Country Report of Bangladesh
On
EFFECTIVE TROPICAL CYCLONE WARNING IN BANGLADESH

Presented
At
JMA/WMO WORKSHOP ON EFFECTIVE TROPICAL CYCLONE WARNING IN SOUTHEAST ASIA
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Introduction

Bangladesh is situated at the northern tip of the Bay of Bengal. Long continental shelf, shallow bathymetry, complex coastal Geometry with many kinks and islands, and long tidal range between east and west coasts of Bangladesh are well-known features for the highest storm surge and of the longest duration.

About 5% of the global tropical cyclones form over the Bay of Bengal (Fig.1). On an average, 5 to 6 storms form in this region every year. But casualties, here, is 80% of the global casualties. Loss of life and property is mainly attributed to the storm surge.

Introduction continued….

The Bay of Bengal is surrounded by the coastal region of India, Bangladesh and Myanmar.

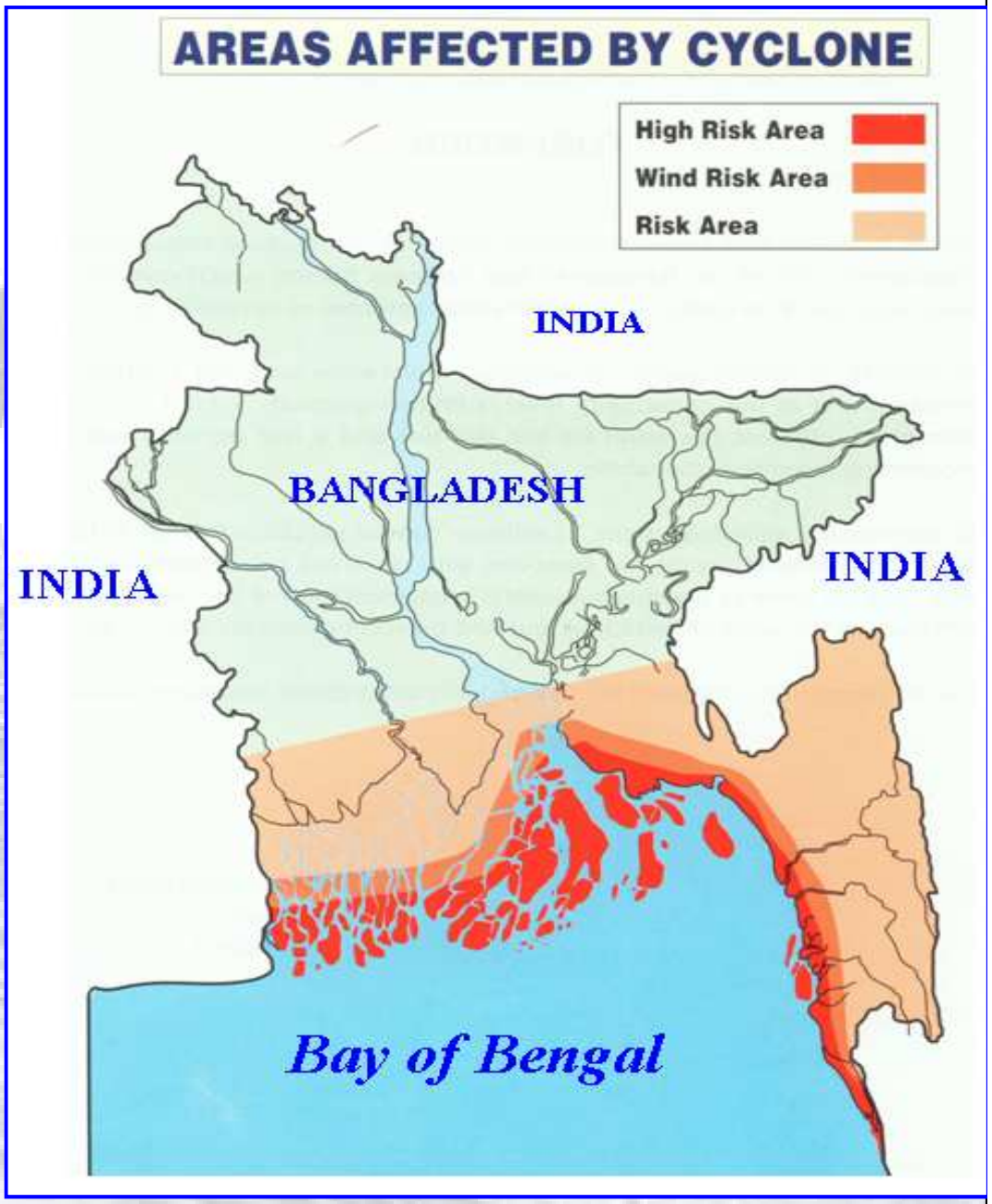
Northern part of the Bay of Bengal is generally known as Head Bay to meteorologists, stands within 18.0 ° N to 23.0 ° N latitude and 83.5 ° E to 94.5 ° E longitude and surrounded by Orissa and West Bengal coast of India in the west, coastal areas of Bangladesh in the north and Myanmar coast in the southeast.

