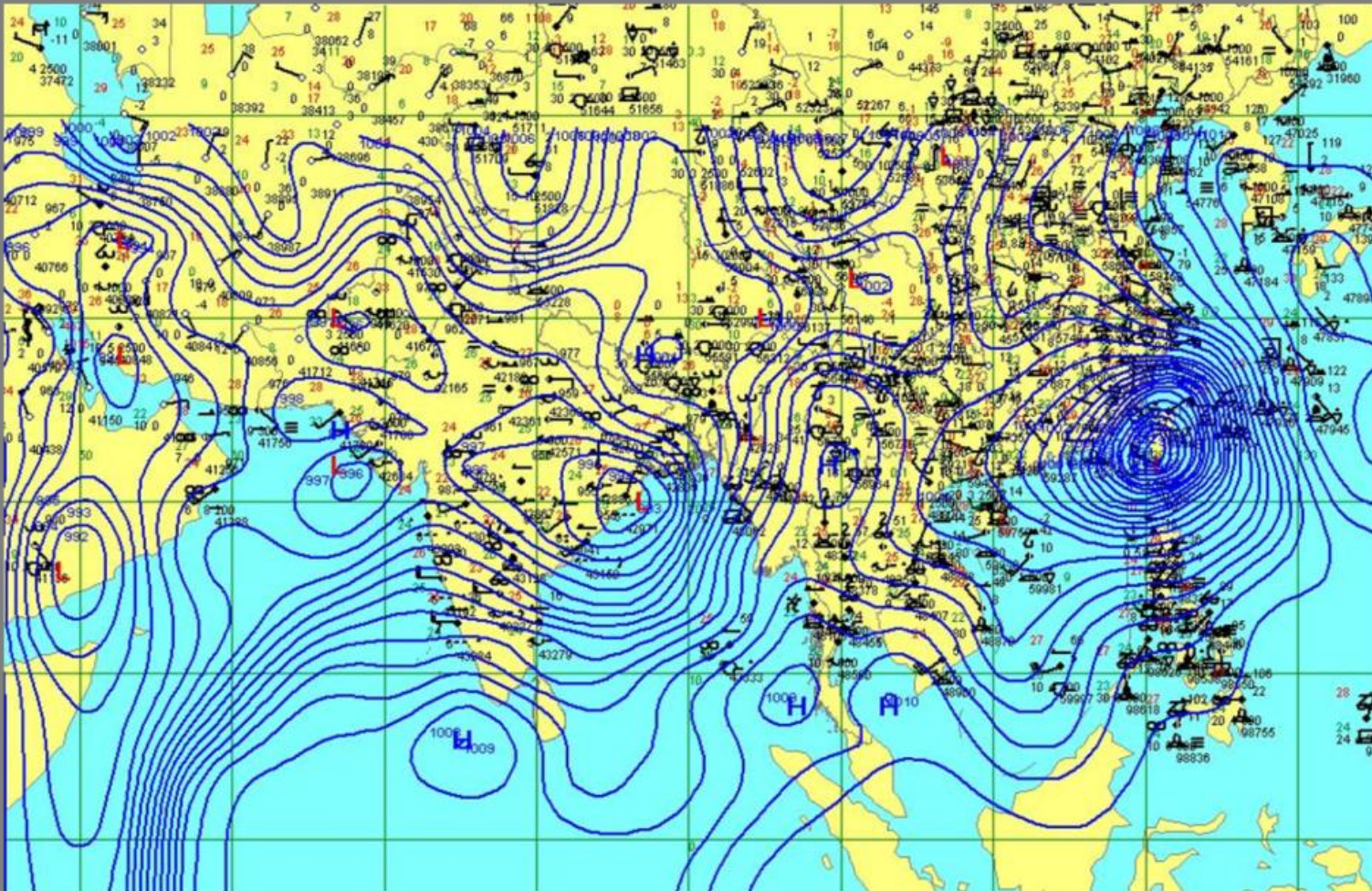
Analysis by Visual Weather



Analysis of Thermodynamic Parameter by Visual Weather



# MICAPS



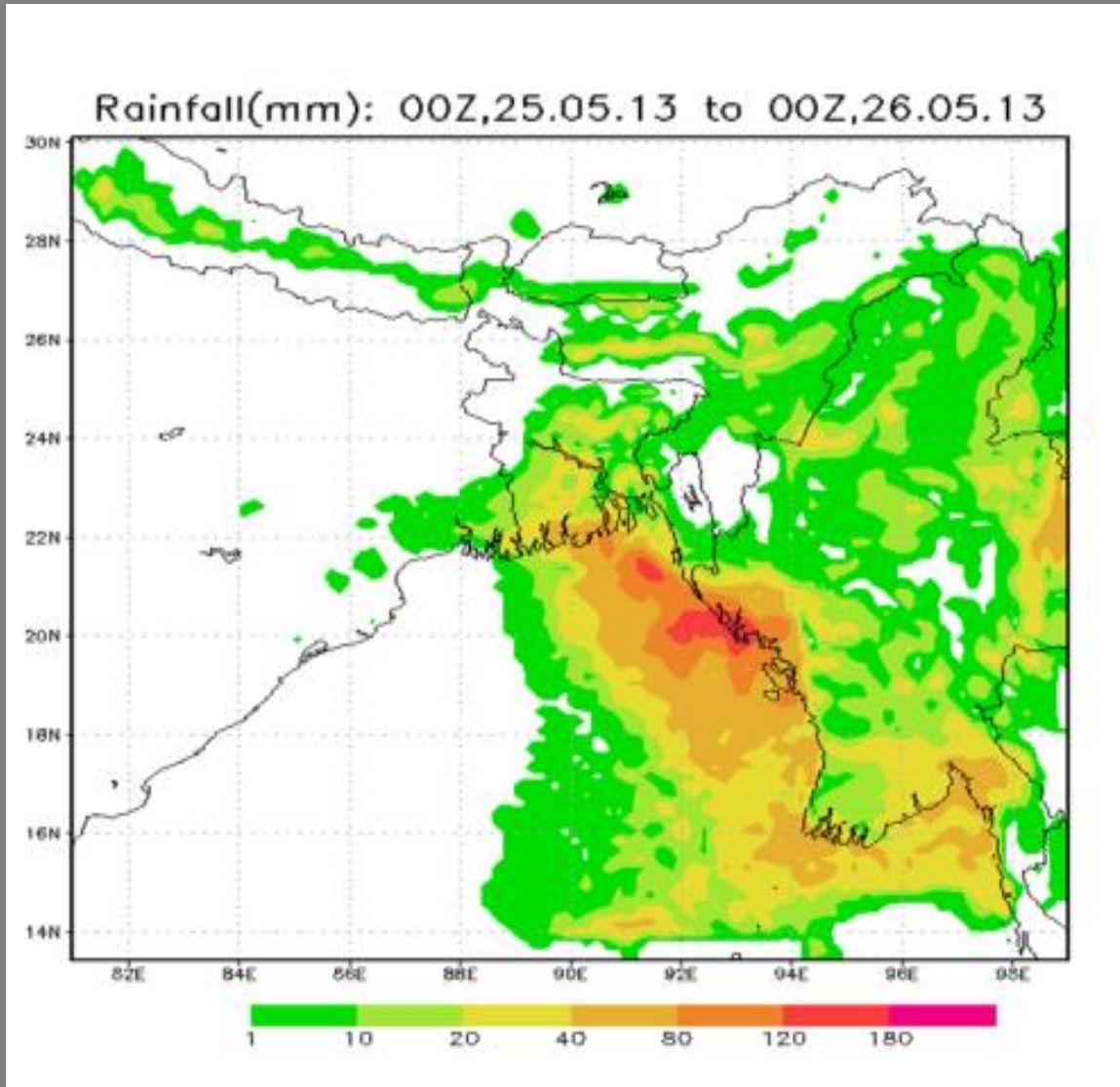
Pressure Analysis by MICAPS

# Different types of Model used at BMD

- WRF
- NHM
- MRI Storm Surge Model
- IIT-D Storm Surge Model
- MRI Wave Model
- PRECIS Model



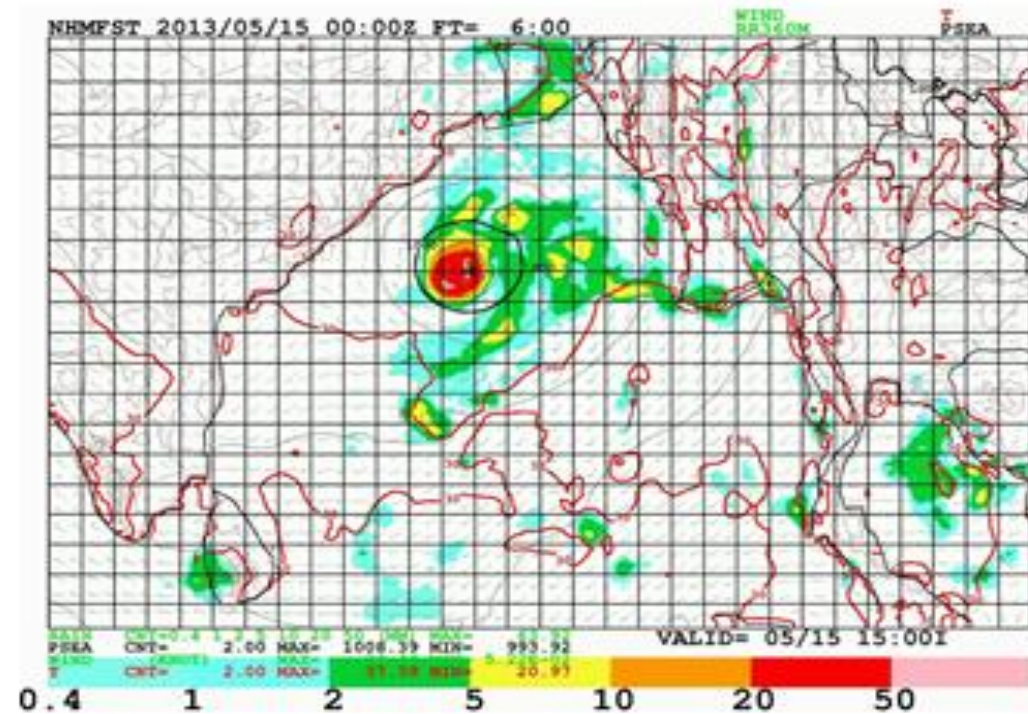
# WRF Model



WRF Model Product (Cyclone MAHASIN)

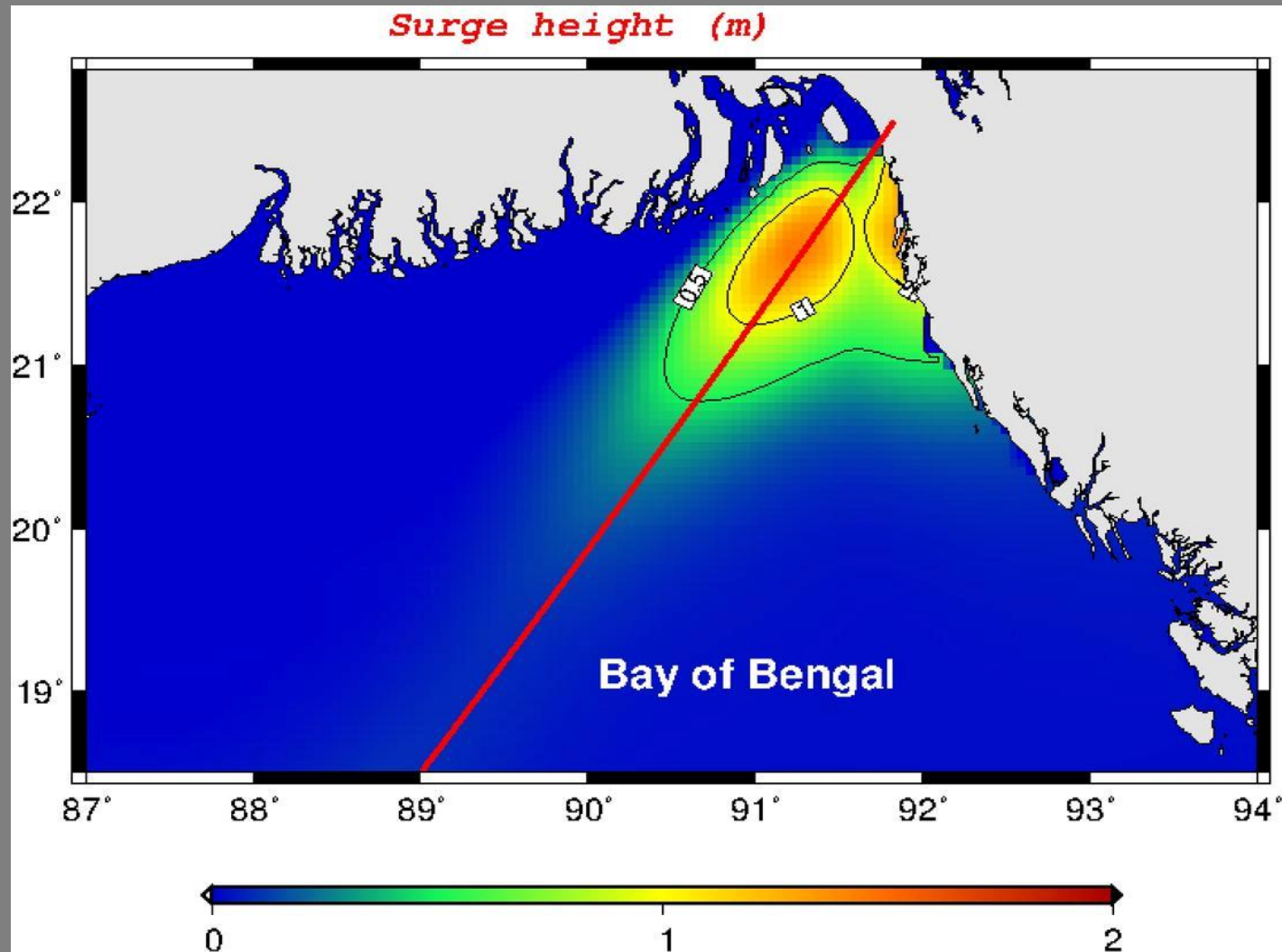
# NHM Model

পিসি ক্লাস্টার ও **NHM** মডেল



PC Cluster and NHM Model Product (Cyclone MAHASIN)

