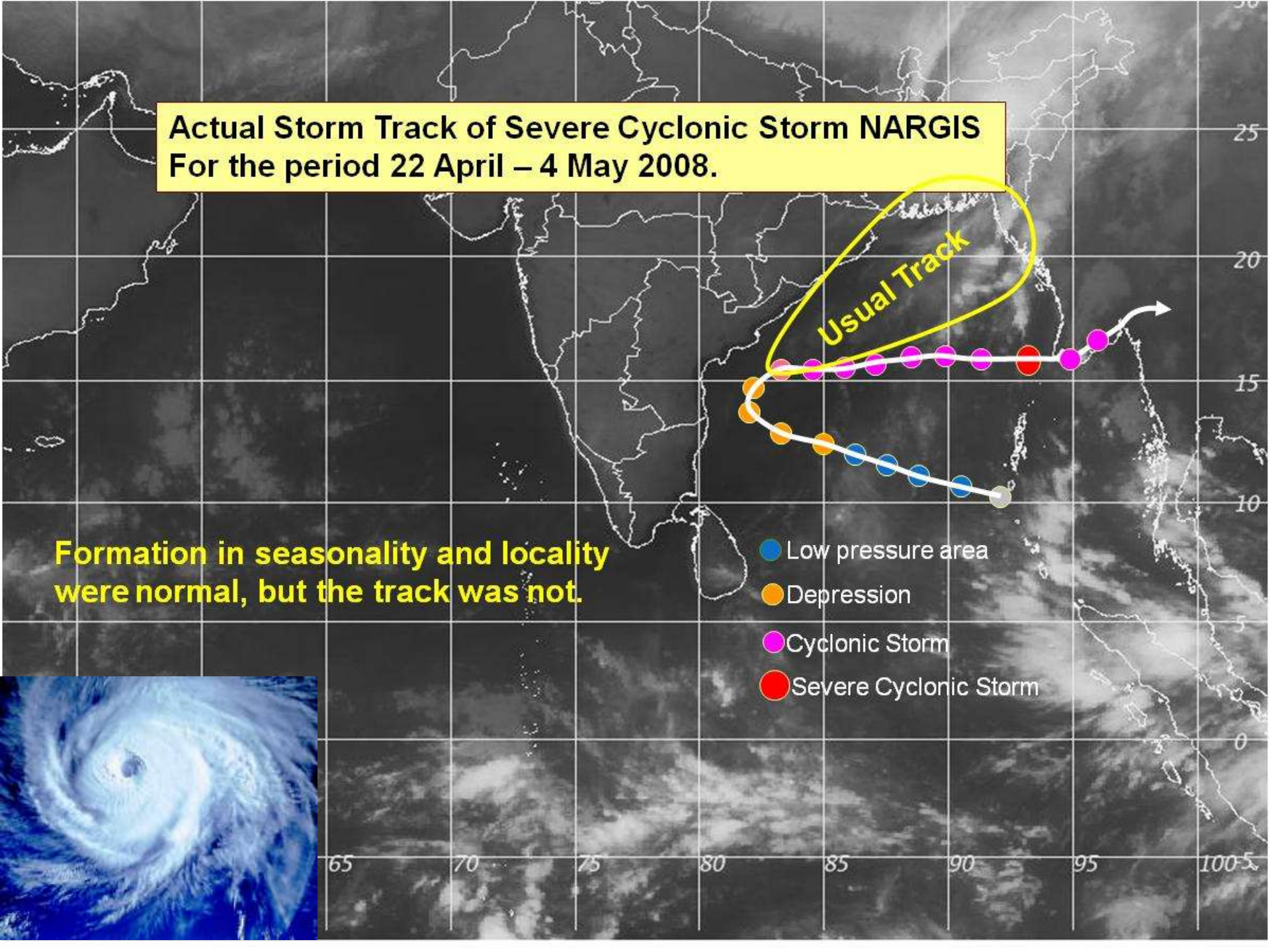
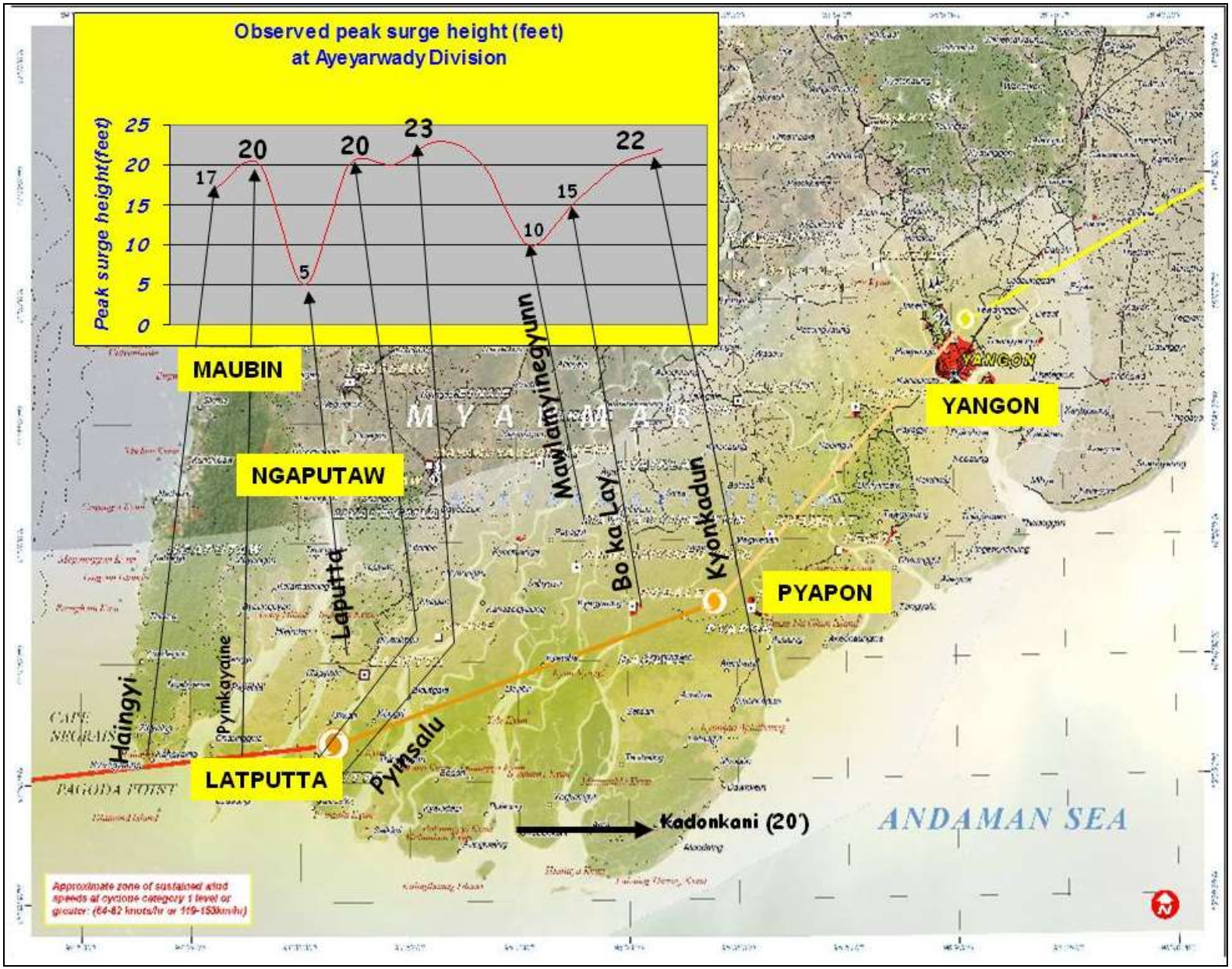
The Changing Risks and their Underlying Causes In Climate of Myanmar