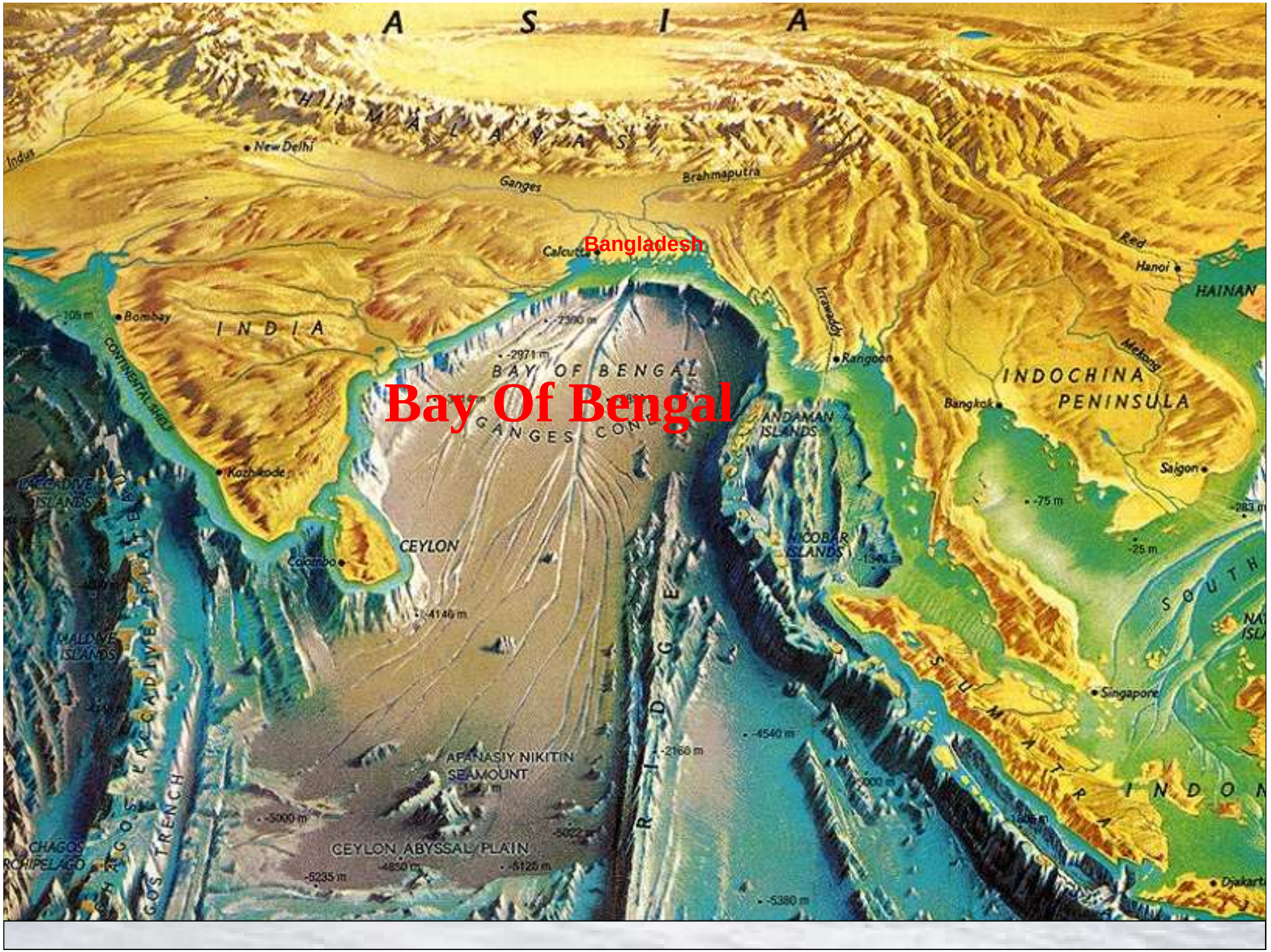
The coastal geometry and bathymetric condition of Head Bay is very complex.

The Lion numbers of cyclones formed in the Bay of Bengal initially move towards the west or northwest and recurved towards right due to the effect of the Coriolis force.

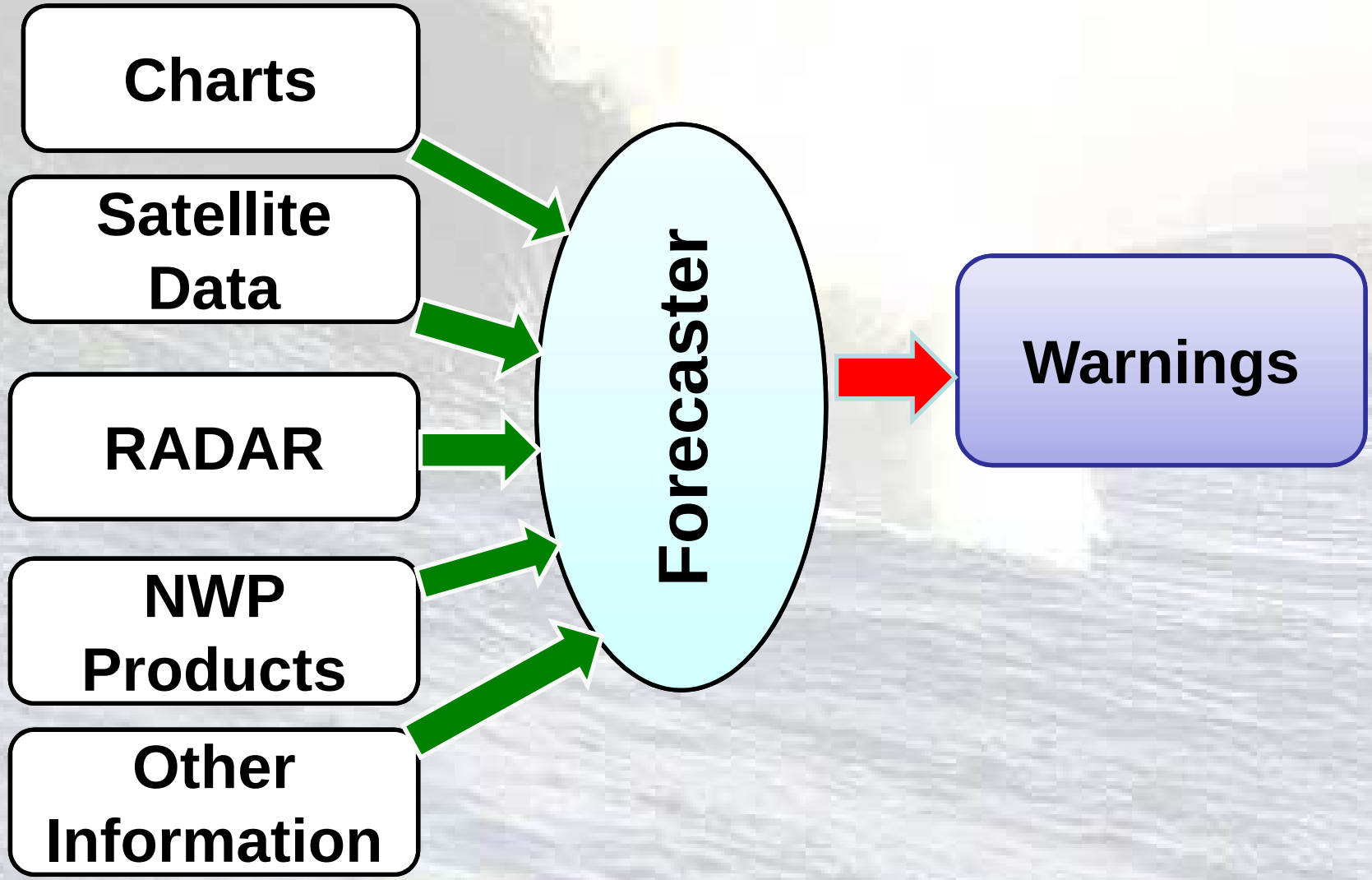
When they moved further north towards Bangladesh coast where bathymetric depth is shallow the height of the storm surge become higher and higher.

When they made landfall in the coast, they produce devastating impacts over the coastal areas of Bangladesh .