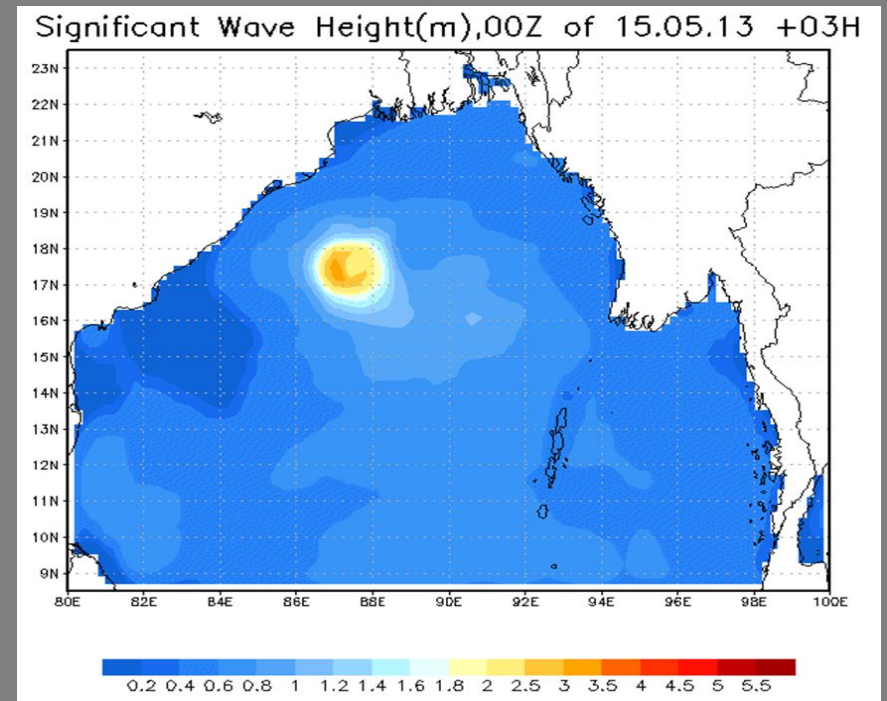
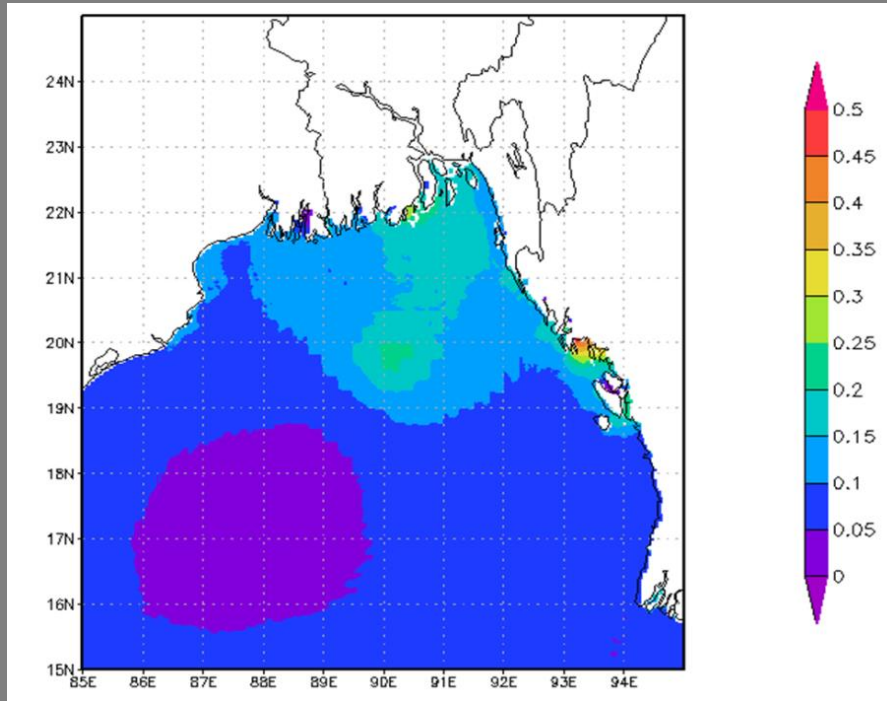
# IIT-D Storm Surge Model



IIT-D Storm Surge Model Product (Cyclone MAHASIN)



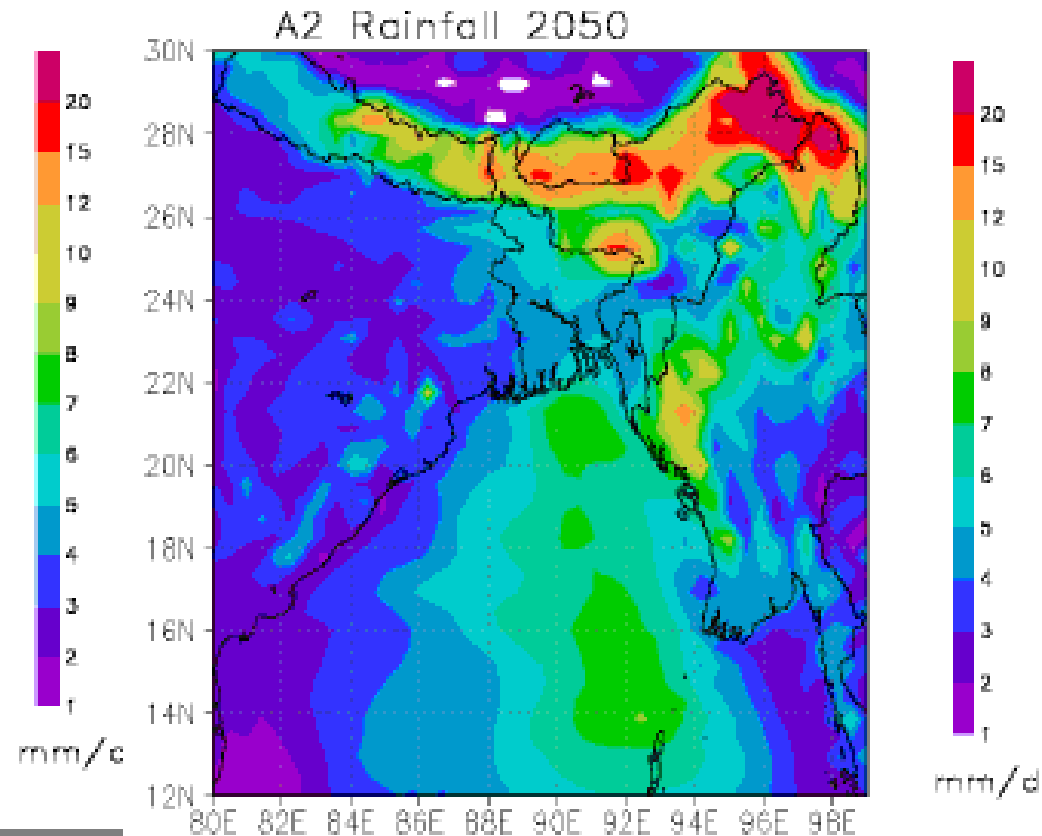
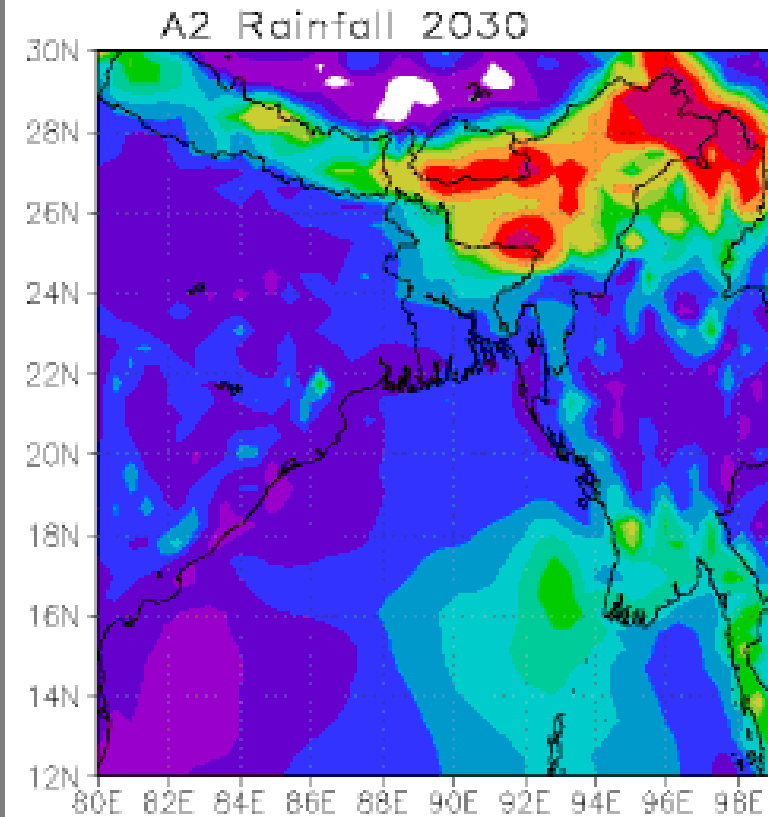
# MRI Storm Surge and MRI Wave Model



MRI Storm Surge and MRI Wave Model Product

# Climate Division

## PRECIS model generated future scenario of Bangladesh in 2030 and 2050



**A2 (SRES A2 Emission) rainfall scenarios generated by PRECIS 1.5.1 in 2030.**

**A2 (SRES A2 Emission) rainfall scenarios generated by PRECIS 1.5.1 in 2050.**

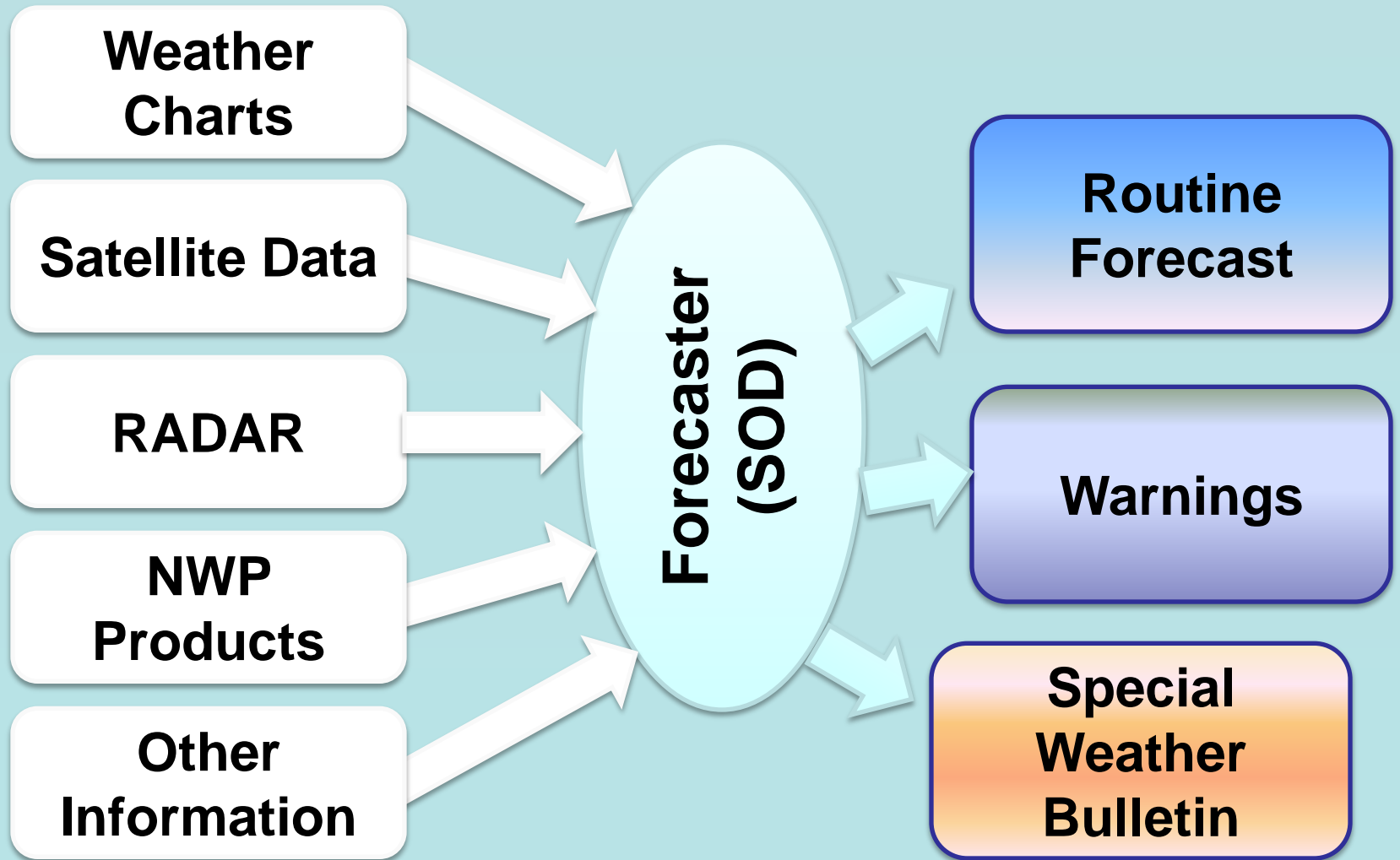
**Forecasts and Warning  
issued**

**BY**

**BMD**



# How to Issue Forecast & Warnings



## Regular Forecasts issued by BMD

### **a. Morning**

- |   |           |
|---|-----------|
| 1. Forecast for Hon'ble Prime Minister<br>( Bengali & English ) | 10:00 BST |
| 2. Weather Forecast For Dhaka And N/Hood                        | 10:15 BST |
| 3. Bangladesh Morning Inference                                 | 11:30 BST |
| 4. Bangladesh Daily Weather Summery                             | 14:00 BST |
| 5. Weather Forecast for Farmers                                 | 14:00 BST |

### **b. Evening**

- |  |           |
|--|-----------|
| Weather Forecast<br>( For Chittagong & Chittagong Hill tracts) | 15:30 BST |
|--|-----------|

### **c. Night**

- |  |           |
|--|-----------|
| 1. Bangladesh Evening Inference          | 22:00 BST |
| 2. Weather Forecast For Dhaka And N/Hood | 06:00 BST |
| 3. Weather Forecast for Farmers          | 05:30 BST |

# List of Forecasts Daily Issued by BMD for River and Sea Navigation

## a. Morning

- |                                     |           |
|-------------------------------------|-----------|
| 1. Inland Riverport Warning         | 10:30 BST |
| 2. Sea Bulletin                     | 10:30 BST |
| 3. Weather F/C for Fishing Trawlers | 10:45 BST |

## b. Evening

- |   |           |
|---|-----------|
| 1. Weather F/C For Bangladesh south of lat.24° N & North of 21° N | 15:00 BST |
| 2. Inland Riverport Warning                                       | 16:00 BST |

## c. Night

- |   |                |
|---|----------------|
| 1. Sea Bulletin                             | 22:00 BST      |
| 2. Inland Riverport Warning ( Two times)    | 22:00,0530 BST |
| 3. Weather Forecast For Chittagong –Sandwip | 05:00 BST      |



## Warnings Issued by BMD

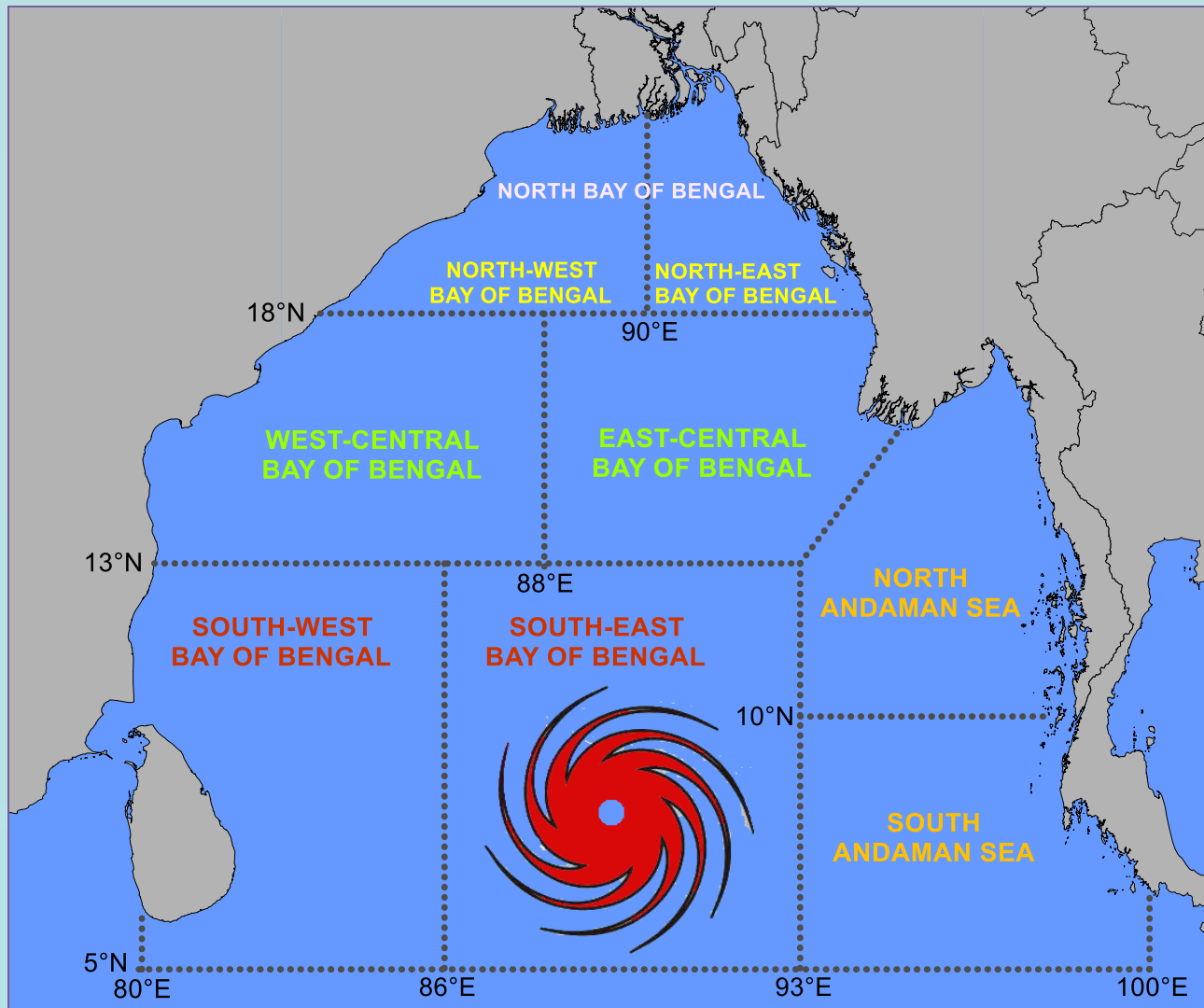
- **Special Weather Bulletins**
- **Kalbaishakhi/ Nor'westers Warnings**
- **Heavy Rainfall Warnings**
- **Squall Warnings**
- **Heat Wave Warning**
- **Cold Wave Warning**
- **Fog Warning**



The following forecasts for Aviation are issued (Route forecast) for each flight from Airport Meteorological Office.