Dr. Tun Lwin
Former Director-General
Former P.R. of Myanmar with WMO,
Consultant, Myanmar Climate Change Watch
Technical Advisor, RIMES

Myanmar Drilling & Exploration 2013 Conference & Exhibition
24-25 July, Traders Hotel, Yangon, Myanmar


Actual Storm Track of Severe Cyclonic Storm NARGIS
For the period 22 April – 4 May 2008.
Usual Track
Formation in seasonality and locality were normal, but the track was not.
Low pressure area
Depression
Cyclonic Storm
Severe Cyclonic Storm
25
20
15
10
5
0
65
70
75
80
85
90
95
100

Observed Peak Surge Heights of Cyclone Nargis in the Delta Region (Coastal and Inland)



LOSS OF DAMAGE BY NARGIS

Affected population	11 millions
Houses Damaged	745,764
Deaths (human)	**84,537**
Missing (people)	**53,836**
Injured	19,359
Severely affected people	2.4 millions
Death of cattle, bulls, Buffaloes, household animals	**155,248 above**
Area covered by salty sea water	72,798 acres
Cyclone affected area (Delta)	23,500 sq. km.
Affected townships	37
Paddy Loss	25% of annual production
Private Sector Loss	8.3800 trillion kyats
National Sector Loss	3.3547 trillion kyats