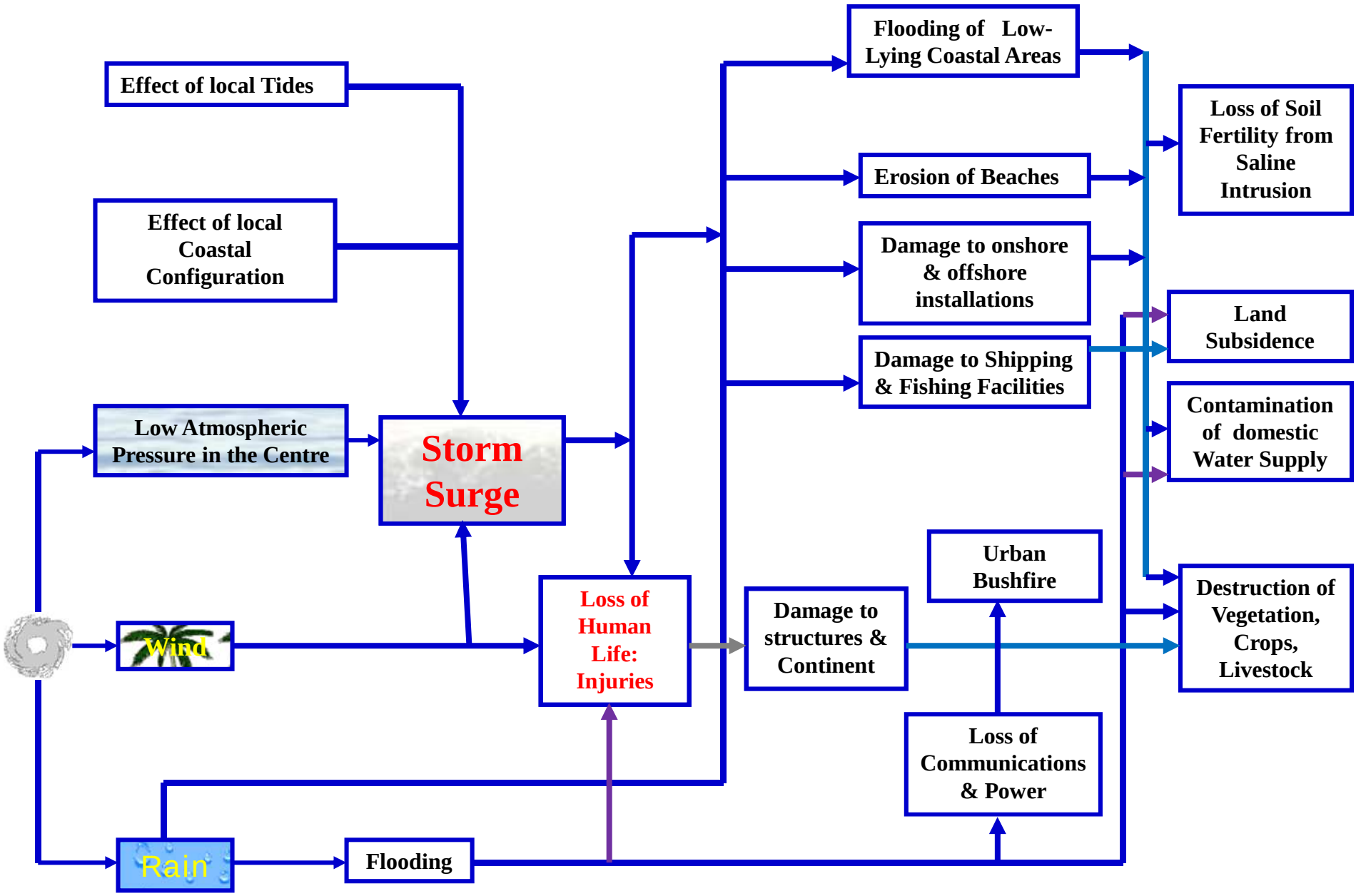

A S I A
HIMALAYAS
New Delhi
Indus
Ganges
Brahmaputra
Bangladesh
Calcutta
Red
Hanoi
HAINAN
Irrawaddy
Rangoon
Mekong
INDIA
Bombay
105 m
CONTINENTAL SHELF
-2300 m
-2971 m
BAY OF BENGAL
Bay Of Bengal
GANGES CON
INDOCHINA
PENINSULA
Bangkok
ANDAMAN
ISLANDS
Saigon
-75 m
-283 m
Kozhikode
LACCADIVE
ISLANDS
CEYLON
Colombo
-4146 m
NICOBAR
ISLANDS
-25 m
SOUTH
MALDIVE
ISLANDS
SUMATRA
INDON
Singapore
-4540 m
RIDGE
-2160 m
APANASIY NIKITIN
SEAMOUNT
-5000 m
CHAGOS
ARCHIPELAGO
CEYLON ABYSSAL PLAIN
-4850 m
-5125 m
-5235 m
-5380 m
Djakart