- **Terminal Aerodrome forecast (TAF)**
- **Route forecast (ROFOR)**
- **SIGMET**
- **METAR containing landing and take off Weather information**
- **SPECIS whenever condition exists (Low clouds, Poor Visibility, squally wind, Thunder Storm etc.)**

# Different regions of the Bay of Bengal



# The signal systems for maritime ports

<b>Signal system for maritime ports</b>	<b>Wind speed (km/h)</b>
<b>Distant Cautionary signal number - I</b>	<b>51-61</b>
<b>Distant Warning signal number - II</b>	<b>62-88</b>
<b>Local Cautionary signal number - III</b>	<b>40-50</b>
<b>Local Warning signal number - IV</b>	<b>51-61</b>
<b>Danger Signal number – V, VI, VII</b>	<b>62-88</b>
<b>Great Danger Signal number– VIII, IX, X</b>	<b>89-117 or above</b>



# The signal systems for Inland River ports

<b>Signal system for Inland River ports</b>	<b>Wind speed (km/h)</b>
<b>Cautionary signal number -I</b>	<b>45-60</b>
<b>Riverine Warning signal number - II</b>	<b>61-80</b>
<b>Riverine Danger Signal number – III</b>	<b>62-88</b>
<b>Riverine Great Danger Signal number– IV</b>	<b>89-117 or above</b>



Government of the People's Republic of Bangladesh  
Bangladesh Meteorological Department  
Storm warning Centre  
Agargaon, Dhaka-1207

Phone: 8113071  
FAX: 8118230  
E-Mail: info@bmd.gov.bd  
swc@bmd.gov.bd  
swc.mi@yahoo.com  
Website: www.bmd.gov.bd  
Dated, Dhaka: 27-11-2008

No. Jha: Sa:-20(15)/96/

Forecast Valid for 24 Hours Commencing 09 AM Today:

**Synoptic Situation:** The depression over Southwest Bay intensified into a cyclonic storm "Nisha" over Southwest Bay off Tamilnadu coast of India and remained practically over the same area and was centred at 27,000 UTC within half a degree of Lat. 10.8° N and Long. 80.0° E. (R) Lat. 10.8° N and Long. 80.0° E. It is likely to move in a northwesterly direction and cross Tamilnadu coast near Nagapathinam by noon/afternoon today. Maximum sustained wind speed within 29 NM of the storm centre is about 33 kts rising to 43 kts in gusts/squalls. Sea will remain moderate/rough near the system.

**Forecast:** Weather is likely to remain mainly dry with partly cloudy sky over the country.

Night temperature may remain nearly unchanged over the country.

Wind direction and speed at Dhaka : N/NE'ly 08-12 kph.  
RH at 06 A.M. of Dhaka : 93 %  
Today's sunset at Dhaka : 05-10 mts.  
Tomorrow's sunrise at Dhaka : 06-22 mts.  
Outlook for next 72 hrs : Little change.

Rainfall for last 24 hours (till 06 AM today) and maximum temperature of yesterday, minimum temperature of Today:

Name of Divisions	Name of Stations	Rain fall (mm)	Max. Temp (°C)	Min. Temp (°C)	Name of Divisions	Name of Stations	Rain fall (mm)	Max. Temp (°C)	Min. Temp (°C)
Dhaka	Dhaka	00	29.6	17.2	Sylhet	Sylhet	xx	28.8	17.3
	Mymensingh	00	28.4	14.5		Srimangal	00	29.2	12.2
	Tangail	00	28.7	15.6	Rajshahi	Rajshahi	00	27.8	14.6
	Fariapur	xx	28.2	xx		Ishurdi	00	29.0	14.4
	Madaripur	00	28.7	16.2		Bogra	00	29.2	15.7
Chittagong	Chittagong	00	30.0	17.9	Rangpur	00	27.4	16.0	
	Sandwip	xx	29.9	15.5	Sayedpur	xx	xx	xx	
	Shakunda	xx	xx	xx	Dinajpur	00	28.0	14.5	
	Rangamati	xx	30.0	xx	Khulna	Khulna	00	27.5	17.0
	Comilla	00	29.1	15.6		Mongla	00	28.0	17.5
	Chandpur	00	28.2	17.1		Satkhira	00	27.5	15.2
	M. Court	xx	29.0	xx		Jessore	00	29.6	14.2
	Feni	00	30.1	16.2	Chuadanga	xx	xx	xx	
	Hatiya	xx	28.6	xx	Barisal	Barisal	00	28.9	15.4
	Cox's Bazar	00	29.8	17.7		Patuakhali	00	28.4	16.2
Kutubdia	xx	29.0	xx	Bhola		xx	28.5	xx	
Teknaf	xx	30.2	xx	Khepupara	xx	28.6	16.2		

(Md. Rashaduzzaman)  
Assistant Meteorologist  
For Director

## Daily Weather Forecast

- To:
1. Cabinet
  2. Princip
  3. Mr. En
  4. Secretary, Ministry of Agriculture, FAX: 763809
  5. Secretary, Ministry of Food and Disaster Management, FAX: 769623, 7174146
  6. Secretary, Ministry of Water Resources, FAX: 762400
  7. Secretary to the Hon'ble Chief Adviser, FAX: 8113243
  8. Eng. Gen. S. M. Sultan Uddin, (Joint) BARRISTER, JUDGE (WRD) HMDD, P.O. 8117945
  9. Chairman, Sugar and Food Industries Corporation, Fax: 9550461, 9555700
  10. Director General, Hon'ble Chief Adviser's Sp. Security Force, Box: 811181
  11. Assistant Military Secretary to the Hon'ble President, Bangla Bhawan, Dhaka, Fax: 9566593
  12. Hon'ble Chief Adviser's Monitoring Cell, FAX: 8115900
  13. FPC/FC, Fax: 9557386/7174736
  14. Bangladesh Army (Military Operation Directorate), Fax: 8226437
  15. World Food, Fax: 8113147
  16. Sr. Asst. Secretary, Shipping Management & Export Cell, Ministry of Industries, 91, Motilal C/A, Dhaka-1000.
  17. Deputy Director, SWC
  18. Deputy Director, BMD HQ
  19. P.A. to the Director, BMD
  20. C/IMP, Fax: 9596554



Government of the People's Republic of Bangladesh  
Bangladesh Meteorological Department  
Storm warning Centre  
Agargaon, Dhaka-1207

Phone: 8113071  
FAX: 8118230  
E-Mail: info@bmd.gov.bd

swc@bmd.gov.bd

Website: www.bmd.gov.bd

No. Jha: Sa:-20(15)/96/

Dated, Dhaka: 26-11-2008

## Balloon Observation General Inference of Bangladesh at 26, 1200 UTC

**Part one:** Warning Bay of Bengal.

**Part Two:** The deep depression over Southwest Bay and adjoining Srilanka coast moved Northwest wards intensified into a cyclonic Storm "NISHA" over the southwest Bay off Tamilnadu coast of India and was Centred at 26,1200 UTC when half a degree of lat 10.5° N and long 79.8E. It is likely to move in a Northwesterly direction and cross Tamilnadu coast near Kodikkarai by mid night Today/Early morning Tomorrow.

**Part three:** Area F/C valid for next 16 hrs. Commencing from 26,1700 UTC.

**Weather:** Tempo. Rain/T. Showers over North Bay.

**Wind:** N/NE'ly 12-18 kts. Tempo. Gusting to 30kts.

**Visibility:** 4-6 kms reducing to 2000 m or less in rain/ shower.

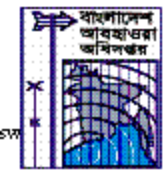
## Forecast for North Bay



Government of the People's Republic of Bangladesh  
 Bangladesh Meteorological Department  
 Storm warning Centre  
 Agar gaon, Dhaka-1207

Phone : 8113071  
 FAX: 8118230  
 E-Mail: [info@bmd.gov.bd](mailto:info@bmd.gov.bd)

Website: [www.bmd.gov.bd](http://www.bmd.gov.bd)  
 Dated, Dhaka: 27-11-2008



No. Jha: Sa:-20(15)/96/

**Fleet F/C for area C-90 Valid for 12 hrs. Commencing 2200 utc of 26.11.08**

**Part one:** Warning Bay of Bangal.

**Part Two:** The deep depression over Southwest Bay and adjoining Srilanka coast moved Northwest wards intensified into a cyclonic Storm "NISHA" over the southwest Bay off Tamilnadu coast of India and was Centred at 26.1200 UTC withen half a degree of Lat 10.5° N and long 79.8E. It is likely to move in a Northwesterly direction and cross Tamilnadu coast near Kodikkarai by mid night Today/Early moiming Tommorrow.

**Part three:** Area F/C valid for next 16 hrs. Commencing 26.1700 UTC.

**Weather:** Tempo. Rain/T. Showers over the area C-90.

**Wind:** N/NE'ly 12-18 kts. Tempo. gusting to 30kts.

**Visibility:** 4-6 kms reducing to 2000 m or less in rain/ shower.

**Outlook For Subsequent 12 hrs. :** Little change.

**MSL Pressure of Dhaka at 26.1200 UTC:** 1012.4 hPa

**Inland Riverport Warning valid till 01 AM of 28.10.2008 commencing from now:**

In association with Rain/Thunder showers tempo. S/SE'ly squalls speed 60-80 Kph is likely to occur over the regions of Rajshahi, Rangpur, Pabna, Bogra, Faridpur, Dhaka, Tangail, Mymensingh, Jessore, Kushtia, Khulna, Barisal, Patuakhali, Noakhali, Comilla, Chittagong, Sylhet and Cox' Bazar wherein river ports shall hoist riverine warning signal number Two (R ) Two.

Rain/Thunder showers accompanied by tempo. S/SE'ly gusty/squally wind speed 45-60 Kph is likely to occur elsewhere over the country wherein river ports shall hoist cautionary signal number One (R ) One.

**Inland River port Warning**

Sd/=   
 Duty Forecasting Officer (DFO)

**Fleet Forecast**



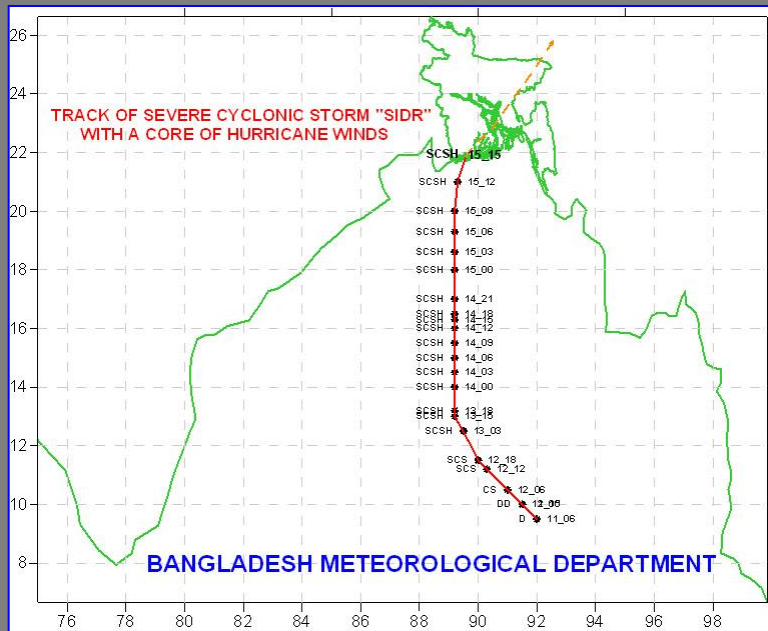
# Satellite & Radar Animation of Cyclones

# Cyclone Detection & Warning

Detection of cyclonic storm in the Bay of Bengal and issuance of timely warning is the task of Storm Warning Centre, Dhaka.

Cyclone warning is given by the Storm Warning Centre as and when a cyclone is detected in the Bay of Bengal. It is monitored from the formation stage till its landfall and forecast of the track is made.