CHANGING RISKS

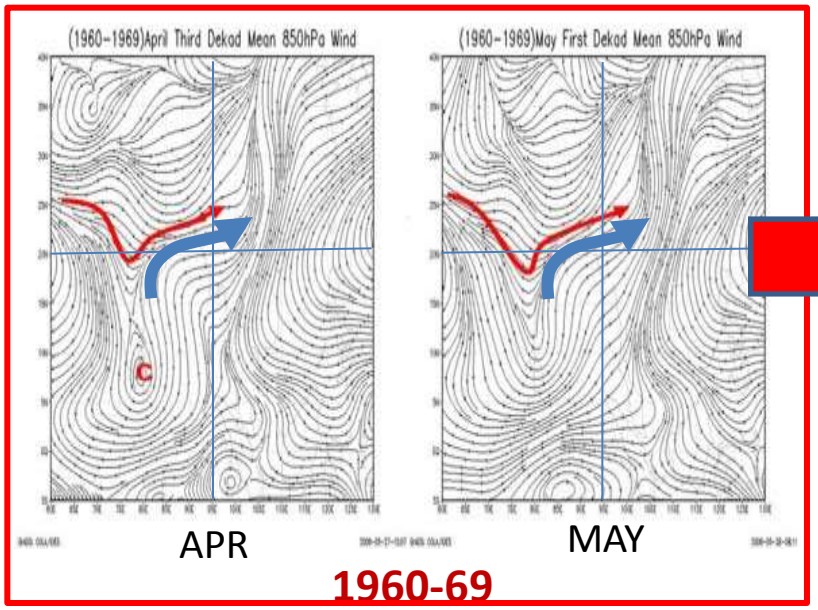
CLIMATIC CAUSES

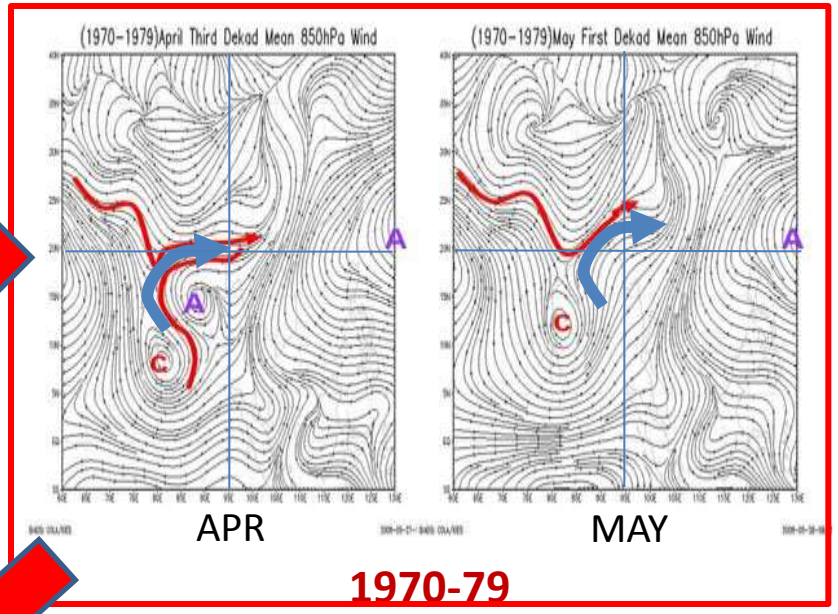
NON-CLIMATIC CAUSES

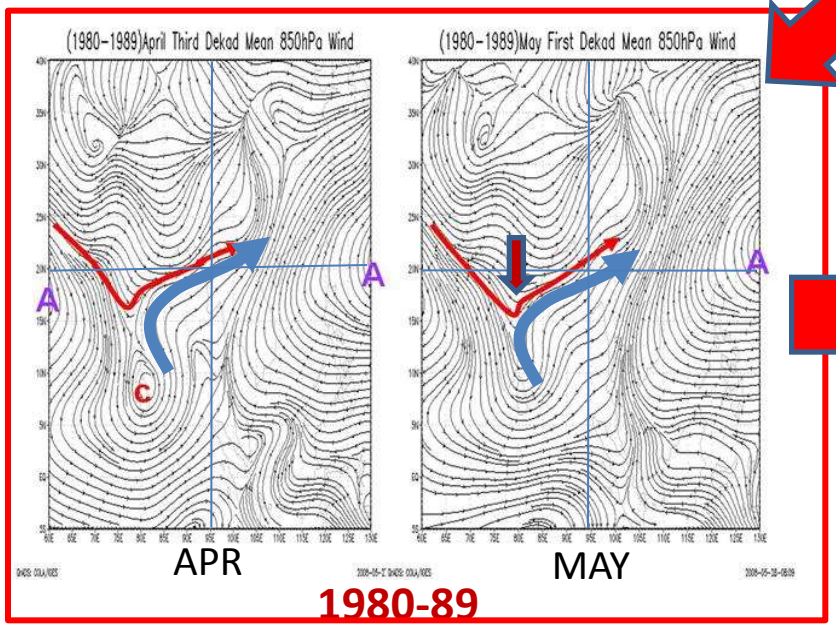
CLIMATIC CAUSES

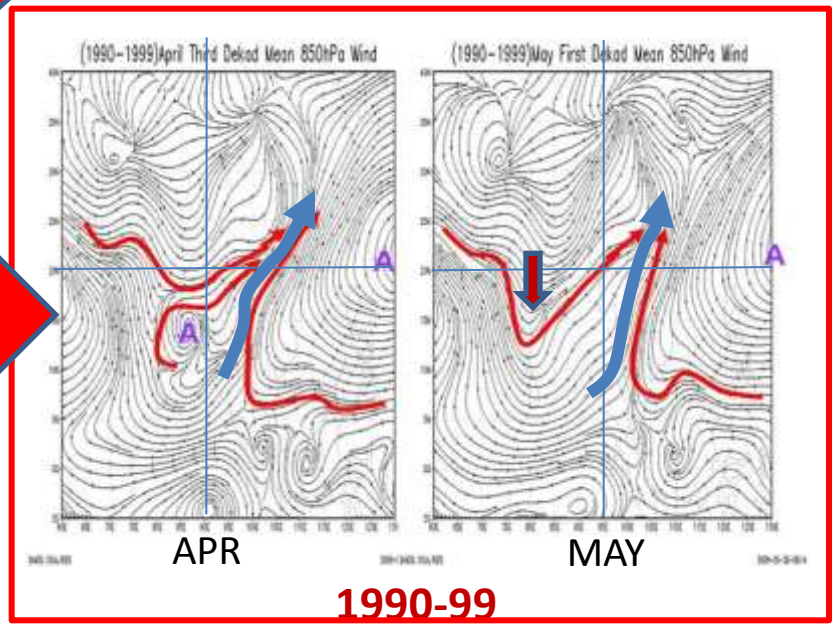
CLIMATIC CAUSES

Decadal Mean of Upper Air Systems

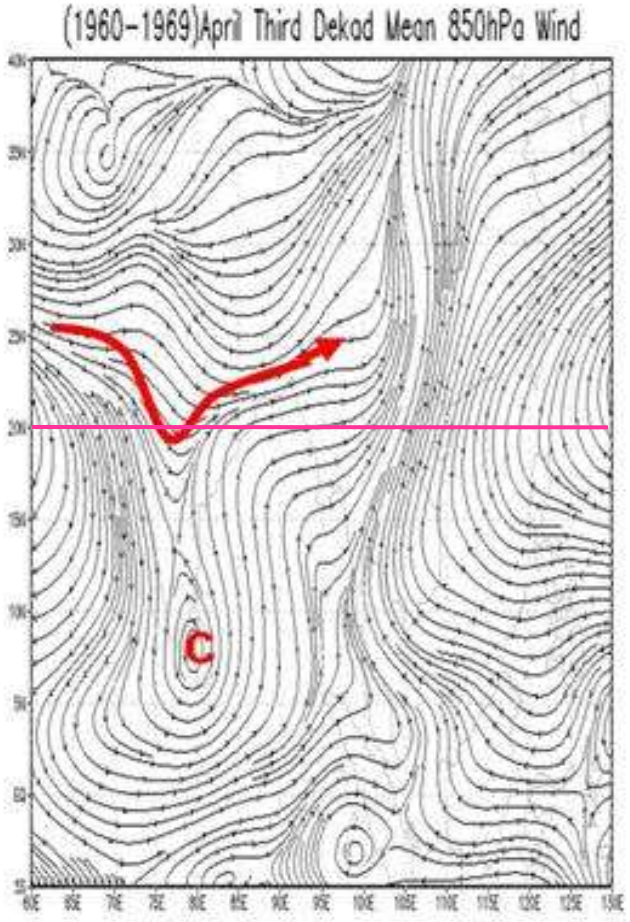




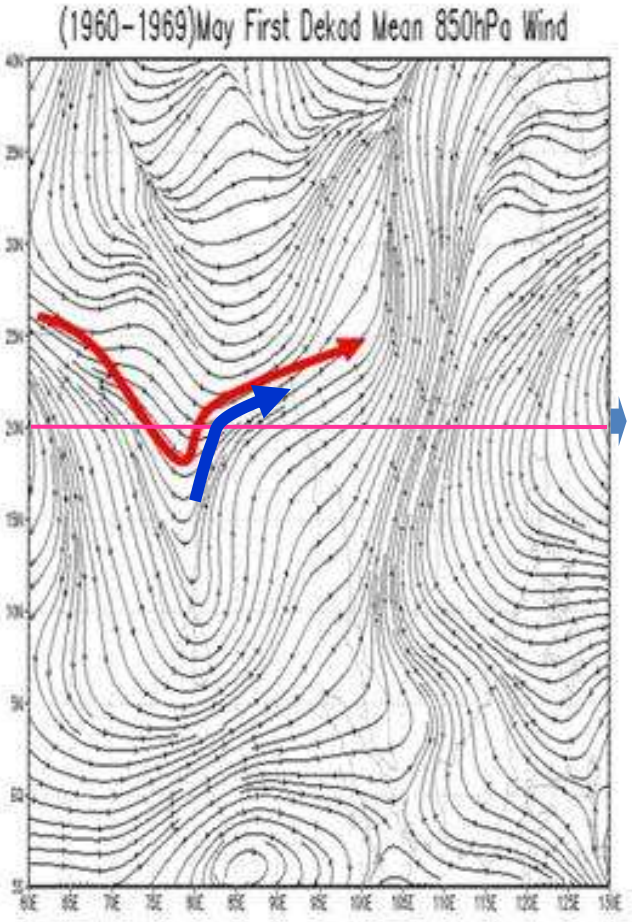