How to Issue Warnings



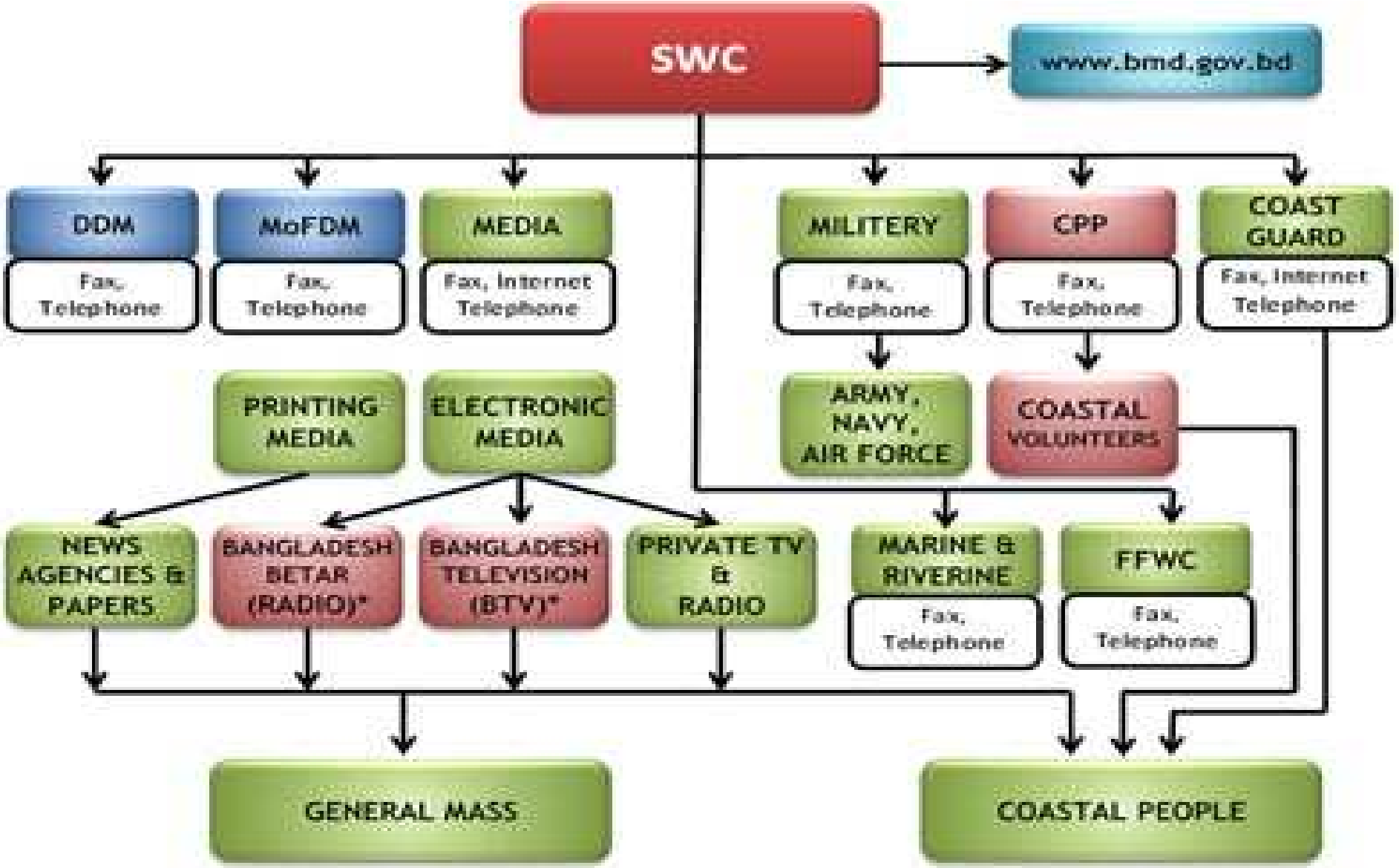
Observational Facilities of BMD

- Synoptic observatories : 35
- Pilot Observatories : 10
- Rawinsonde Observatories: 3
- Agromet observatories : 12
- RADAR Stations : 5 (3 is Doppler Radar)



Potential Impact upon Landfall of a Tropical Cyclone

Warning Dissemination Mechanisms

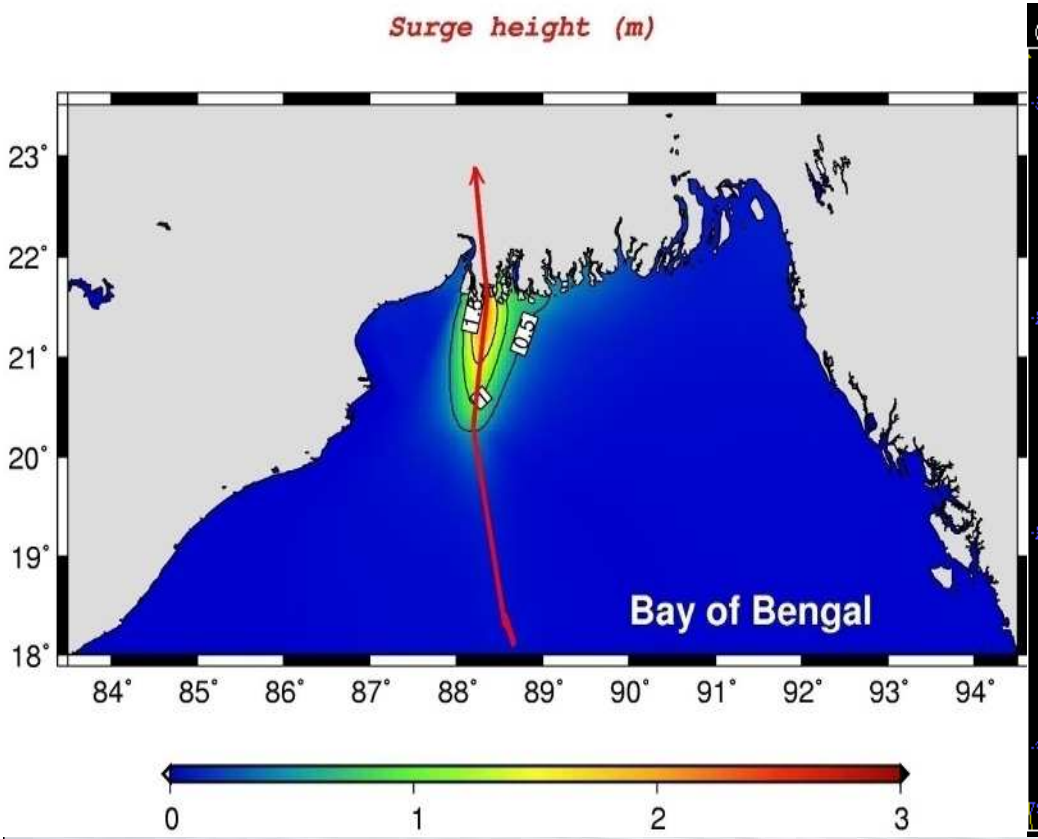


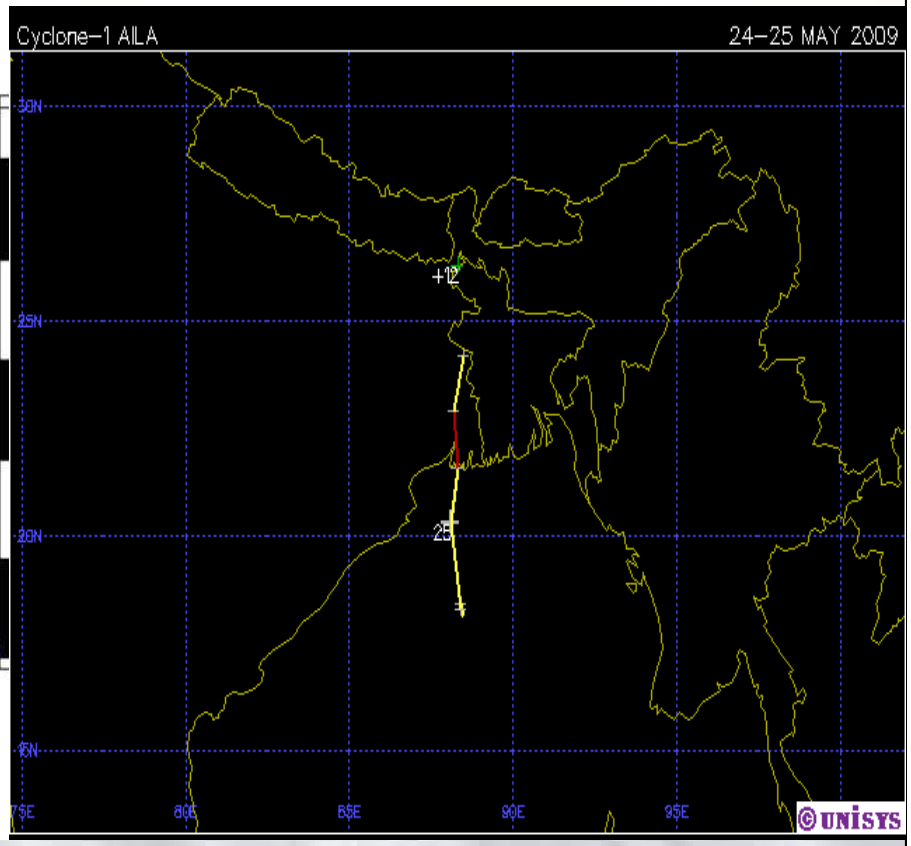
*Mandated to continuous broadcasting of Special Weather Bulletins containing Warning round the clock in case of Cyclones

Some of the devastating cyclones that hit Bangladesh coast are:

Date	People killed	Storm surge height
12 Nov. 1970, cyclone	3,00,000	10 m
29 April 1991, cyclone	1,38,000	6-7.6 m
19 May 1997, cyclone	155	4.55 m
15 Nov. 2007, cyclone	3,363	6.02 m