# Causalities in Cyclone SIDR in Bangladesh



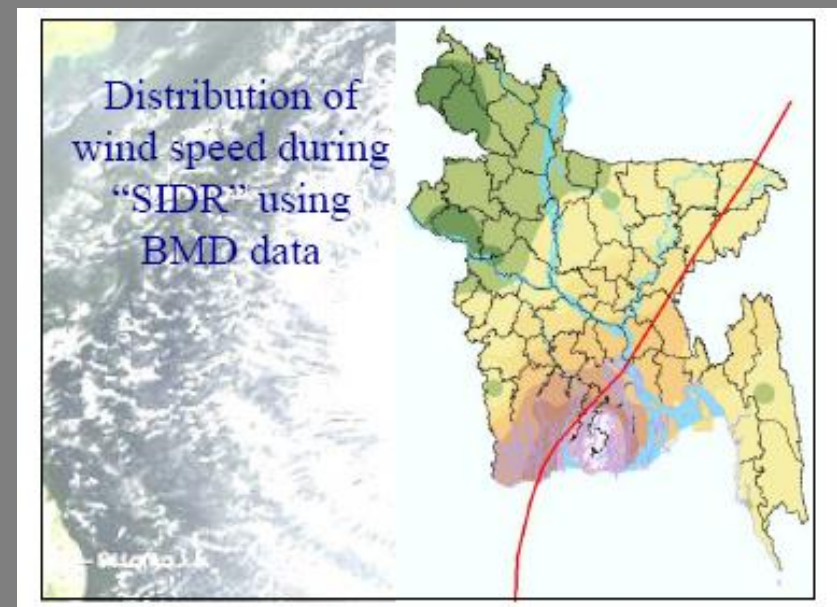
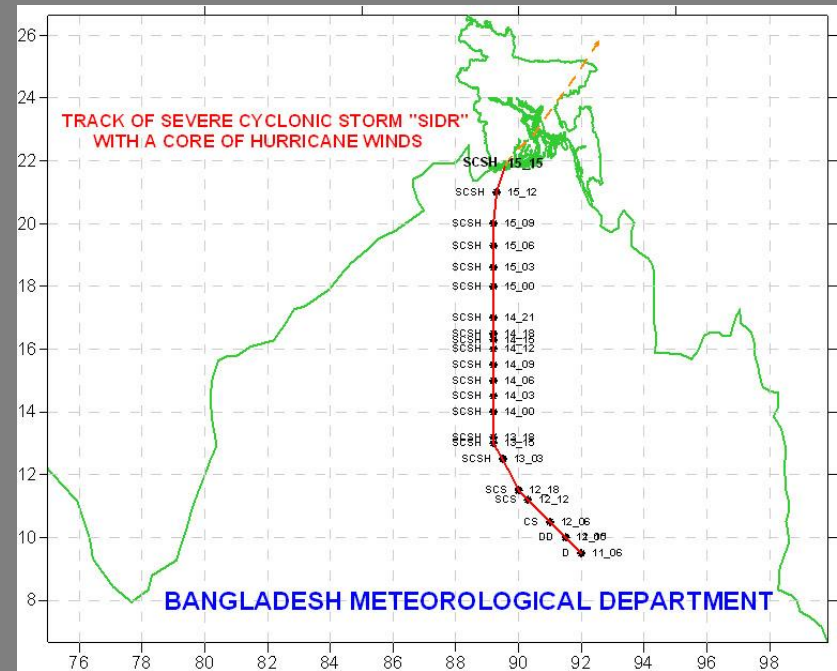
<b>1</b>	<b>Total Death</b>	<b>3,275</b>
<b>2</b>	<b>People missed</b>	<b>871</b>
<b>3</b>	<b>Family affected</b>	<b>1,928,265</b>
<b>4</b>	<b>People affected</b>	<b>8,545,470</b>
<b>5</b>	<b>Houses damaged</b>	<b>1,449,157</b>
<b>6</b>	<b>Crop damaged</b>	<b>2,077,226</b>
<b>7</b>	<b>Trees destroyed</b>	<b>4,065,316</b>



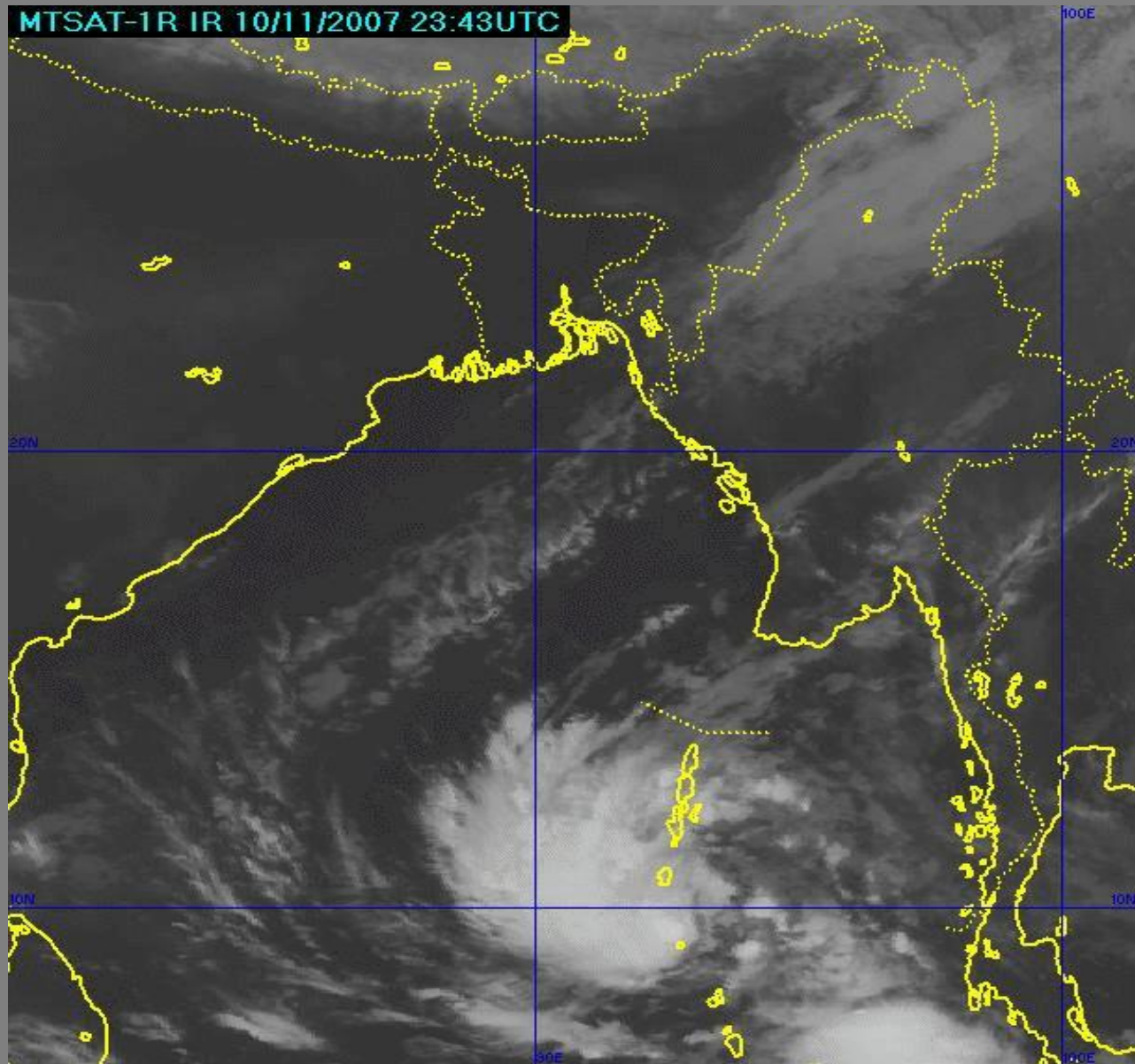
# Observed Track & Recorded Wind Speed

We all know that Bangladesh was affected by the severe cyclone 'SIDR' with hurricane intensity on 15-16 November, 2007.

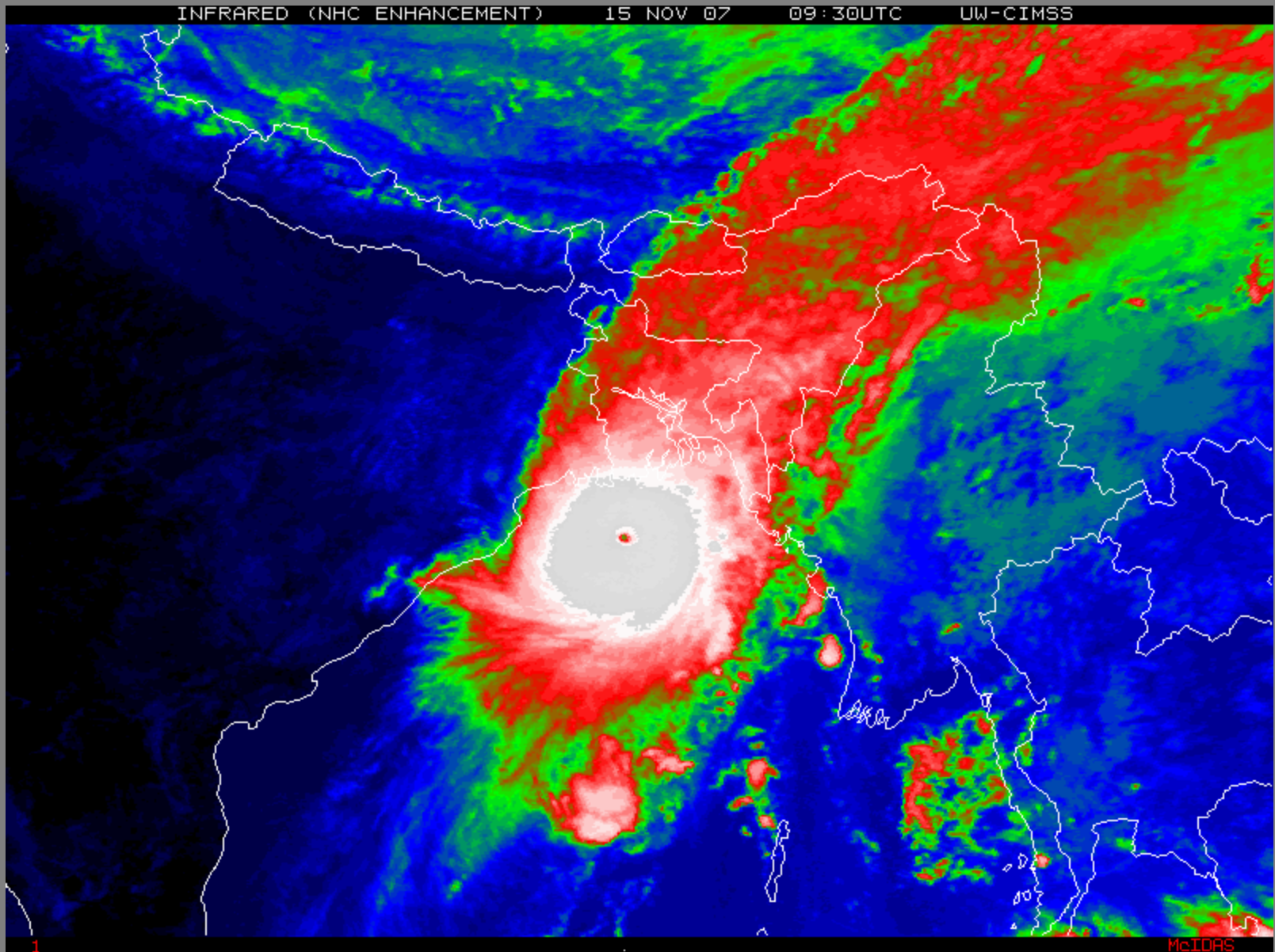
This severe cyclone SIDR devastated the southwestern part of Bangladesh with the recorded maximum wind speed of 223 Km/hr and associated storm surge of about 15 feet in those areas.