Decadal Mean of Upper Air Systems



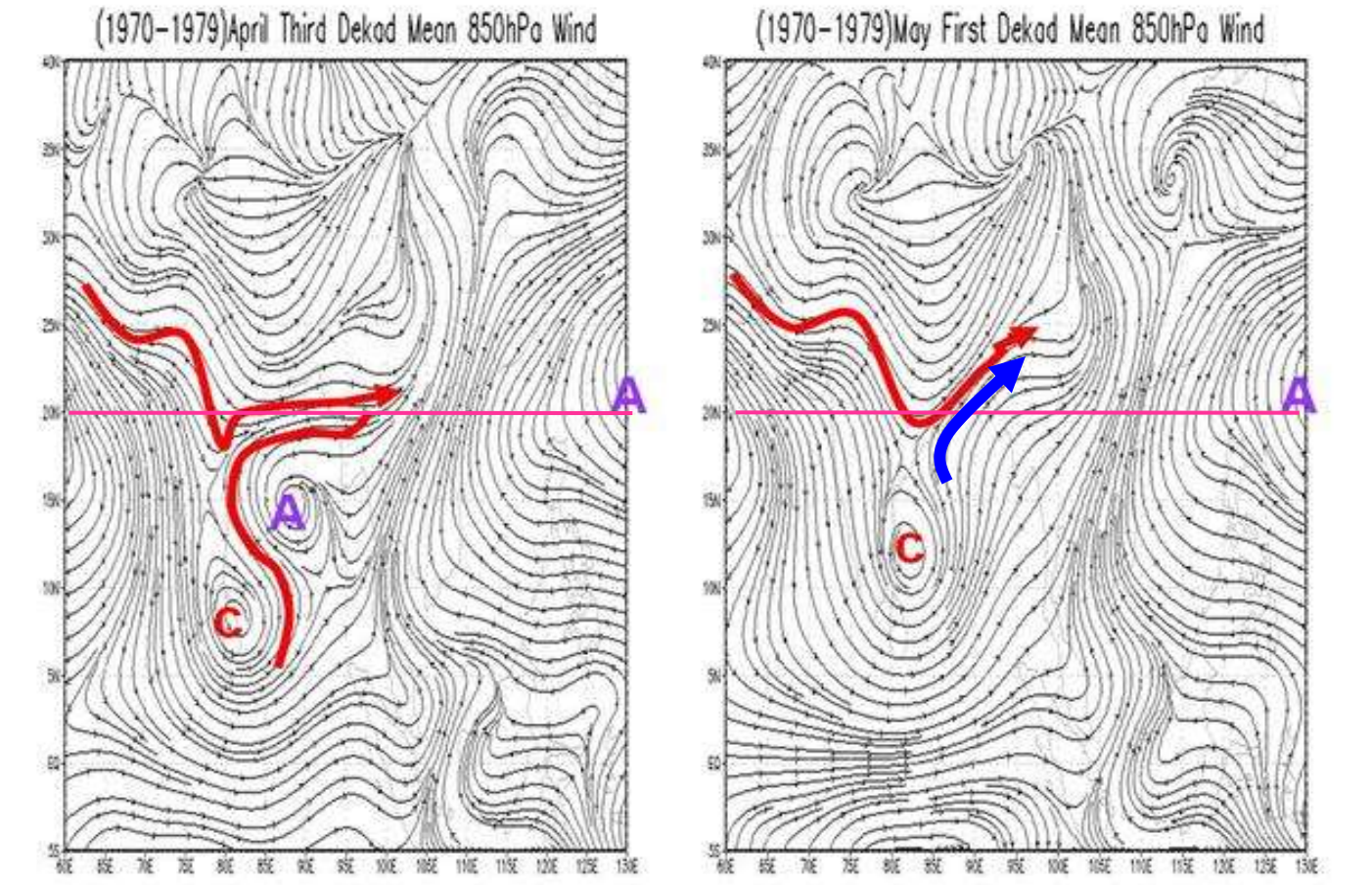
APRIL LAST DECAD



MAY FIRST DECAD

1960-69

Decadal Mean of Upper Air Systems

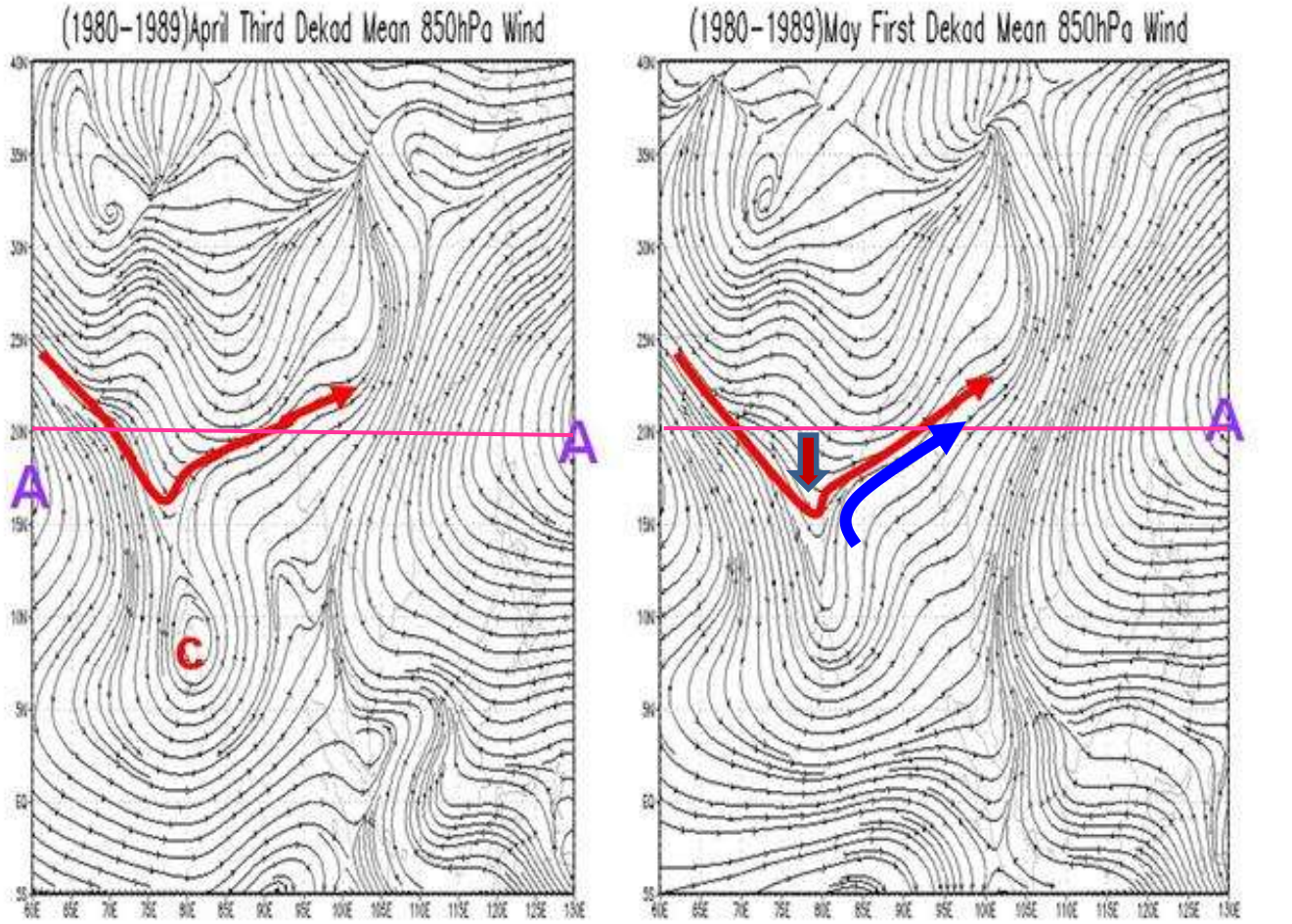


APRIL LAST DECAD **MAY FIRST DECAD**

1970-79

CLIMATIC CAUSES

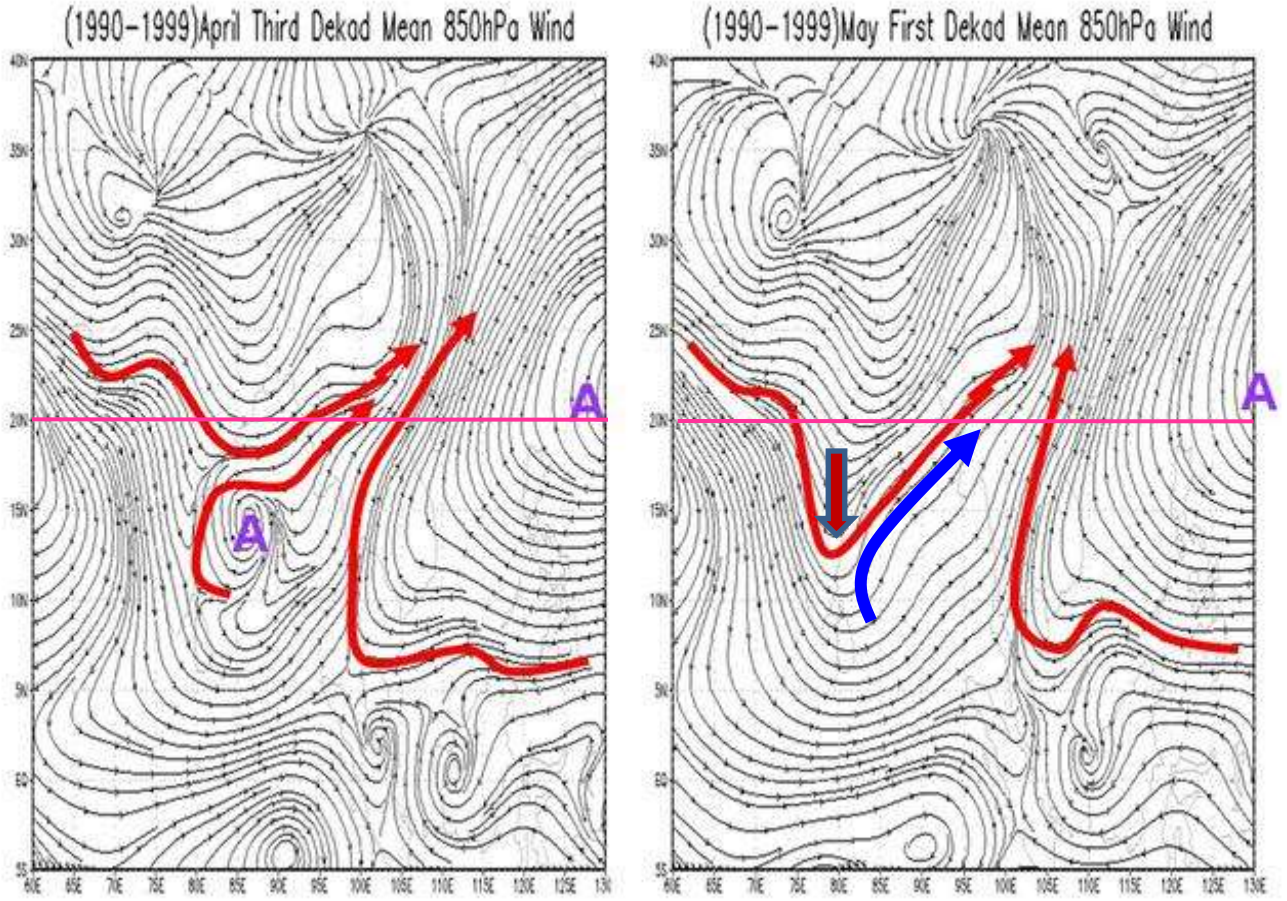
Decadal Mean of Upper Air Systems



APRIL LAST DECAD **MAY FIRST DECAD**