Storm surge due to cyclone Aila'2009

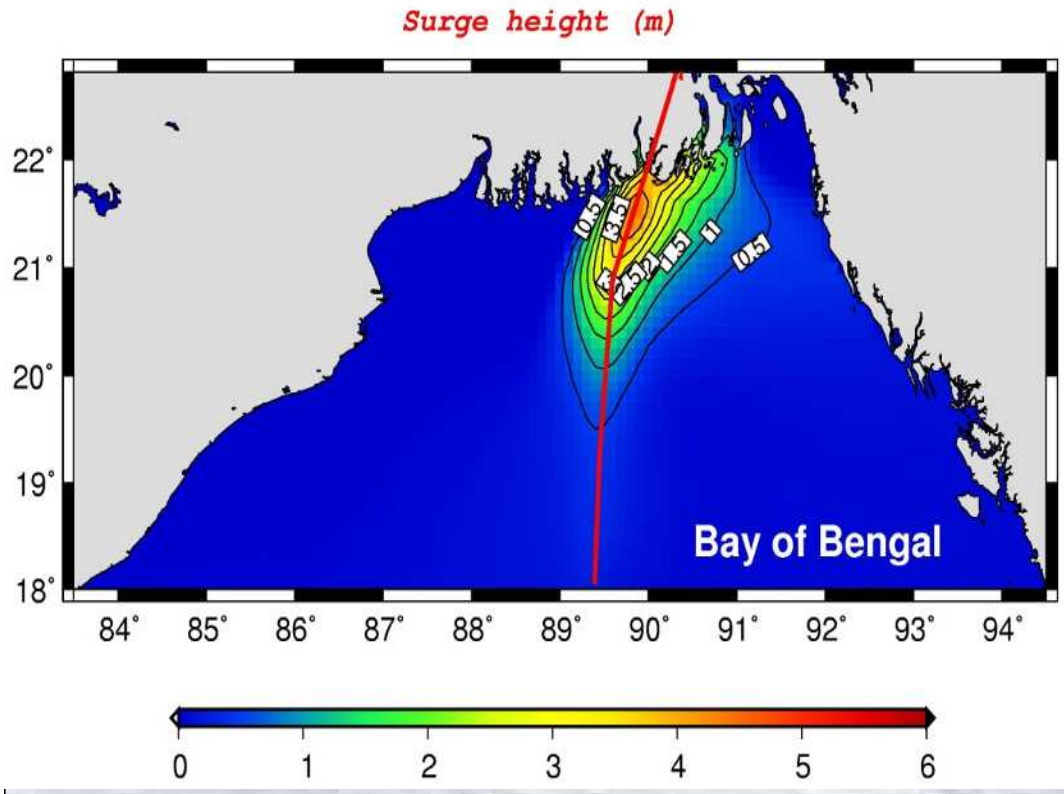




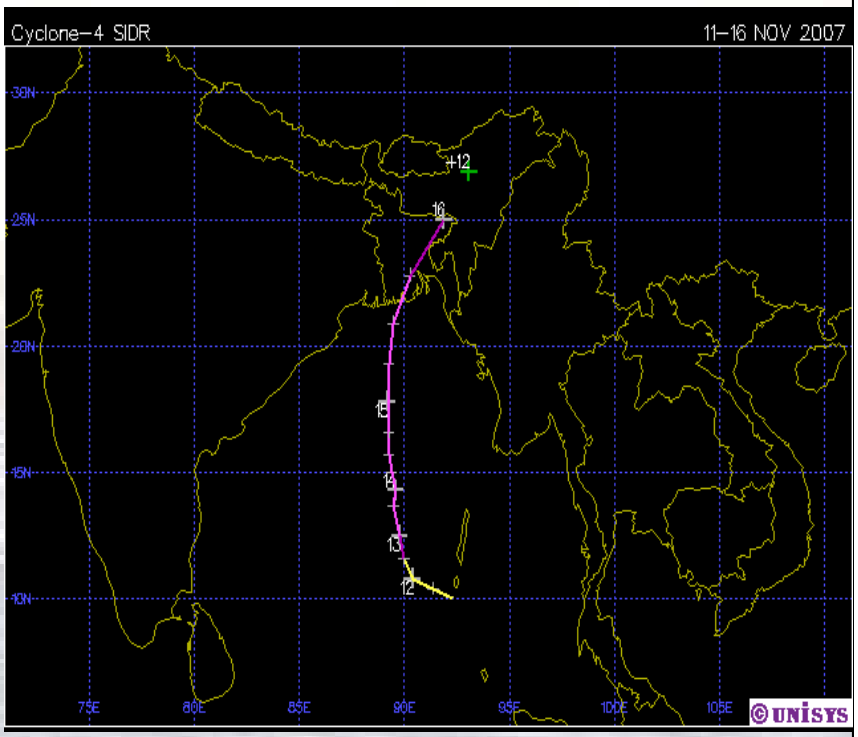
Simulated surge for cyclonic storm
Maximum value of peak surge = 2.53 m.

Track of cyclonic storm
From Unisys site.

Storm surge due to cyclone Sidr'2007

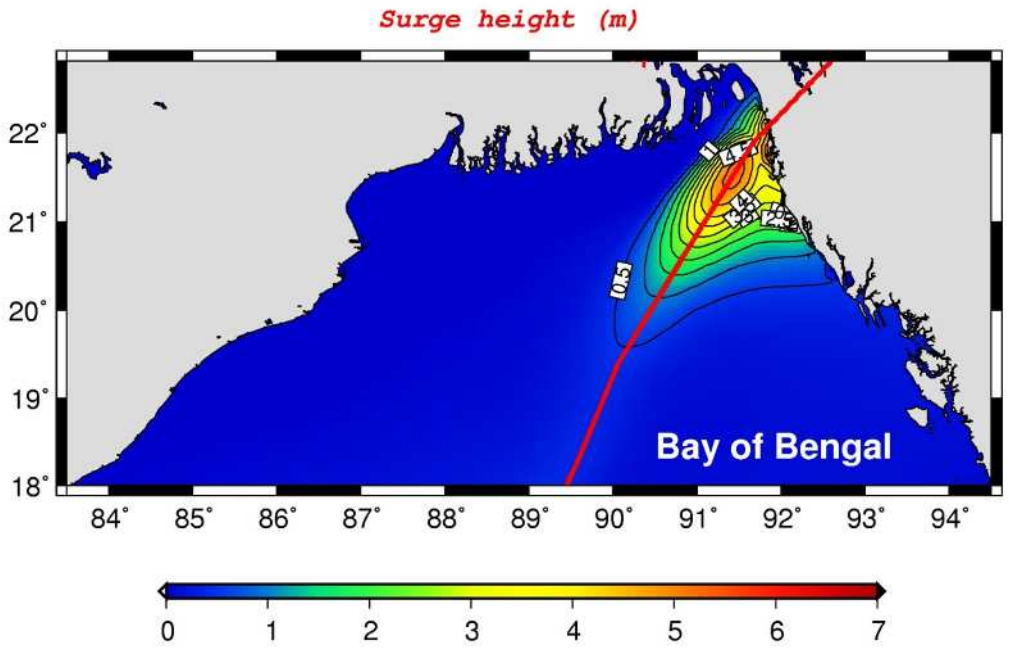


Simulated surge for cyclonic storm
Maximum value of peak surge = 5.56 m.