# Animation of Super Cyclone "SIDR"

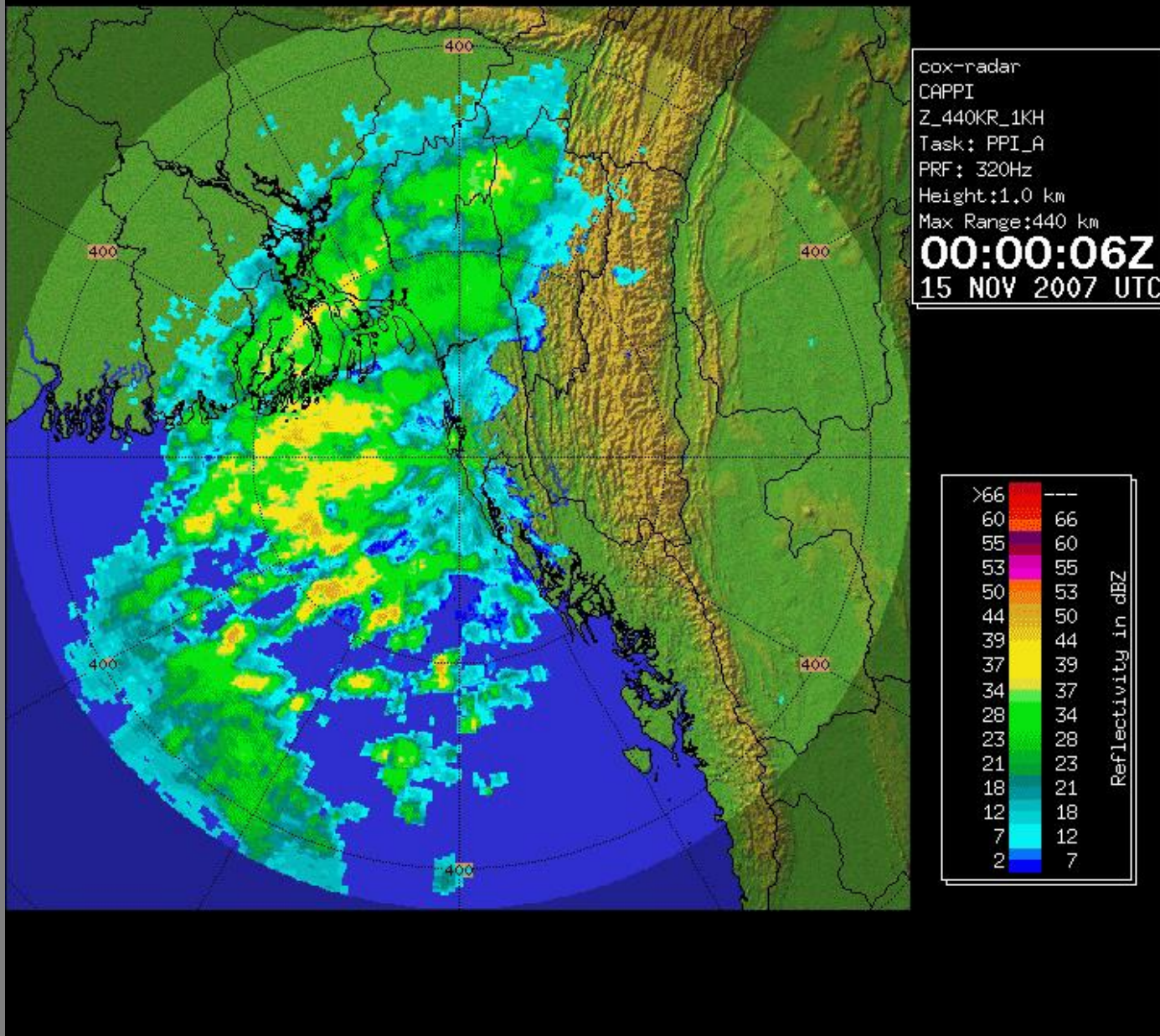


# Satellite Animation of Cyclone "AILA"



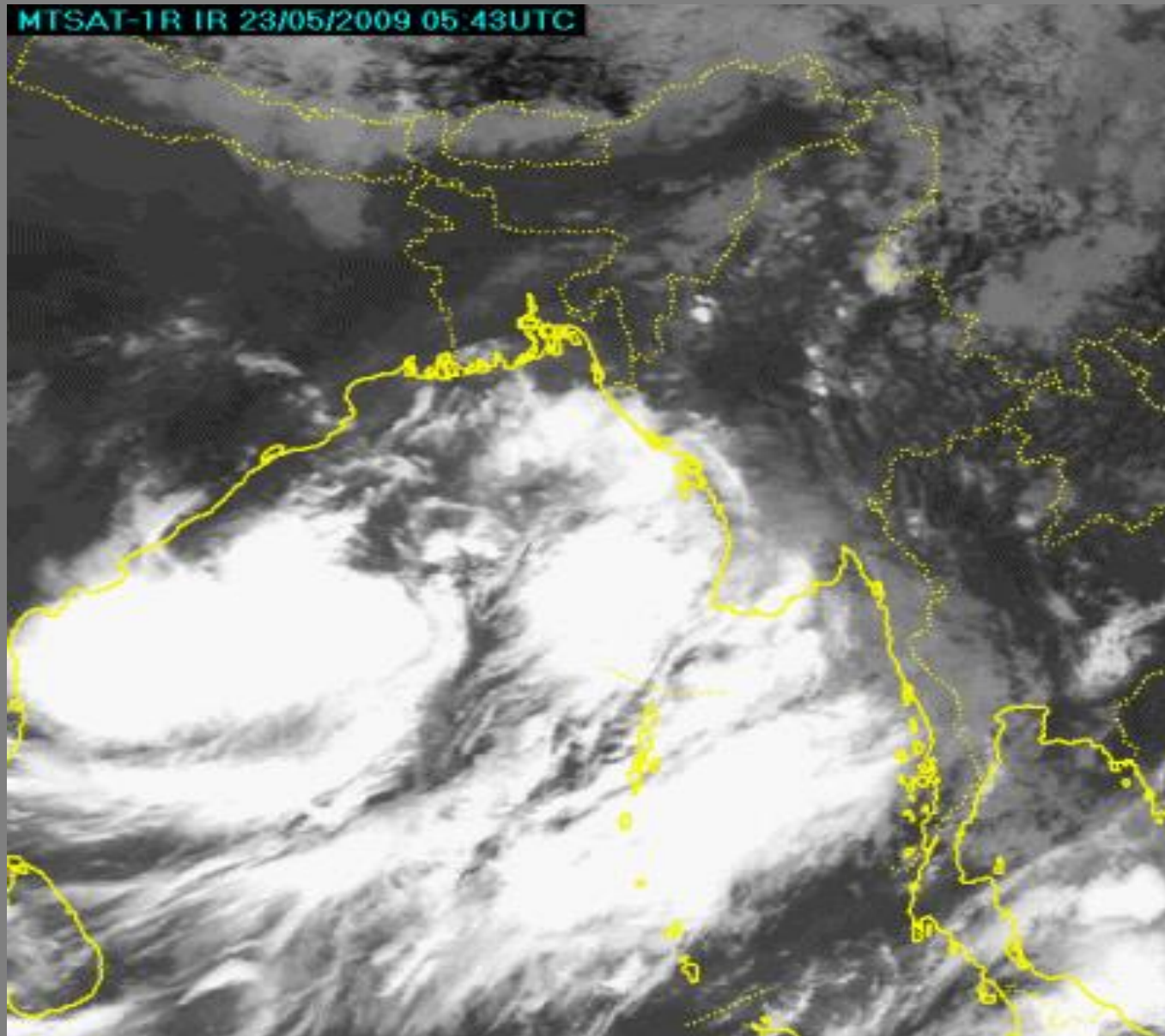


# Radar Picture Animation of SIDR





# Satellite Animation of Cyclone "AILA"

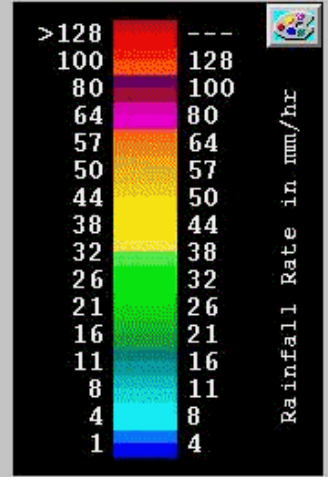


 **KHP/KHP**

 **CAPPI**  
R\_440KR\_1KH  
Hgt: 1.0 km  
Range: 440 km  
PPI\_\*

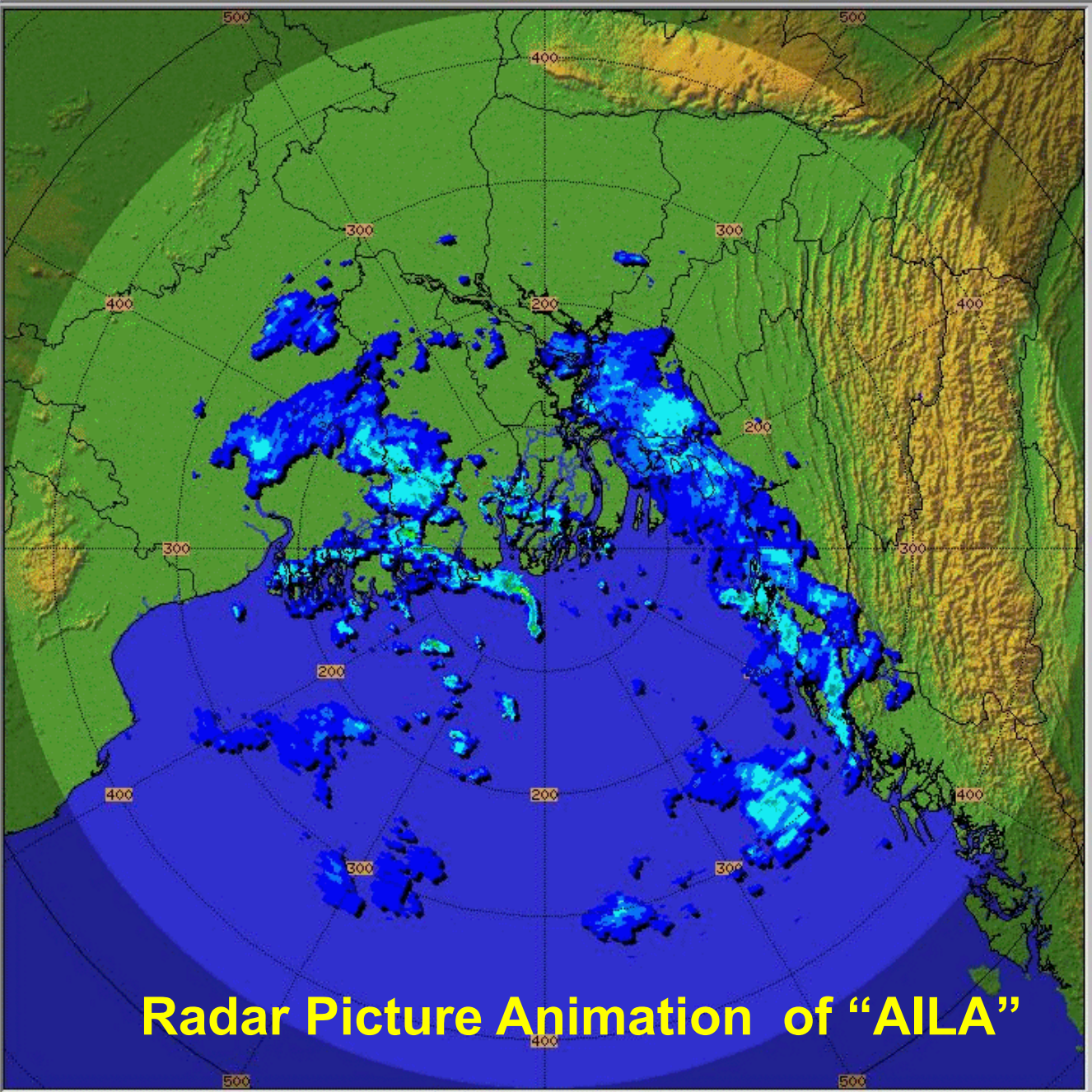
**00:00:07 Z**  
**25 MAY 2009**





**AILA**

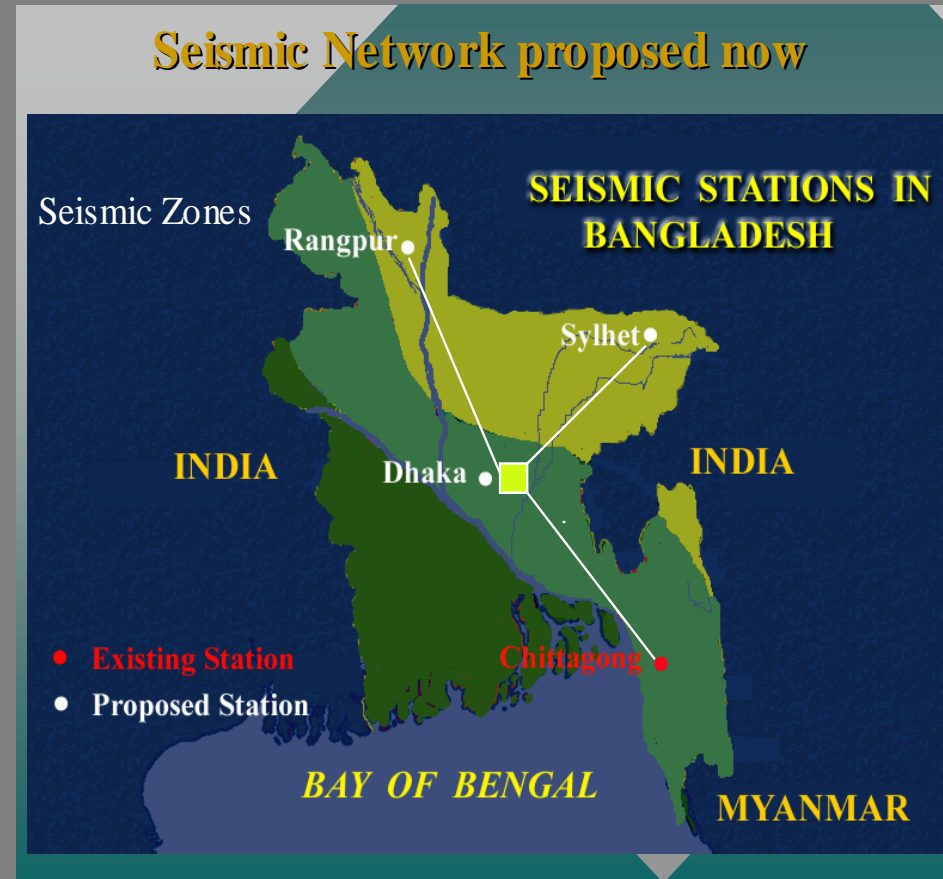
**Radar Picture Animation of "AILA"**





# Seismological Activities in Bangladesh

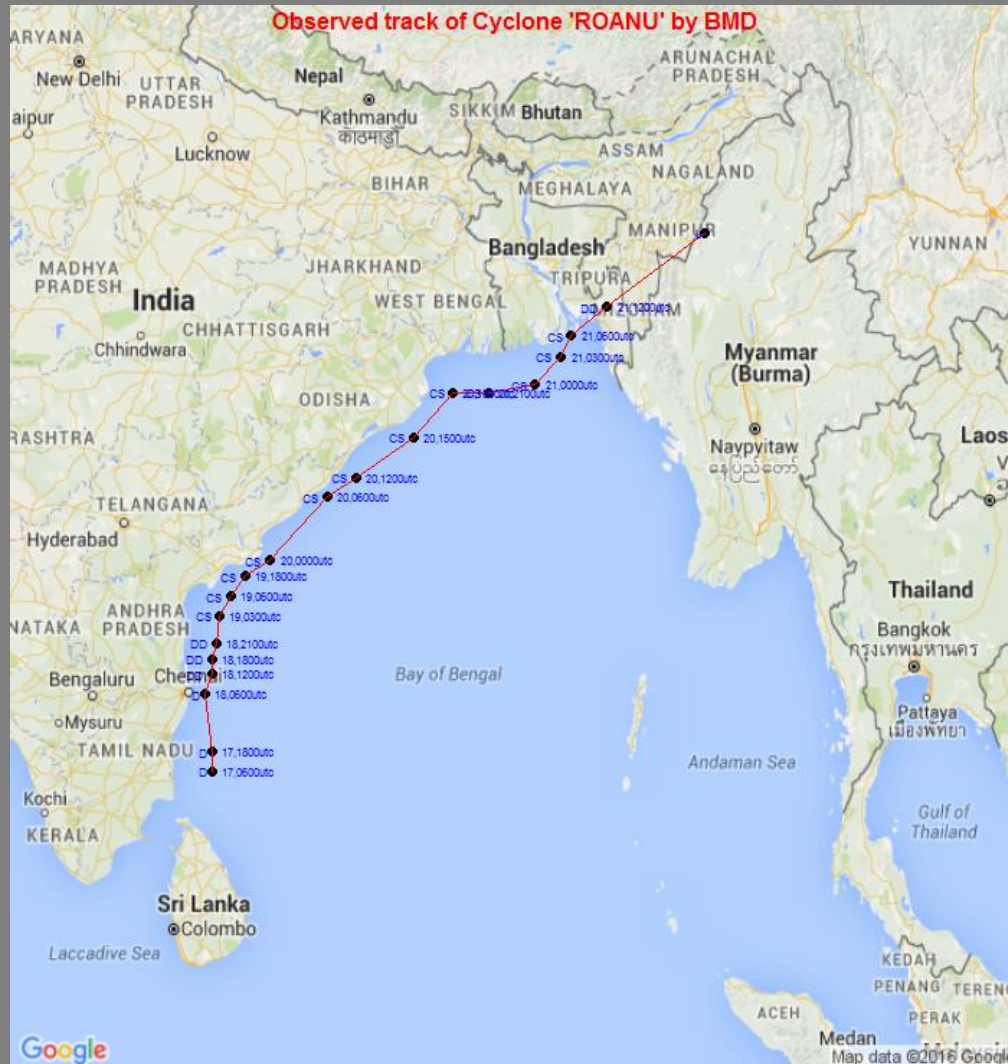
- Bangladesh lies in active seismic zones making the occurrence of deadly earthquakes as a frightening possibility.
- Many of the earthquakes have occurred in the northeastern part of the country and in the southeastern area.
- Bangladesh Meteorological Department (BMD) has been operating Four seismic observatory which are located at Dhaka, Chittagong, Rangpur and Sylhet.
- These New Seismic Stations are Networked by DDN Link.