1980-89

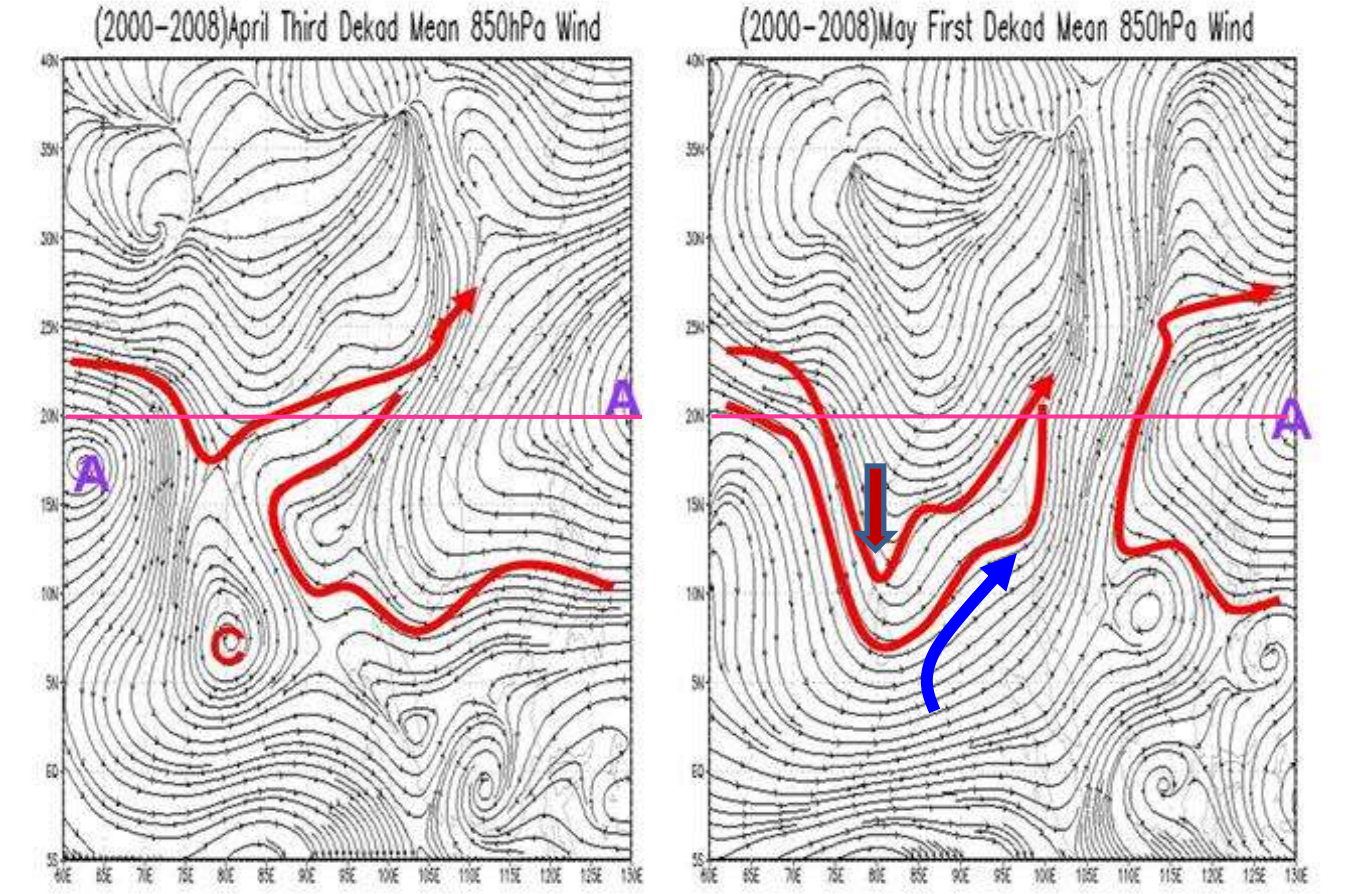
Decadal Mean of Upper Air Systems



APRIL LAST DECAD **MAY FIRST DECAD**

1990-99

Decadal Mean of Upper Air Systems

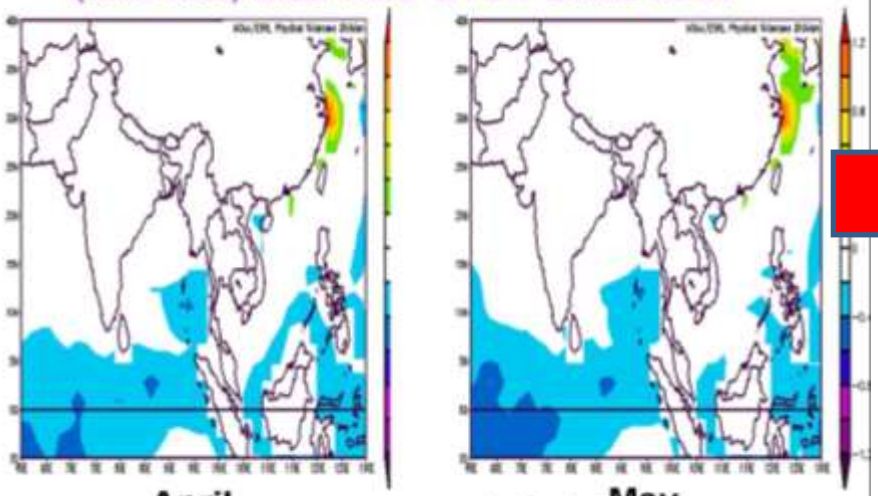


APRIL LAST DECAD **MAY FIRST DECAD**

2000-2008

CLIMATIC CAUSES

(1960-1969) Mean Third & First Dekad SSTA

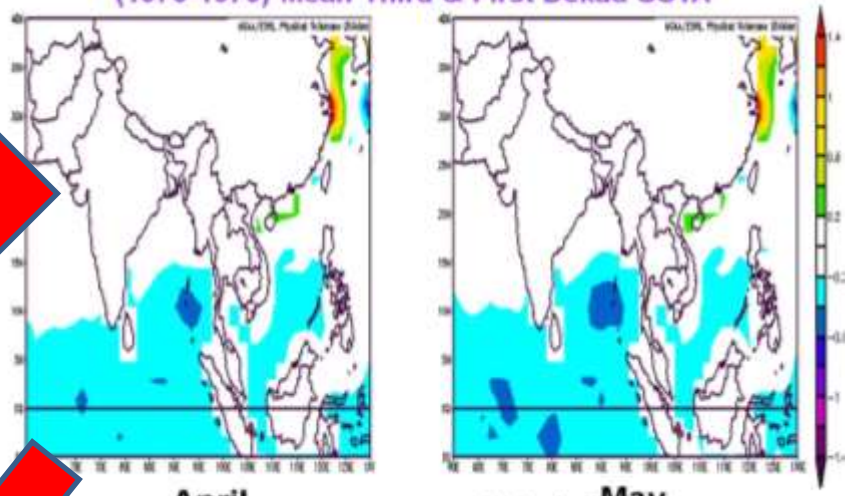


April May