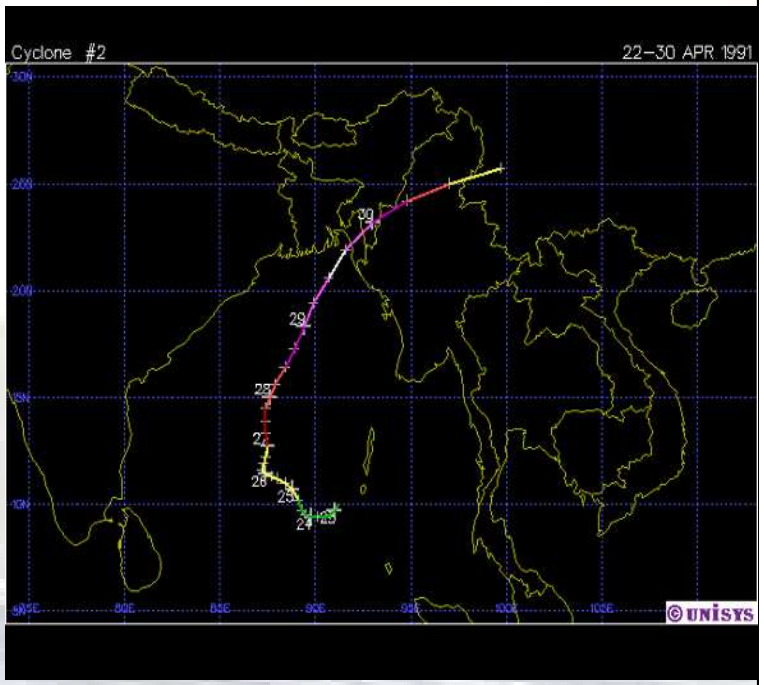


Track of cyclonic storm
(From Unisys site)

Storm surge due to Cyclone 1991

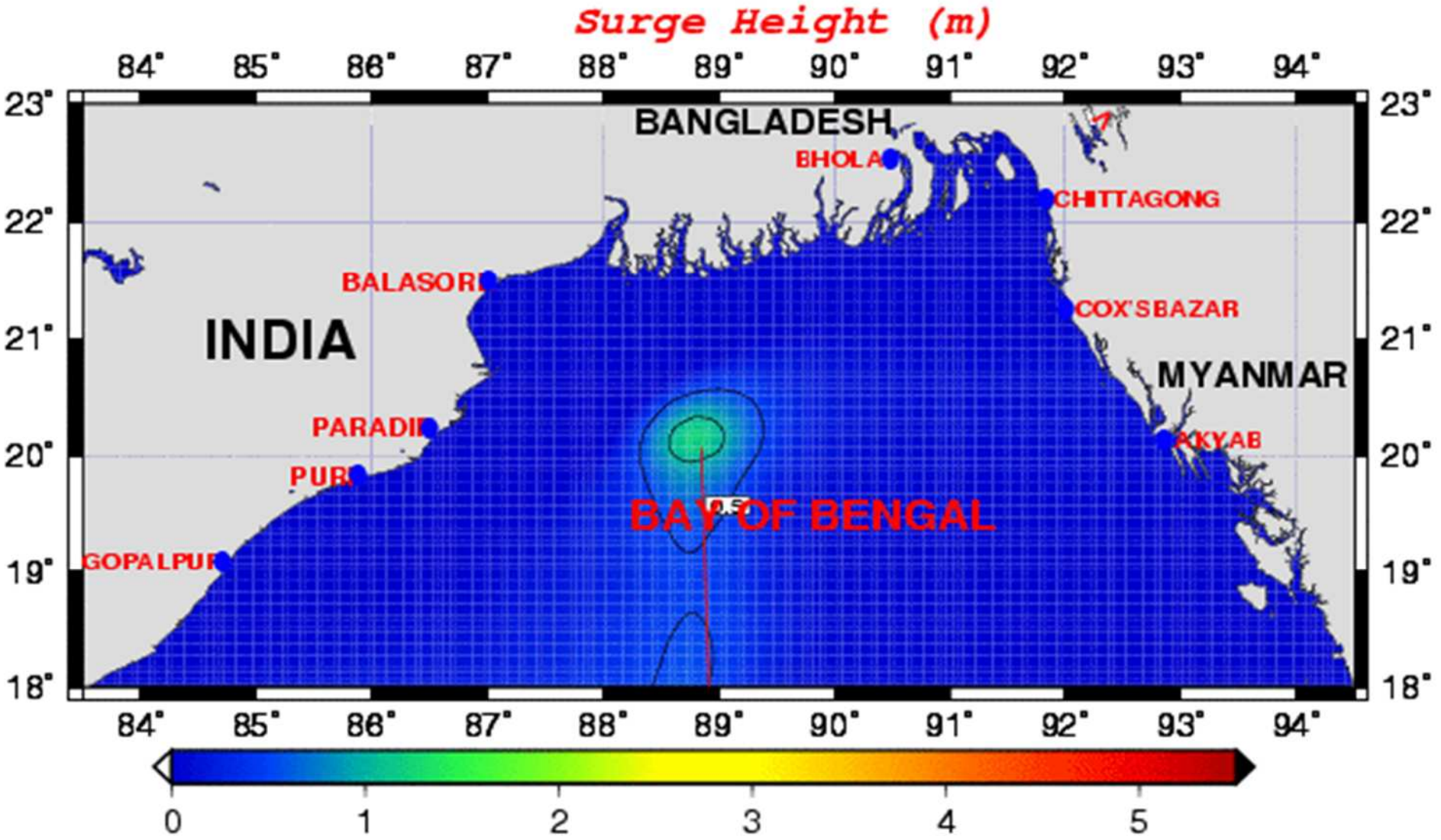


Simulated surge for cyclonic storm 22-30 Apr.'1991, Maximum value of peak surge = 7.05 m