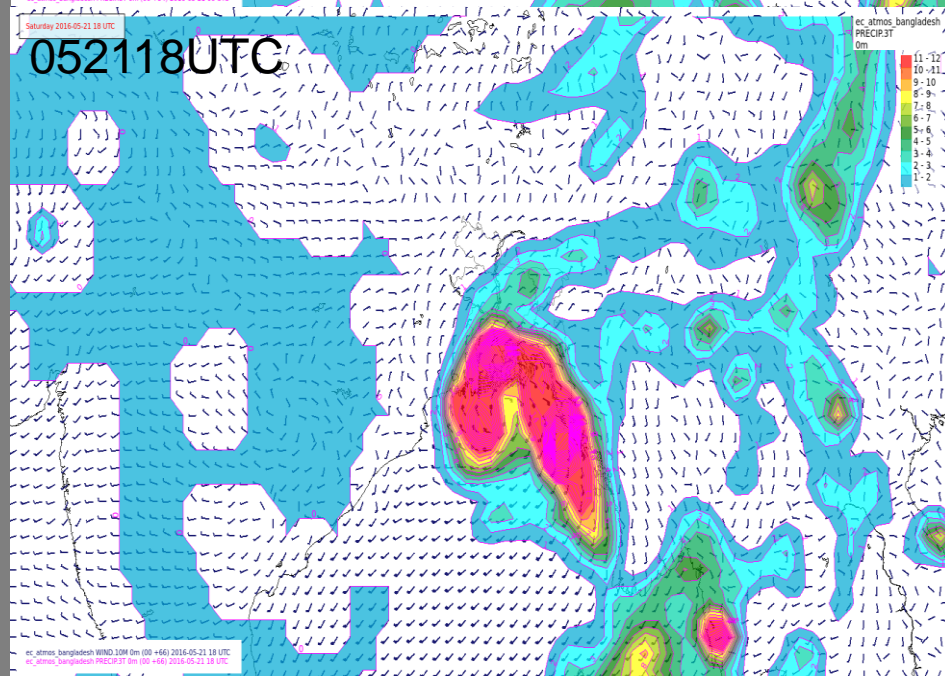
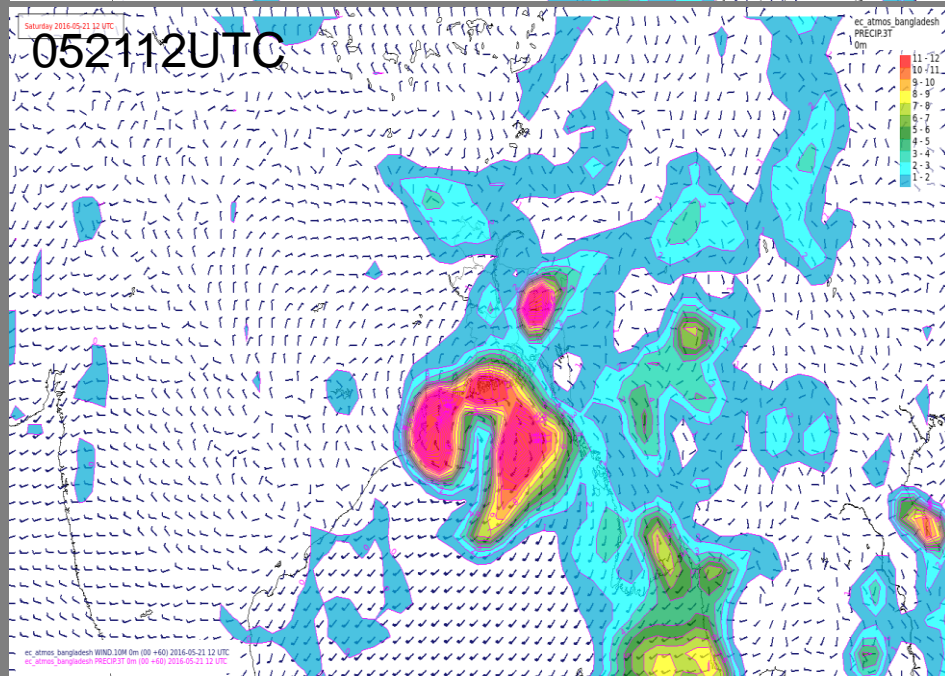
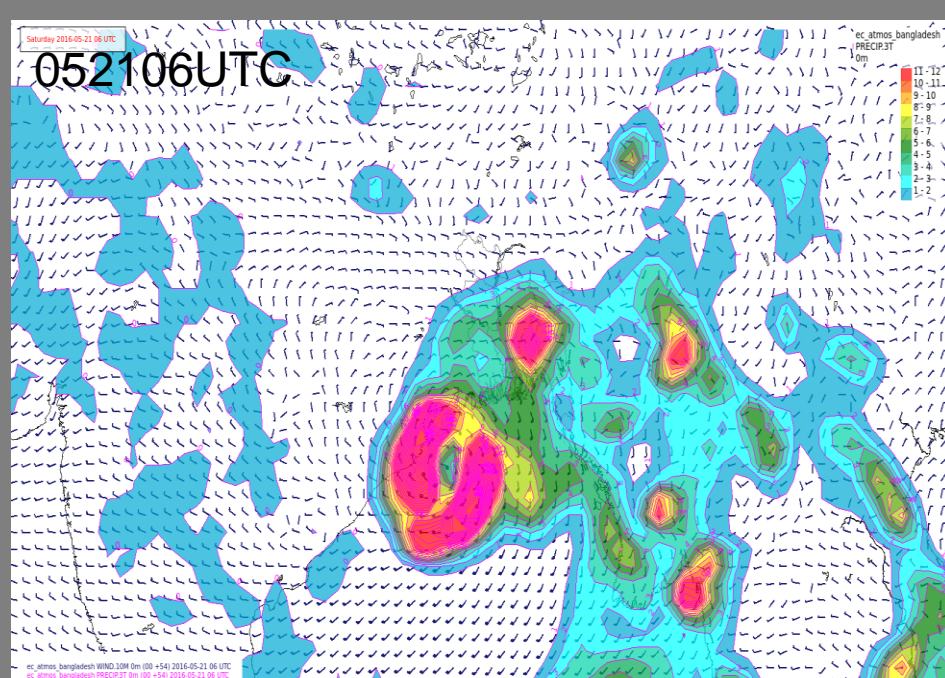
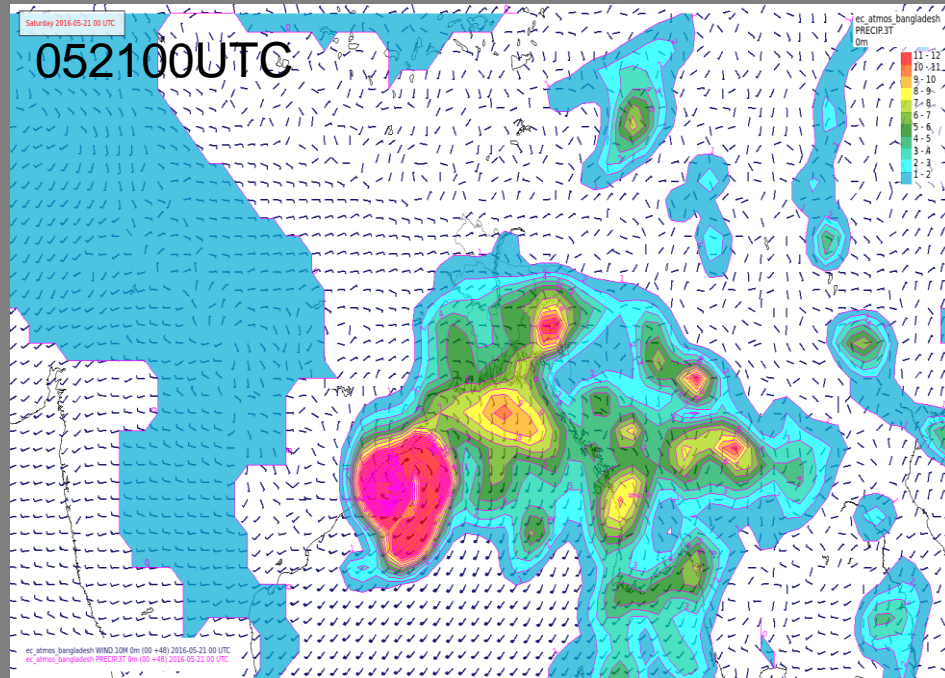
# Case study of Roanu



# Observed track of Roanu

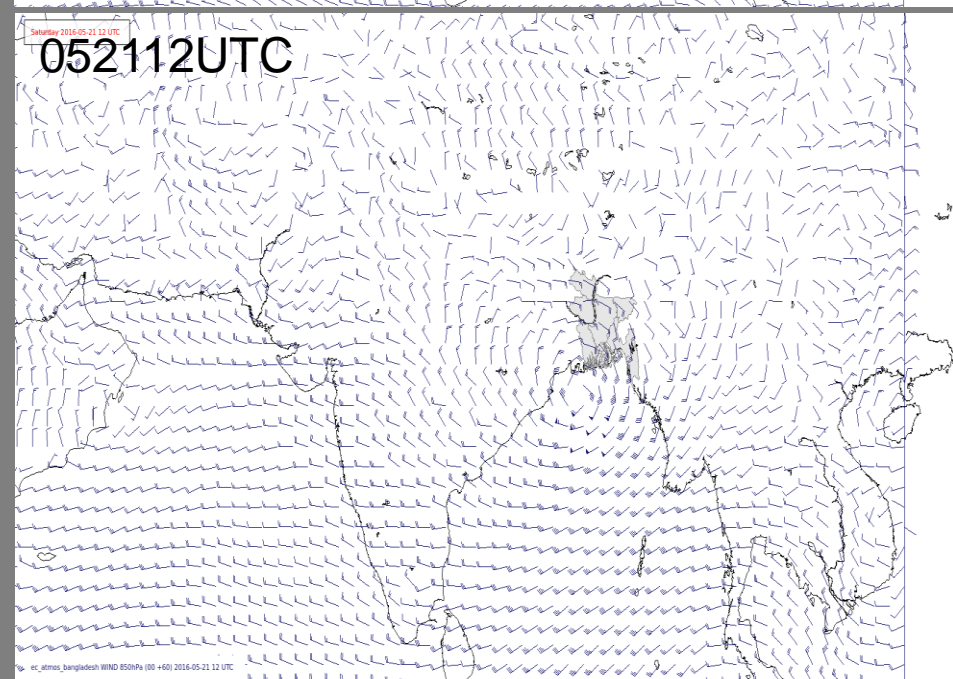
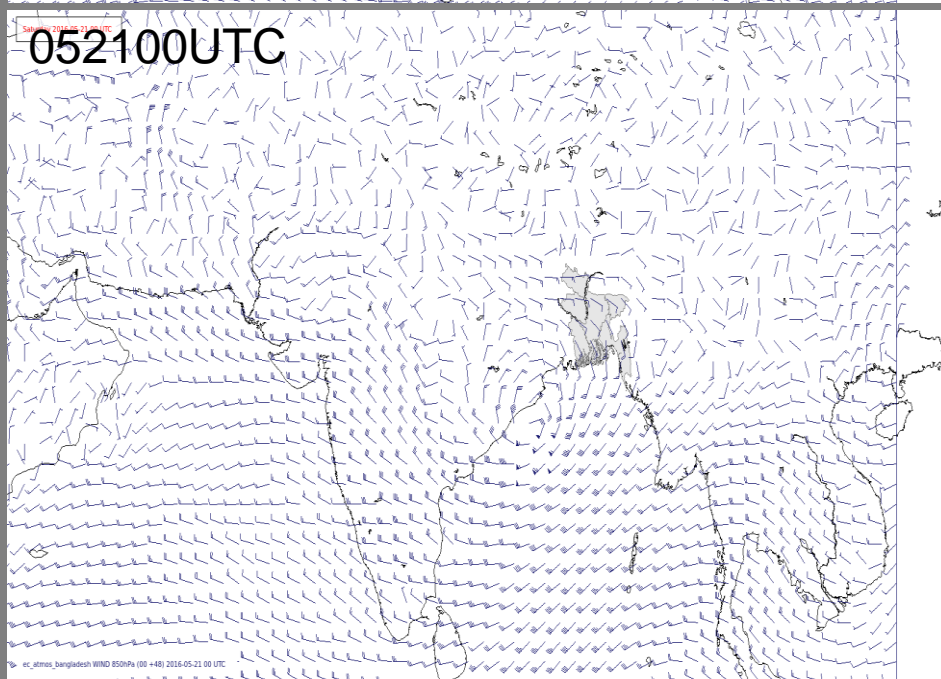
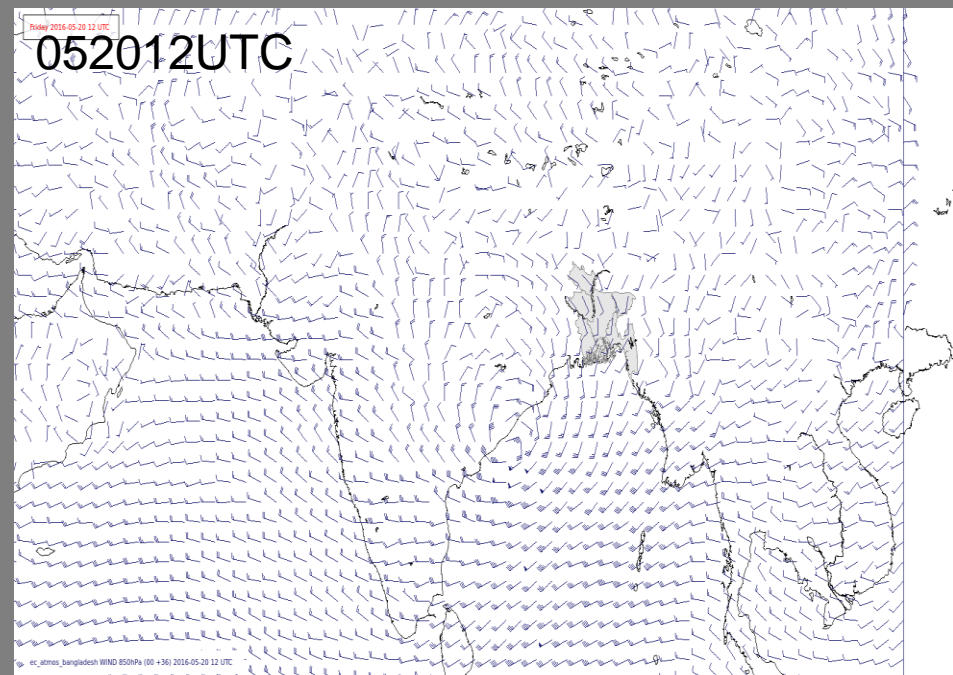
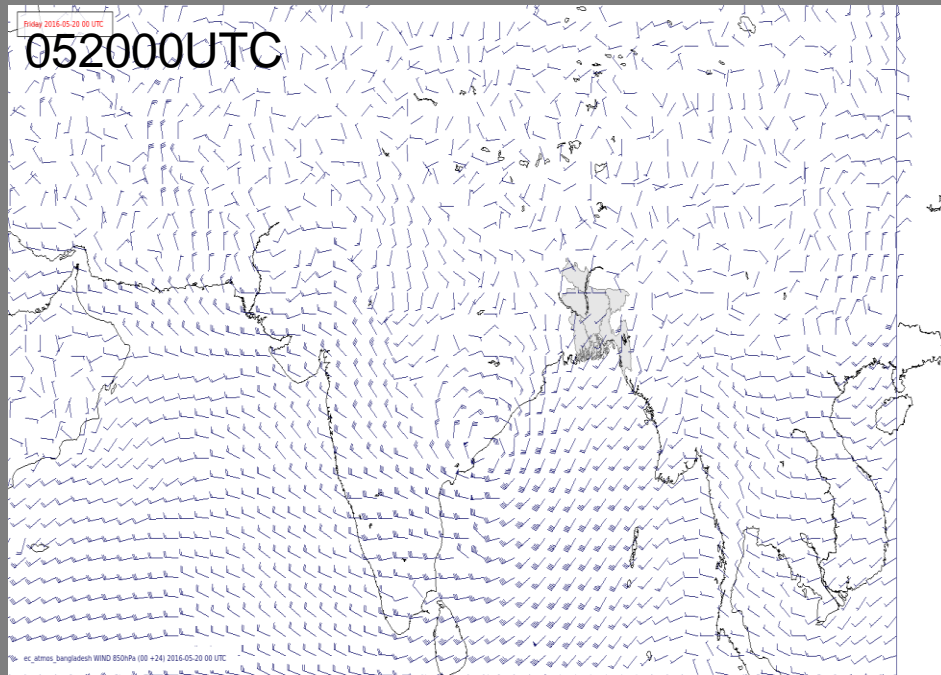