Dr. Tun Lwin
Team Leader, Myanmar V&A Assessment Team

1960-69

(1970-1979) Mean Third & First Dekad SSTA

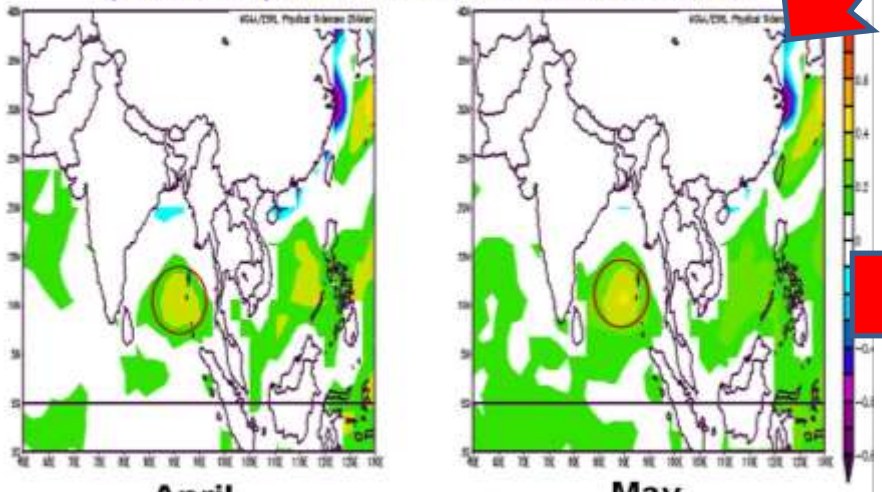


April May

Dr. Tun Lwin
Team Leader, Myanmar V&A Assessment Team

1970-79

(1980-1989) Mean Third & First Dekad SSTA

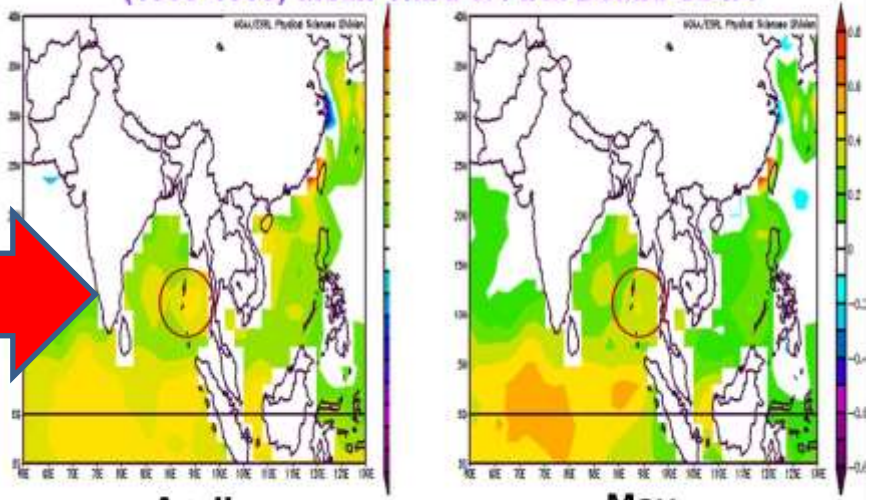


April May

Dr. Tun Lwin
Team Leader, Myanmar V&A Assessment Team

1980-89