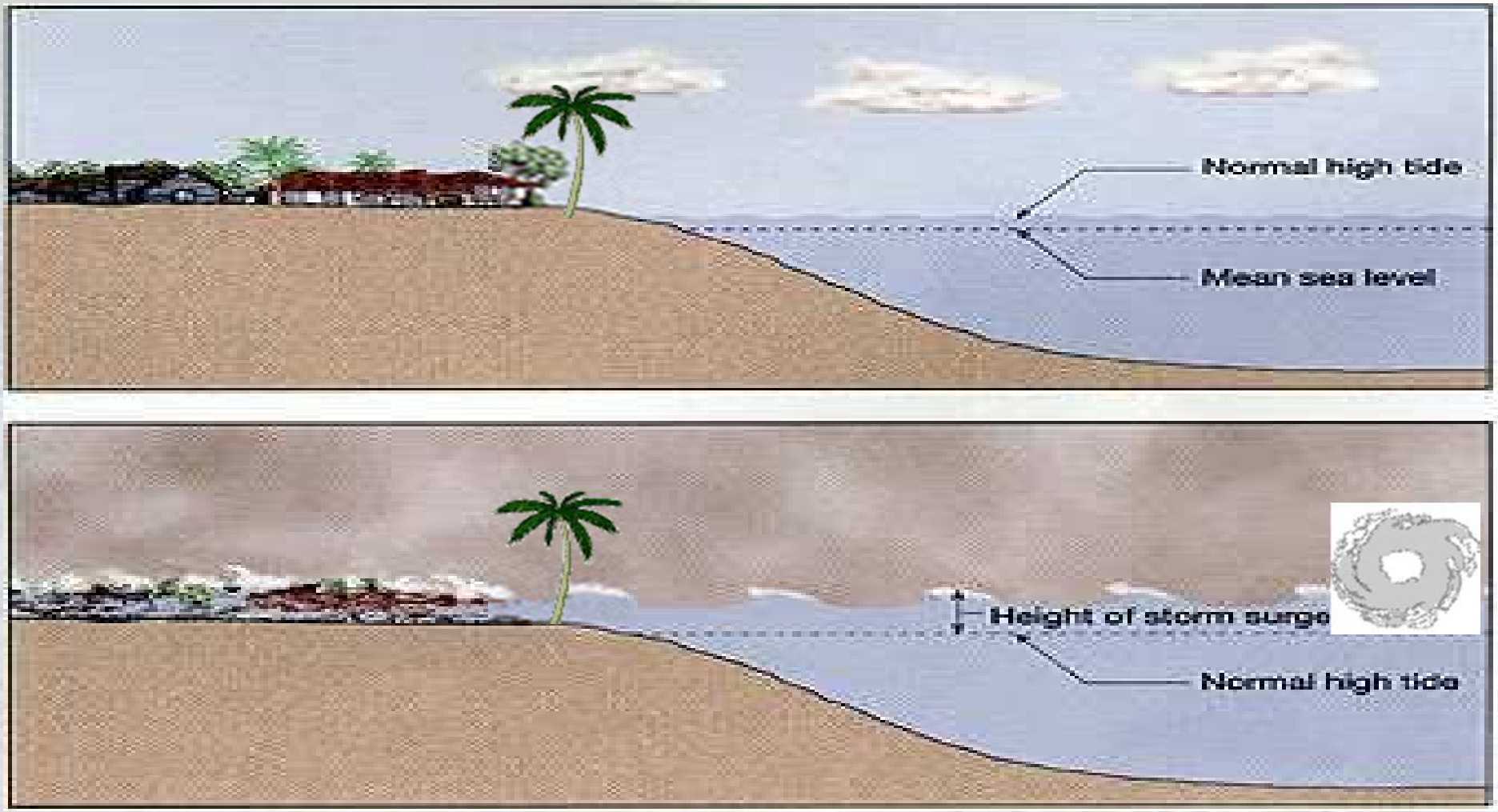
Track of cyclonic storm 22-30 April'1991 (From Unisys site).