# Surface wind field and rainfall based on 051900UTC

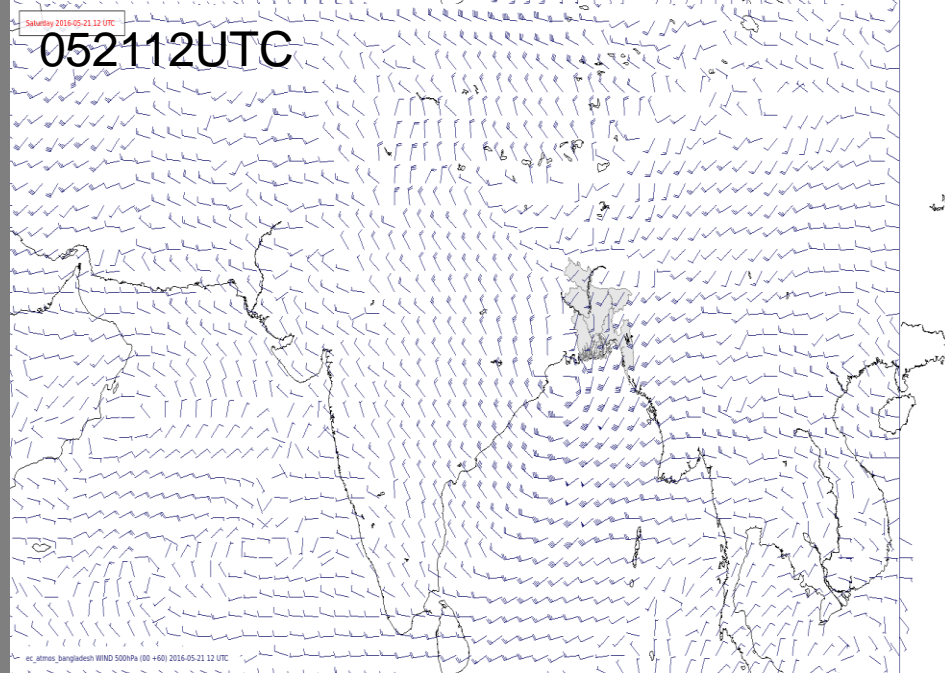
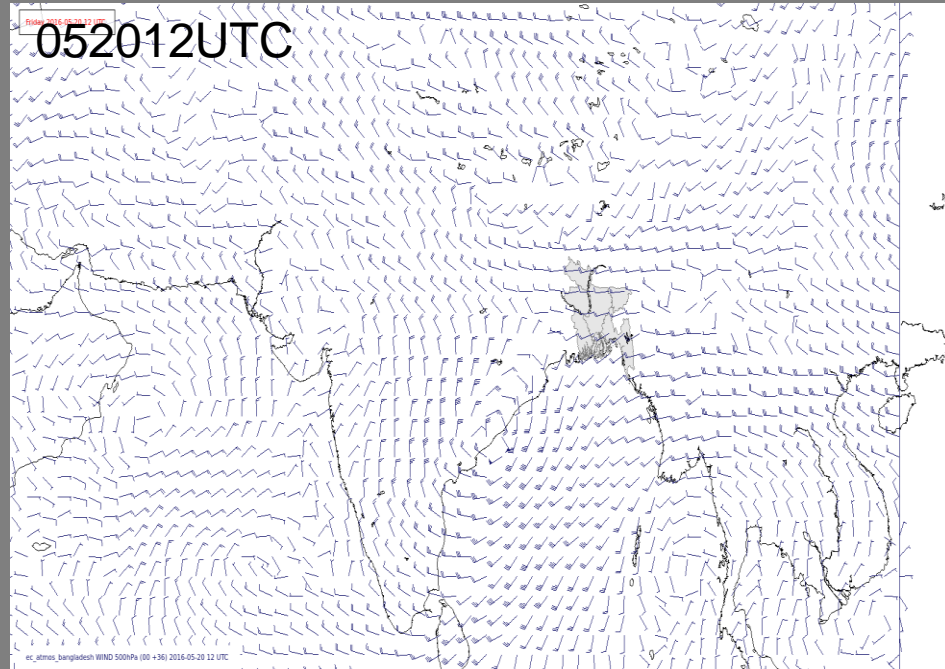
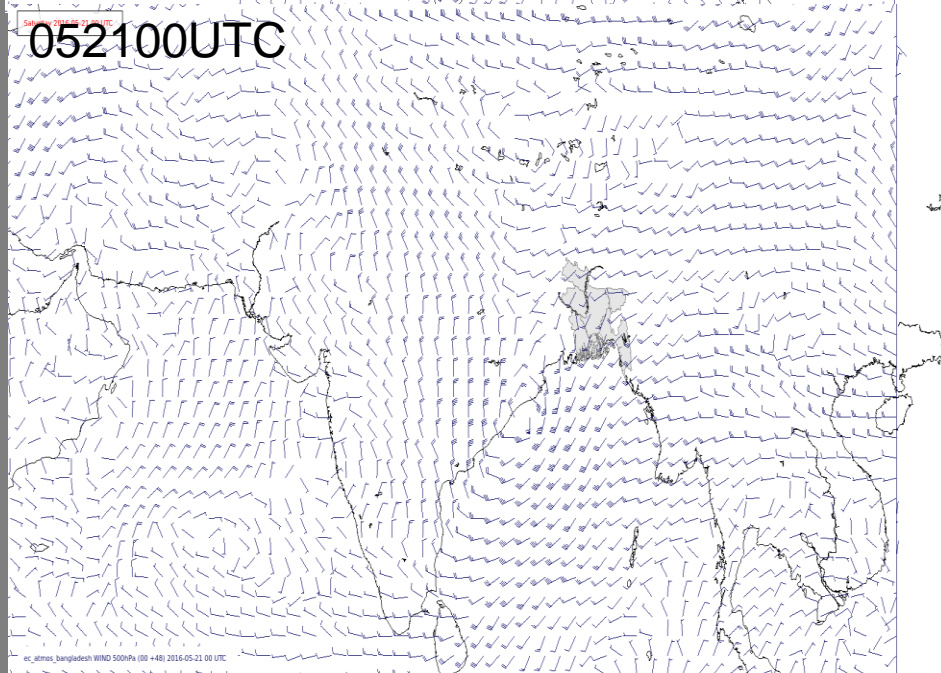
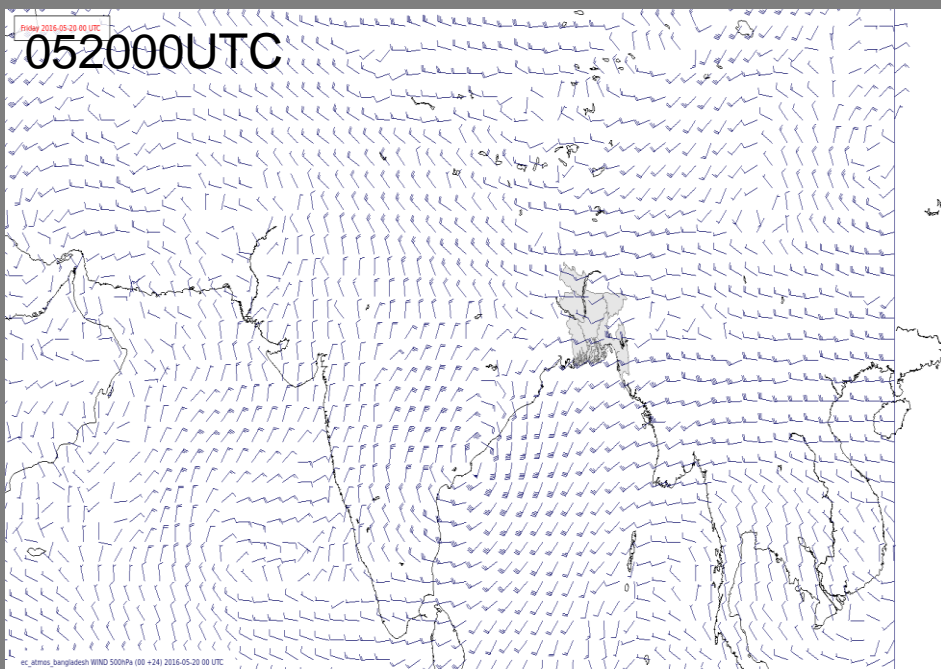




# Wind field at 850hPa based on 051900UTC



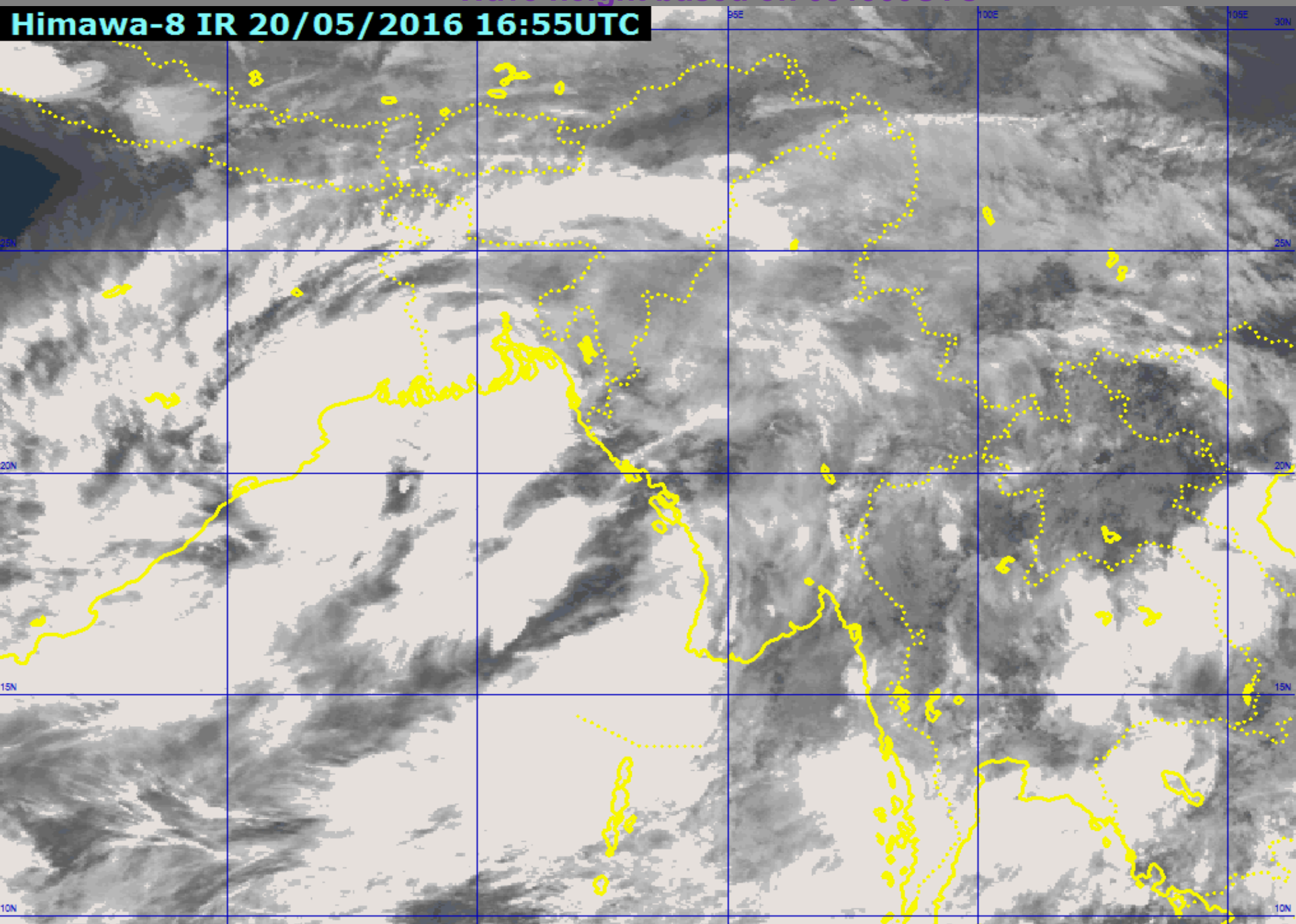
# Wind field at 500hPa based on 051900UTC





Wave height based on 051900UTC

Himawa-8 IR 20/05/2016 16:55UTC



File

View



Mode

User

?



COX/COX



CAPPI

R\_440KR\_1KH

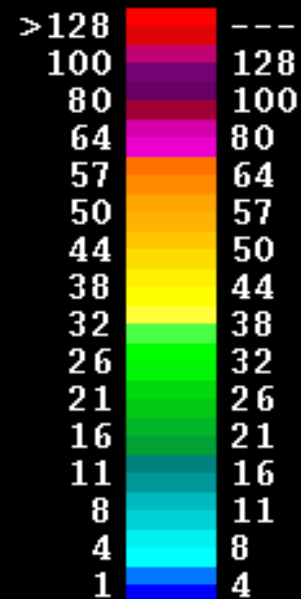
Hgt: 1.0 km

Range: 440 km

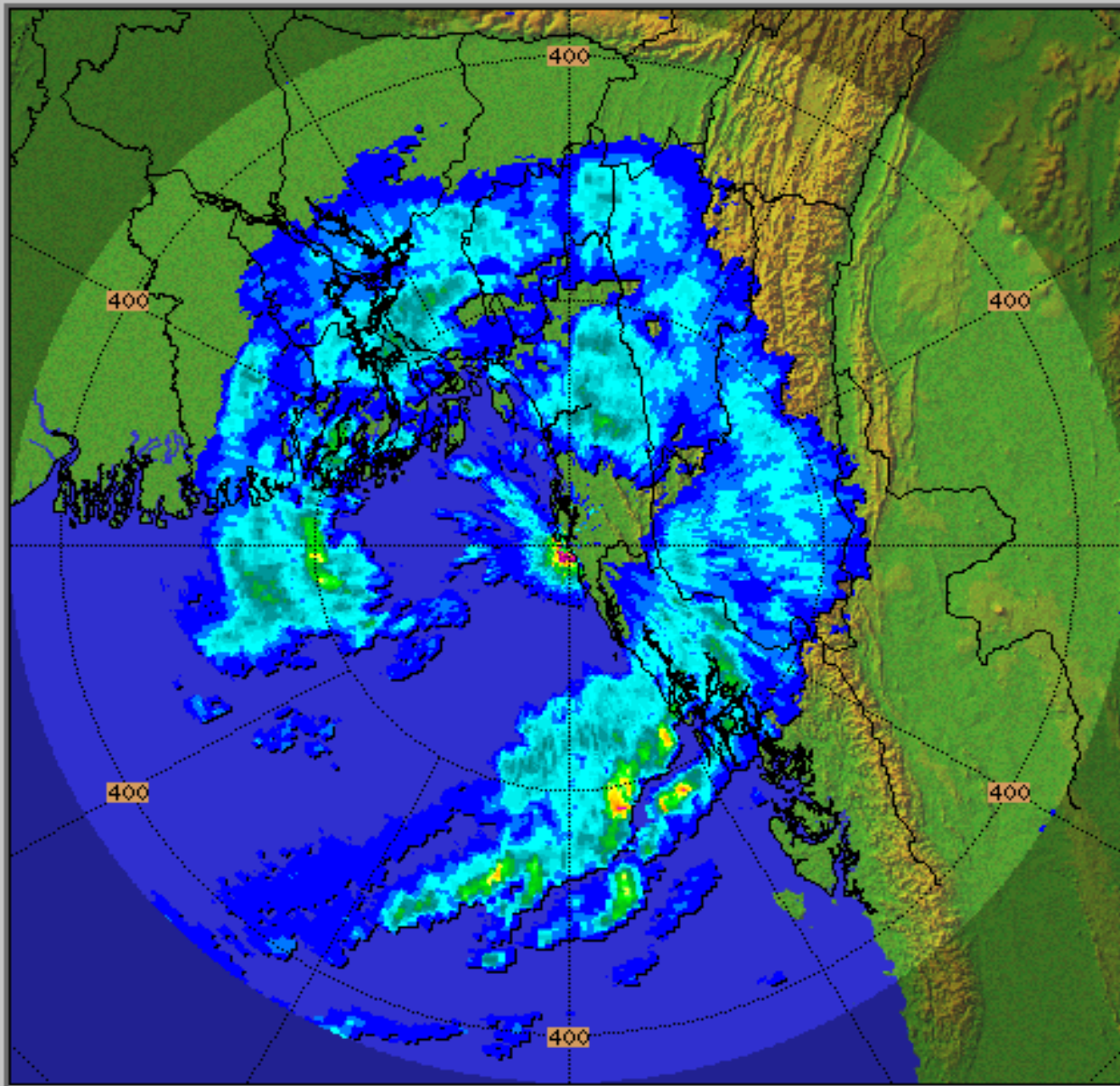
PPI\_\*



03:01:23 Z  
21 MAY 2016



Rainfall Rate in mm/hr



# Warning Dissemination System Of BMD

# WARNING MESSAGE DISSEMINATION MEDIA

- Fax
- Telephone
- E-mail
- BMD Weather APS
- SMS (Experimental)
- Website : [www.bmd.gov.bd](http://www.bmd.gov.bd)
- IVR (Interactive Voice Response by Mobile)
- BTV (Bangladesh Television)