(1990-1999) Mean Third & First Dekad SSTA

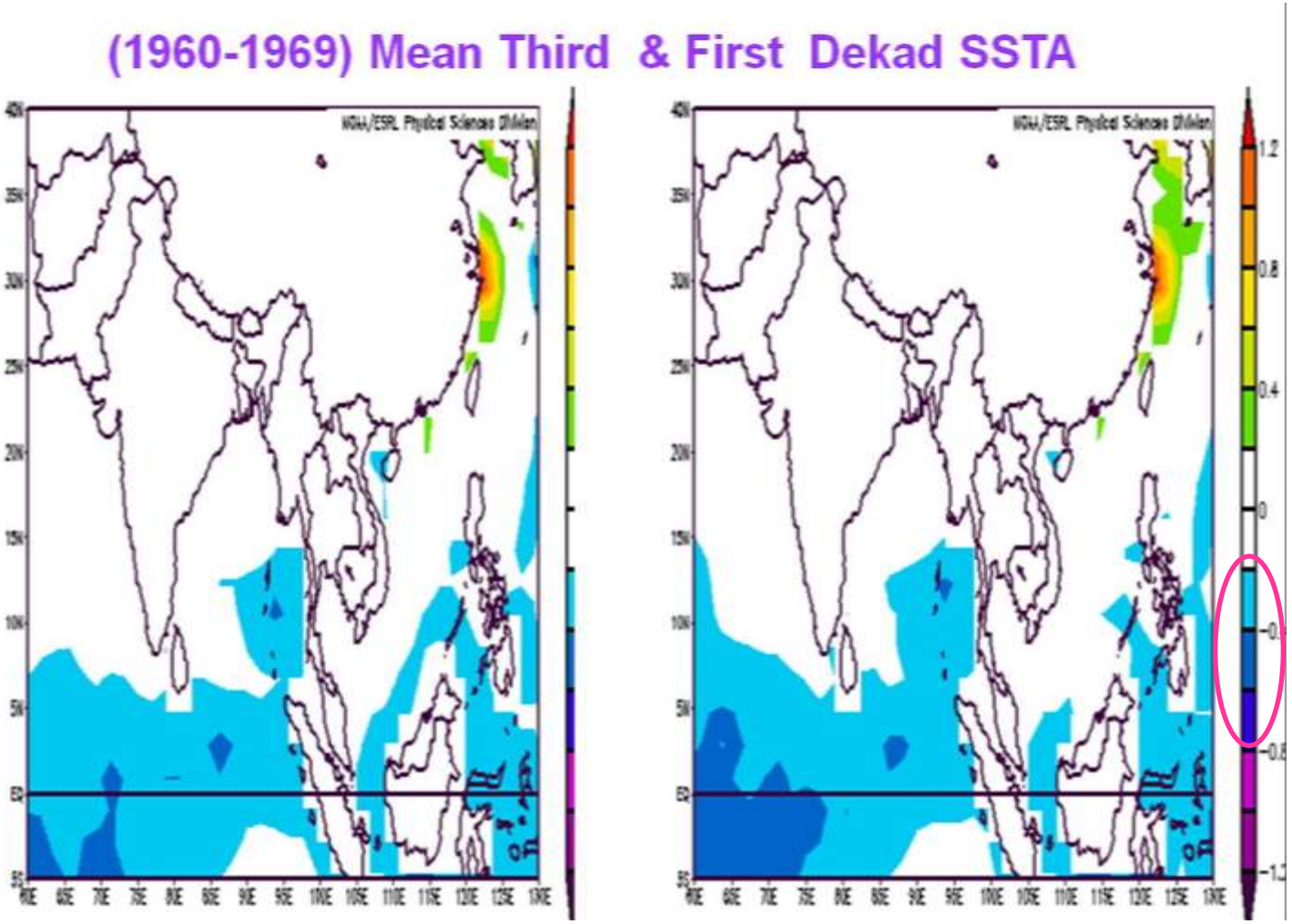


April May

Dr. Tun Lwin
Team Leader, Myanmar V&A Assessment Team

1990-99

Decadal Sea Surface Temperature Anomalies

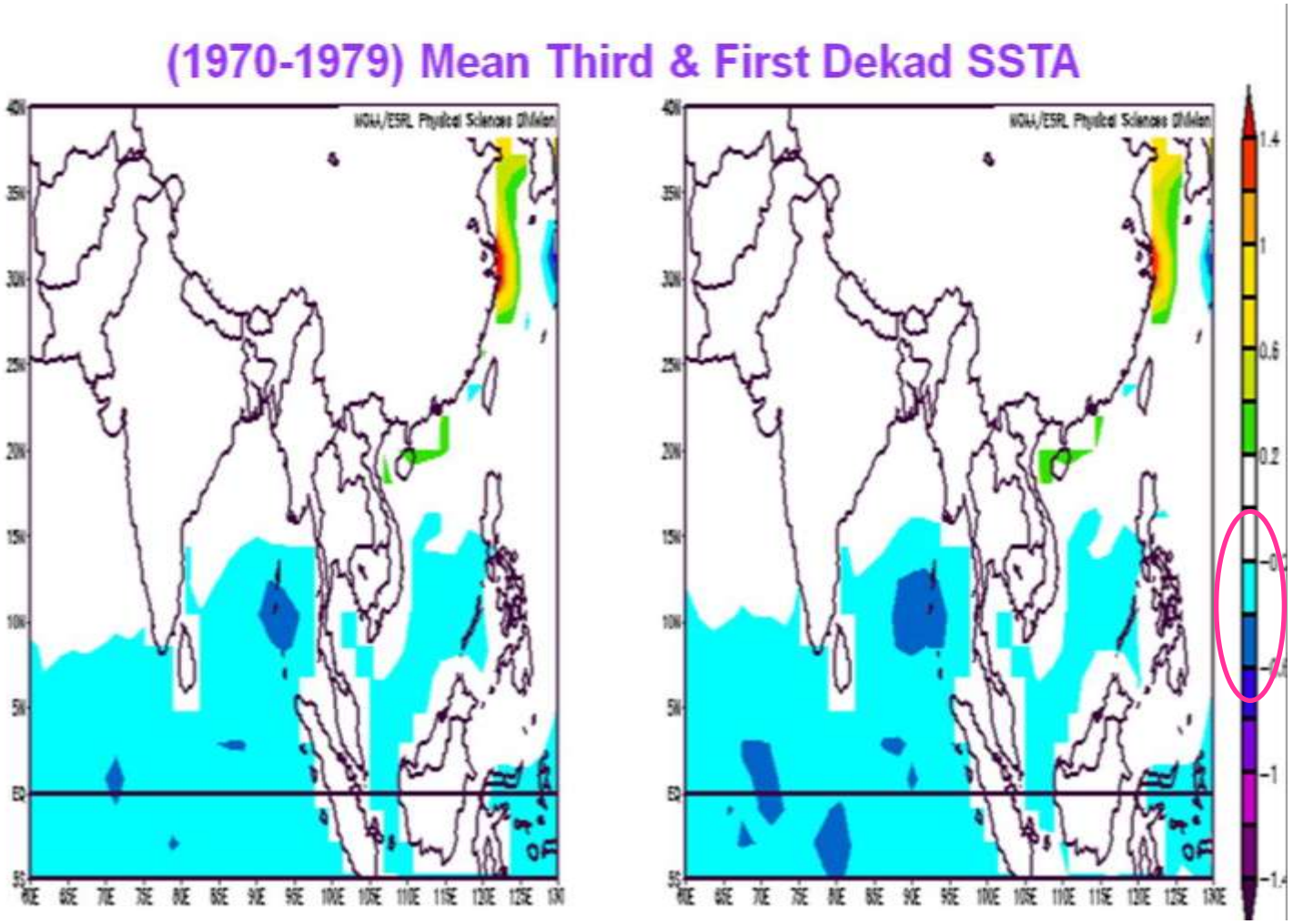


APRIL LAST DECAD

MAY FIRST DECAD

1960-69

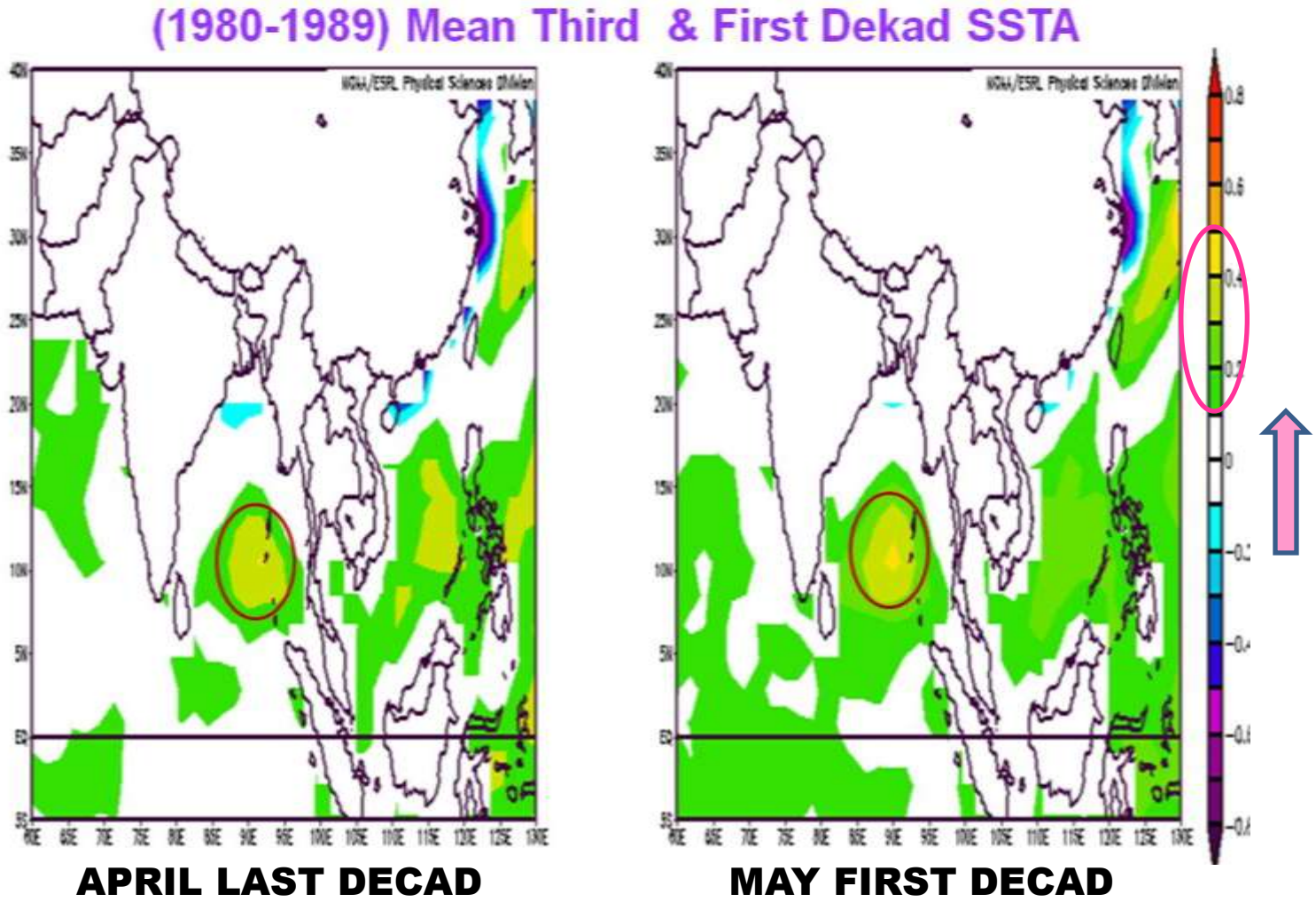
Decadal Sea Surface Temperature Anomalies