Storm surge due to cyclone Sidr'2007

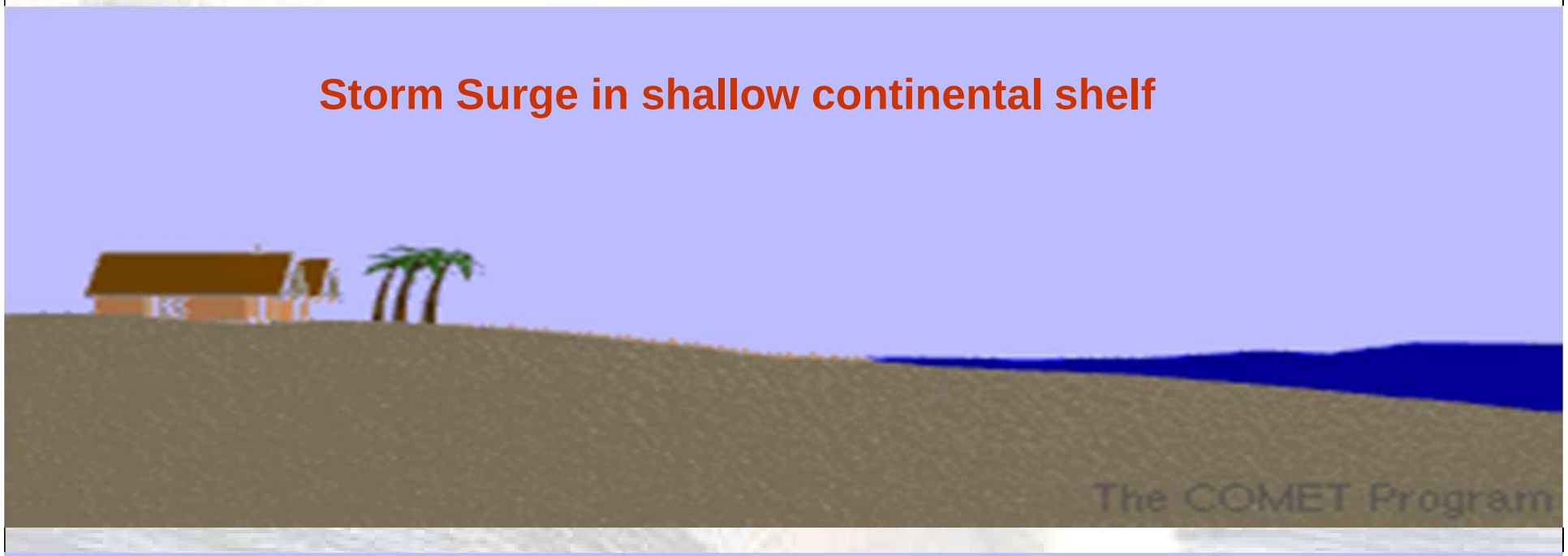


Storm Surge

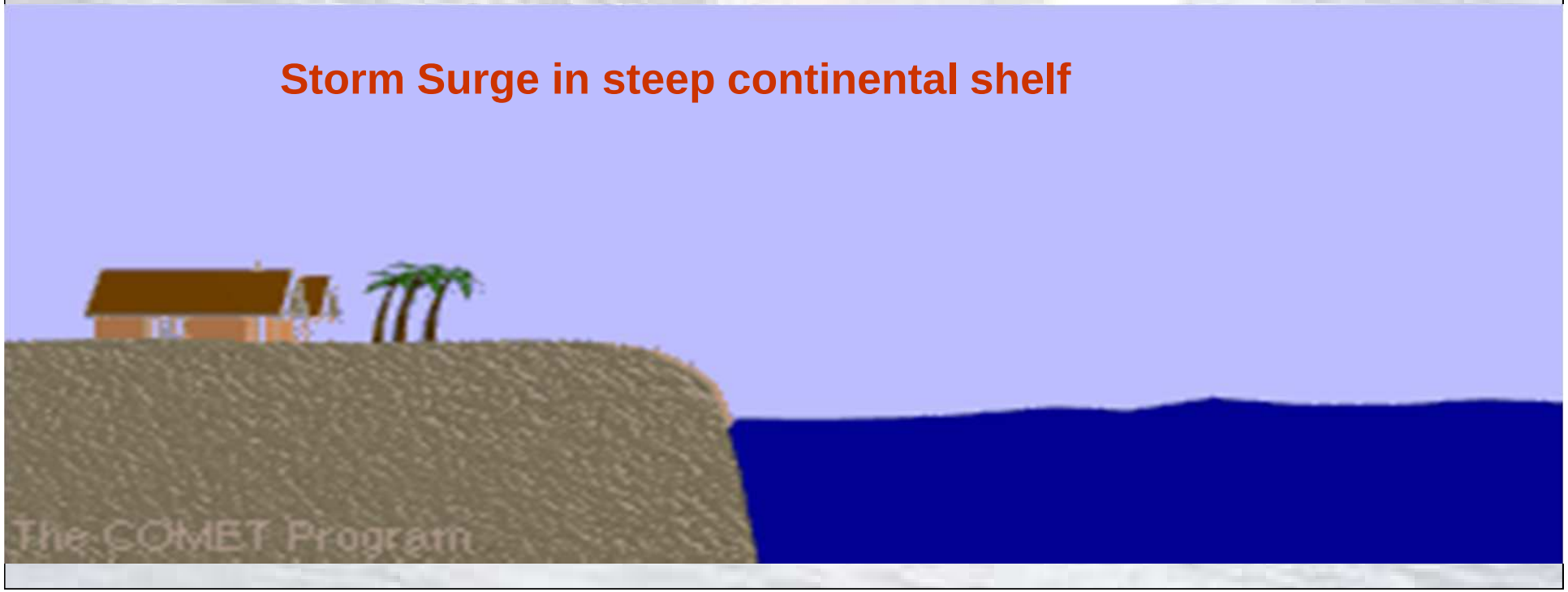
Storm surge is an offshore rise of water associated with tropical cyclone over the low-lying coastal areas.



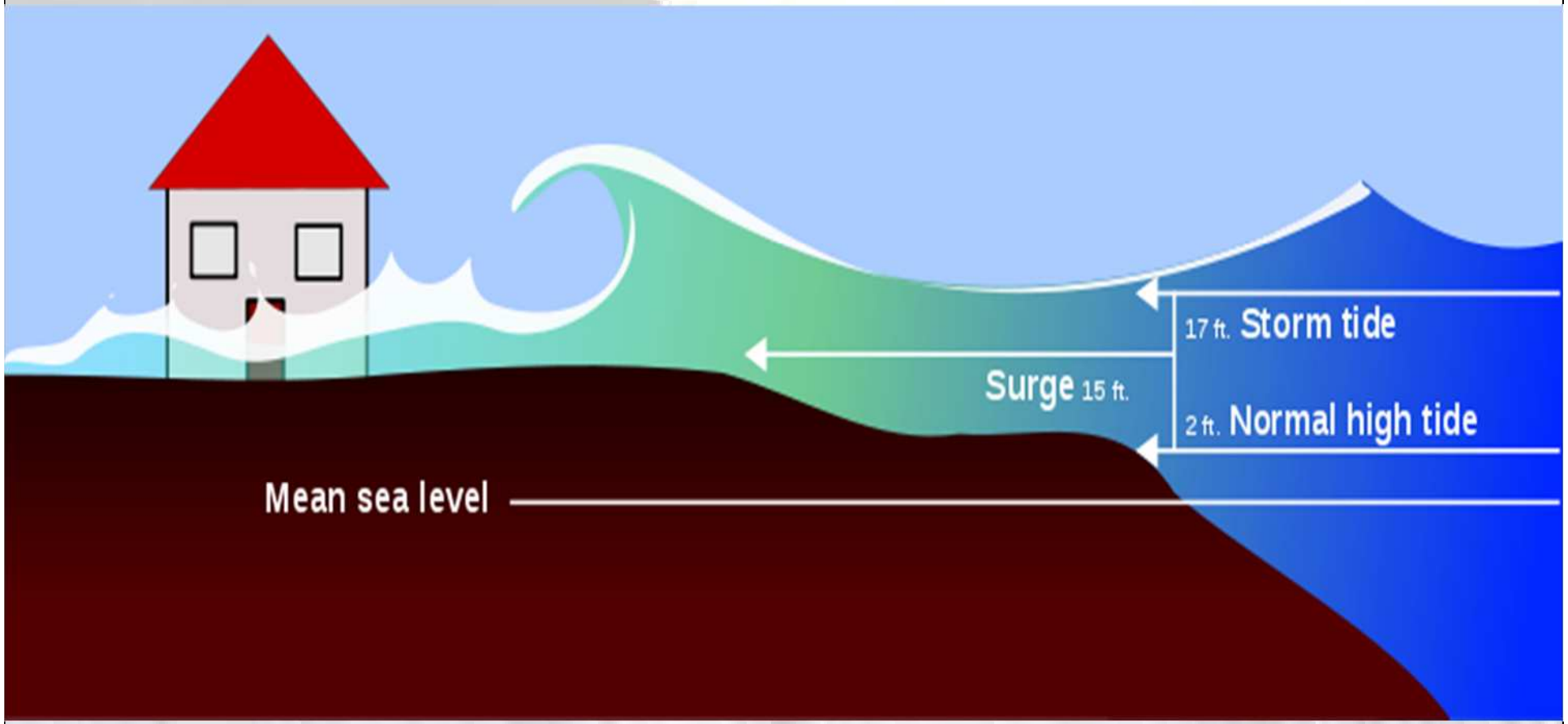
Storm Surge in shallow continental shelf



Storm Surge in steep continental shelf



Impact of Storm surge



Causes of high storm surge over the coastal region of Bangladesh

The main causes for the devastating storm surge along the coastal region of Bangladesh are:

- ✓**Funnel shape of the Bay,**
- ✓**Shallow bathymetry**
- ✓**Long continental shelf,**
- ✓**High astronomical tide and**
- ✓**Long tidal range between east coast and west coast,**
- ✓**Low lying island and chars,**
- ✓**Favourable cyclone track,**
- ✓**Innumerable number of inlets including worlds largest river system (Ganga-Brahmaputra-Meghna).**

Requirement of EWS for TC

- **Almost all the loss of lives and most of the damage from a tropical cyclone are due to the storm surge.**
- **The real time monitoring, forecasting and warning of tropical cyclone helps to reduce the loss of lives and damage of properties.**
- **This needs the address of effective storm surge modeling and forecasting.**
- **Bangladesh Meteorological department is responsible for prediction of storm surge associated with cyclone along the coastal region of Bangladesh.**
- **To address this issue BMD keeps provision of tropical cyclone prediction in the 'Special Weather Bulletin' in a separate paragraph.**

THANK YOU VERY MUCH

FOR YOUR KIND ATTENTION

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