# BMD Domestic Network

**BMD Headquarter  
Agargaon, Dhaka**

**Hon'ble Prime  
Minister's  
Office**

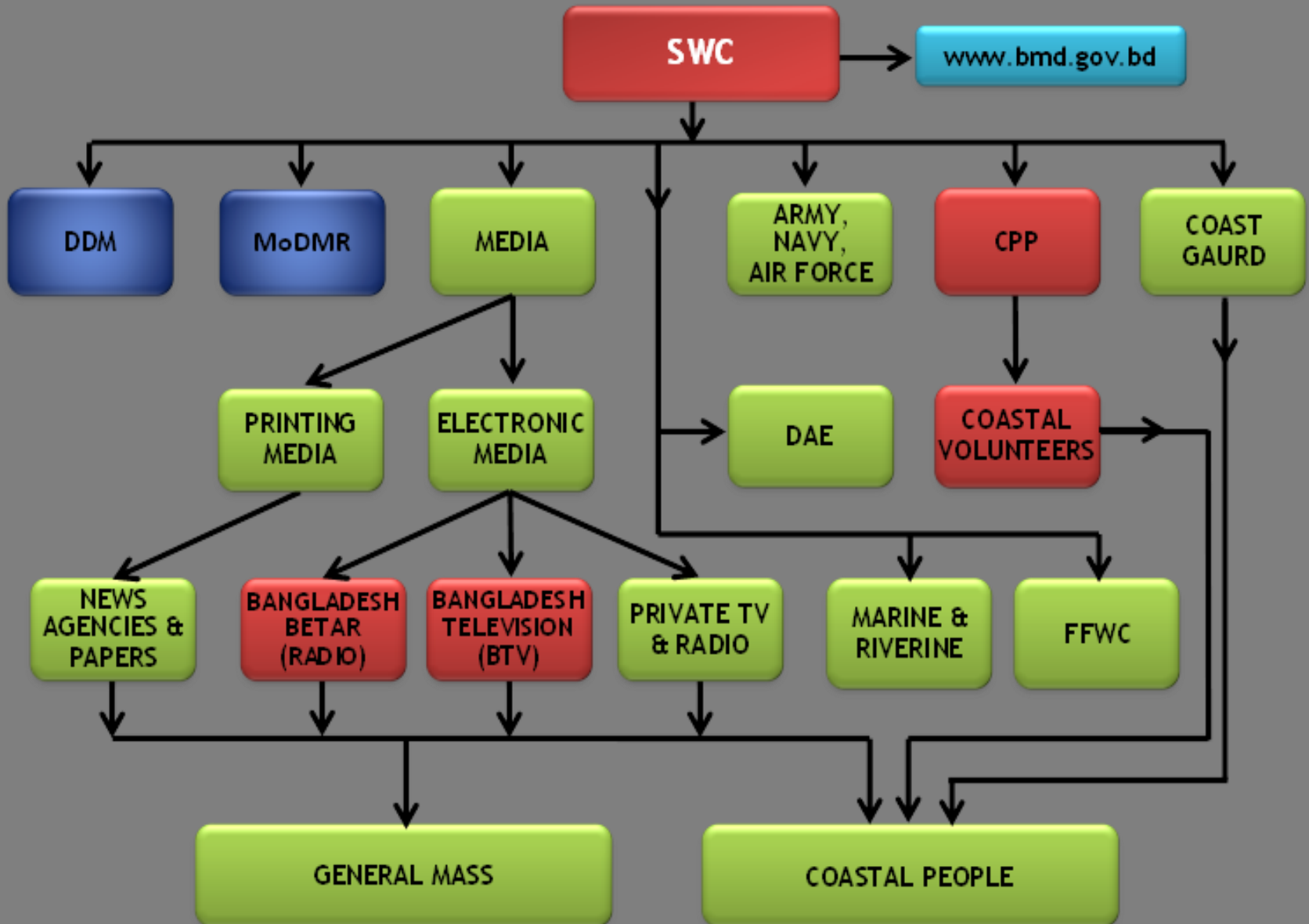
**Water  
Development  
Board**

**Zia International  
Airport**

**Bangladesh  
Television**

**Bangladesh  
Air force**

# Warning Dissemination System



# Weather Information Dissemination cont..

## Open Class & Seminar

### 2010

- Thunderstorm
- Drought
- Earthquake

- Weather Information
- Climate in Bangladesh

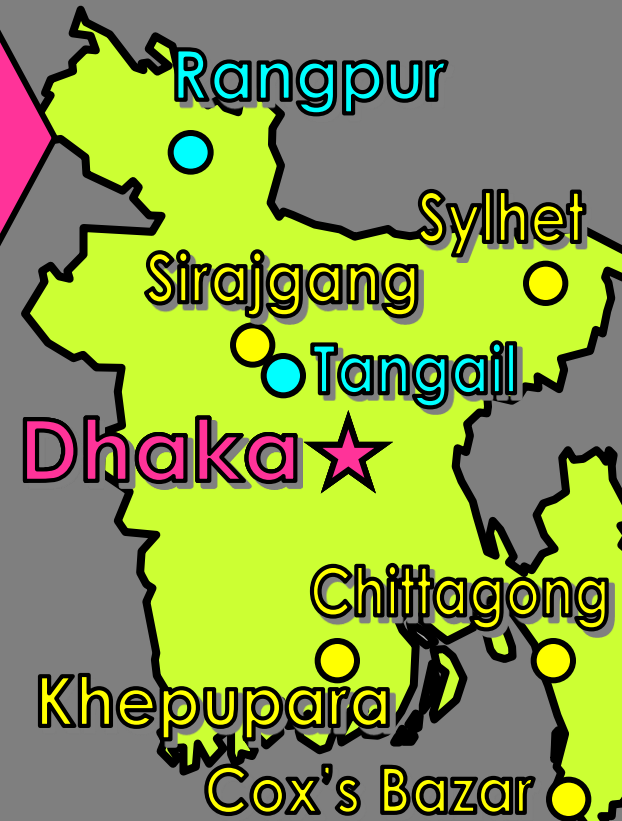
### 2011

- Cyclone
- Flood

- Weather Information
- Climate in Bangladesh

### 2012

- Global Warming  
(Local impact & Regional impact)



# Weather Information Dissemination

The brochure to be used as **educational material** in Bangladesh.



- Thunderstorm
- Drought
- Earthquake
- Cyclone
- Flood
- Global Warming
- Weather Information
- Climate in Bangladesh
- +  
• Instruction for teacher





# Warning Dissemination System by Mobile Phone

SWC



Disaster Warning



BMD server



PSTN server

Master room  
on-air button



Broadcast Tower



Broadcast Tower



# Website of BMD

M | Mymensingh: MAX 25.5°C, MIN 10.5°C, Sunrise : ... AM, Sunset : ... PM | Tangail: MAX 24.4°C, MIN 09.0°C, Sunrise : ... AM, Sunset : ... PM | Faridpur: MAX 25.2°C, MIN



## Bangladesh Meteorological Department

Home

About Us

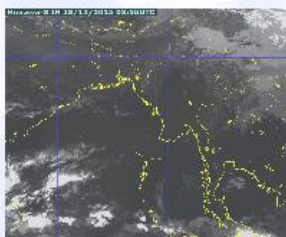
Service

Contact Us

AWS Data

WB Project

rc@bmd.gov.bd | IVR: 10941 \*\*\* Beta Version \*\*\*



### Today's Condition

Dhaka

MAX 25.2°C | MIN 12.5°C

Partly Cloudy

Sunrise : 06.40 AM

Sunset : 05.20 PM



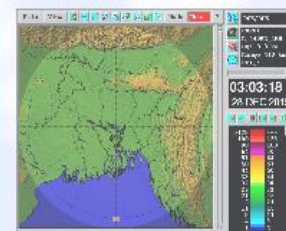
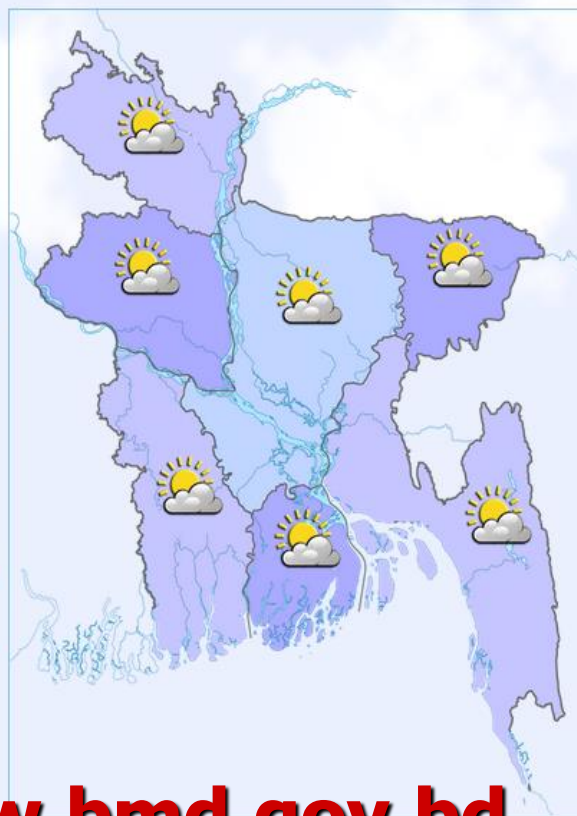
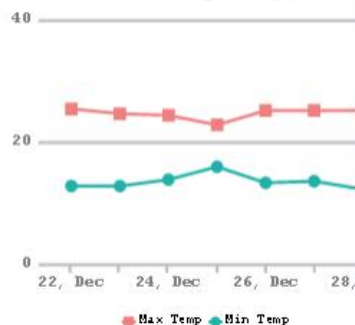
Rainfall : ... mm; Sunrise : 06.40 AM  
Wind : ... kph; Sunset : 05.20 PM  
Morning Humidity : ... %; Evening Humidity : ... %  
Surface Pressure : ...

Temperature

Rainfall

Zoom

### Dhaka last 7 Days Temperature



Forecast

Warning

NWP Products

Cyclone Page

Monsoon

Agromet

Seismology

Hydrology

Weather chart

Moon Coordinates

Citizen Charter of BMD

Press Release

Climate

Publications

Newsletter

Journals

Events

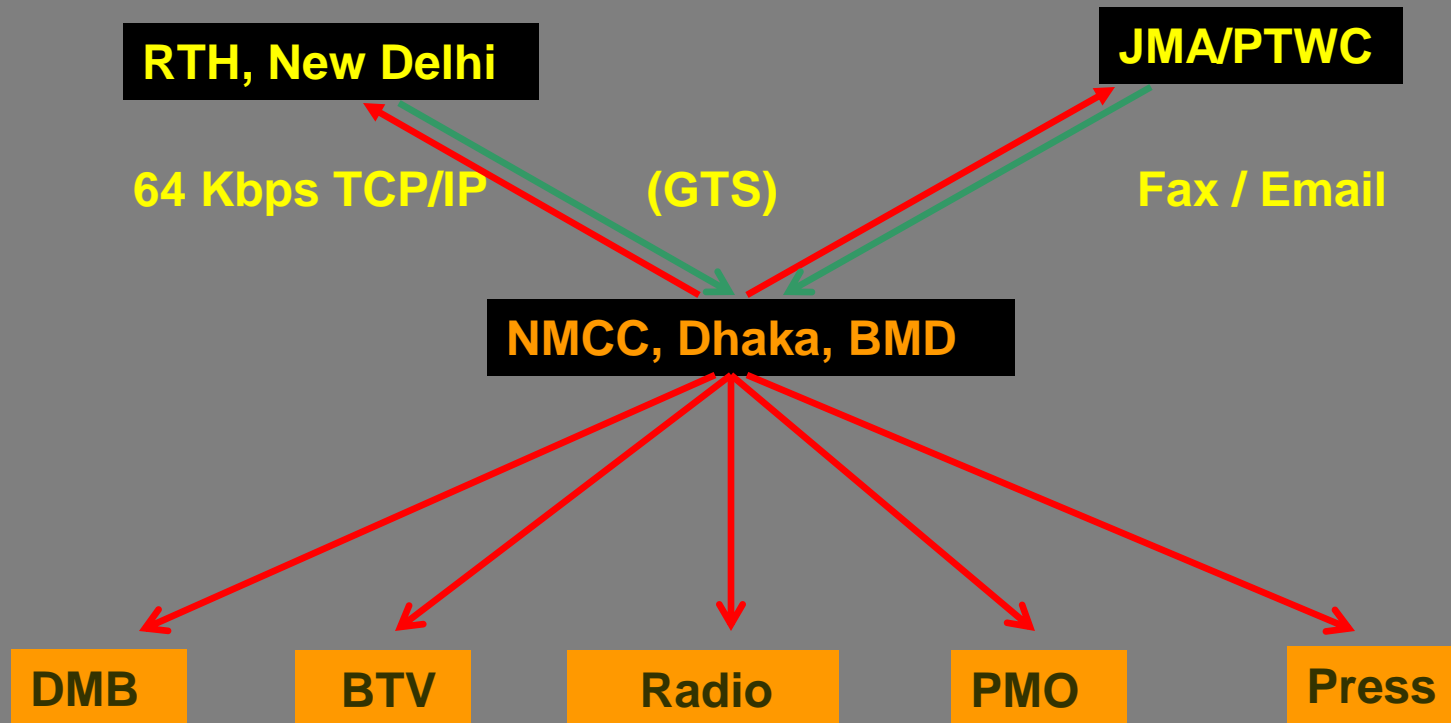
Sunrise & Sunsets

Sahari Iftar

Eclipse

<http://www.bmd.gov.bd>

# Tsunami Warning System in Bangladesh



Bangladesh Meteorological Department (BMD) is the Focal Point to receive Tsunami watch information (TWI) from RTH, New Delhi through GTS Link and through Fax/Internet/Phone From Japan Meteorological Agency (JMA) and PTWC.



# আবহাওয়া বাৰ্তা

Sunny, Light rain, Thunderstorm, Cloudy, Heavy rain, Windy/Squall, Partly cloudy, Fog, Cyclone



Forecast:  
Broadcast in  
BTV by BMD  
Meteorologist



সূর্যাস্ত : ৫:১৩

## বাংলাদেশ আবহাওয়া অধিদপ্তর ৬ টি বিভাগীয় সদরের আজকের সর্বোচ্চ ও সর্বনিম্ন তাপমাত্রা (ডি:সে:)

বিভাগ	সর্বোচ্চ	সর্বনিম্ন
ঢাকা	২৮.৬	১৭.২
চট্টগ্রাম	২৯.০	১৮.০
রাজশাহী	২৮.৮	১৪.০
খুলনা	২৮.৬	১৮.০
বরিশাল	২৯.৪	১৬.২
সিলেট	২৯.৩	১৬.২



# আবহাওয়া বাৰ্তা



## বাংলাদেশ আবহাওয়া অধিদপ্তর আজকের সর্বোচ্চ ও সর্বনিম্ন তাপমাত্রা (ডি:সে:)



## ভূমিকম্প প্রবণ এলাকার মানচিত্র বাংলাদেশ আবহাওয়া অধিদপ্তর



## বাংলাদেশ আবহাওয়া অধিদপ্তর

সূর্যাস্ত	৫:১৩	
টোকিও	১৫.০	১০.০
বেইজিং	১১.০	-০২.০
কুয়ালালামপুর	২৯.০	২৪.০
সিঙ্গাপুর	২৯.০	২৫.০
ব্যাংকক	৩১.০	২৪.০
ঢাকা	২৮.০	১৮.০
দিল্লী	২৫.০	১২.০
কাঠমন্ডু	১৬.০	১১.০
ইসলামাবাদ	১৬.০	০৯.০
ব্রিয়াদ	২৮.০	১৩.০



**THANK YOU**