APRIL LAST DECAD **MAY FIRST DECAD**

1970-79

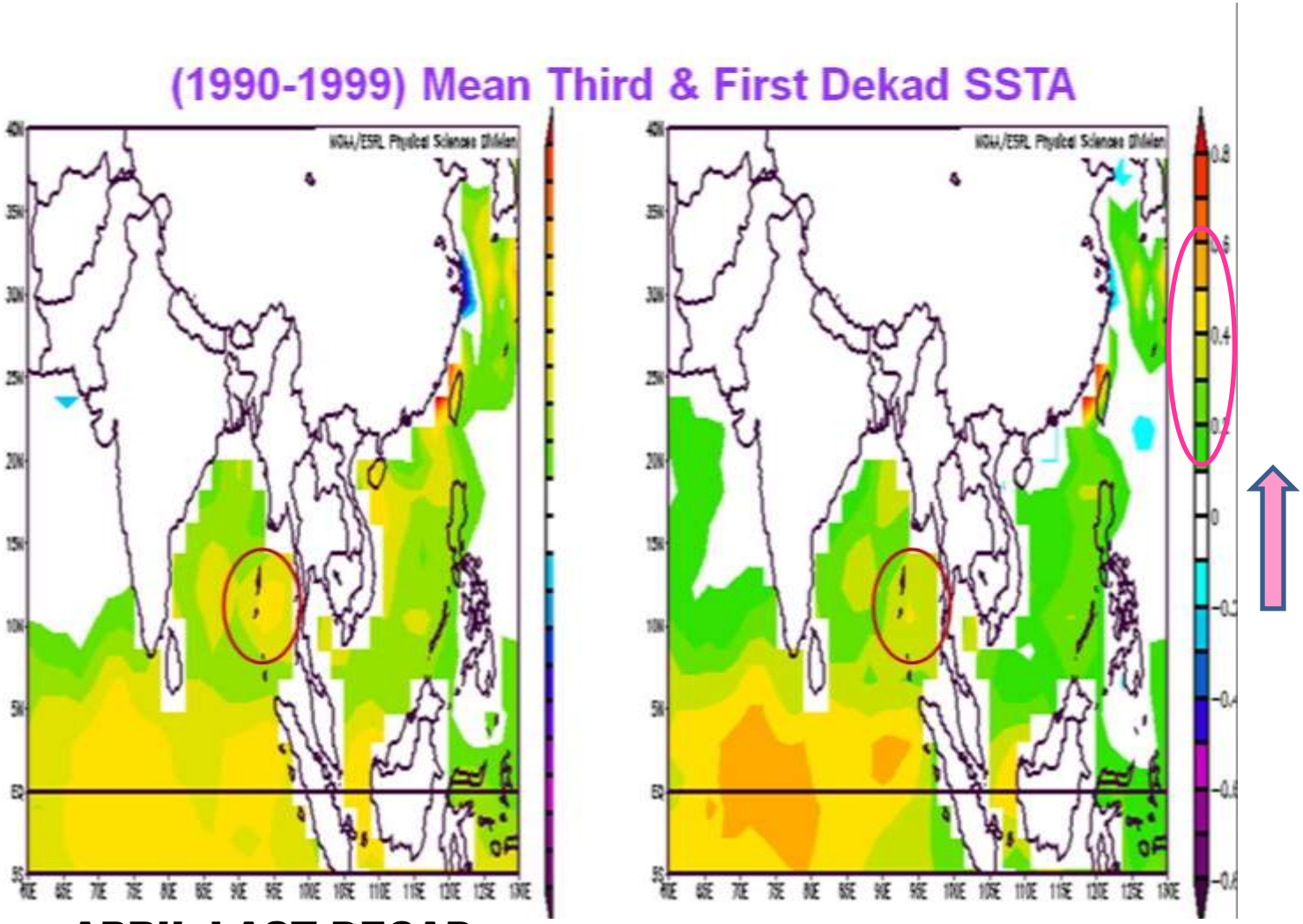
Decadal Sea Surface Temperature Anomalies



APRIL LAST DECAD **MAY FIRST DECAD**

1980-89

Decadal Sea Surface Temperature Anomalies

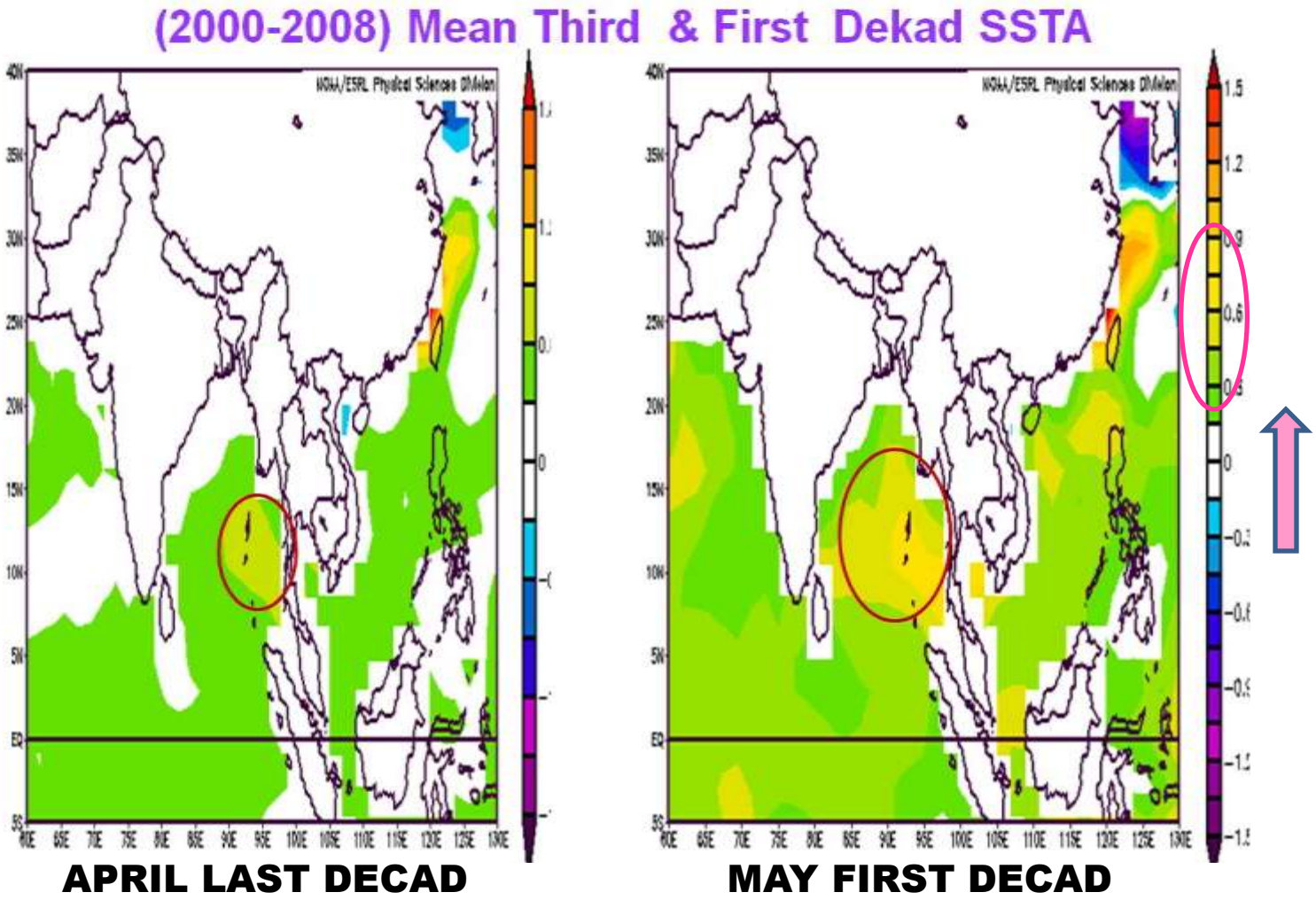


APRIL LAST DECAD

MAY FIRST DECAD

1990-99

Decadal Sea Surface Temperature Anomalies



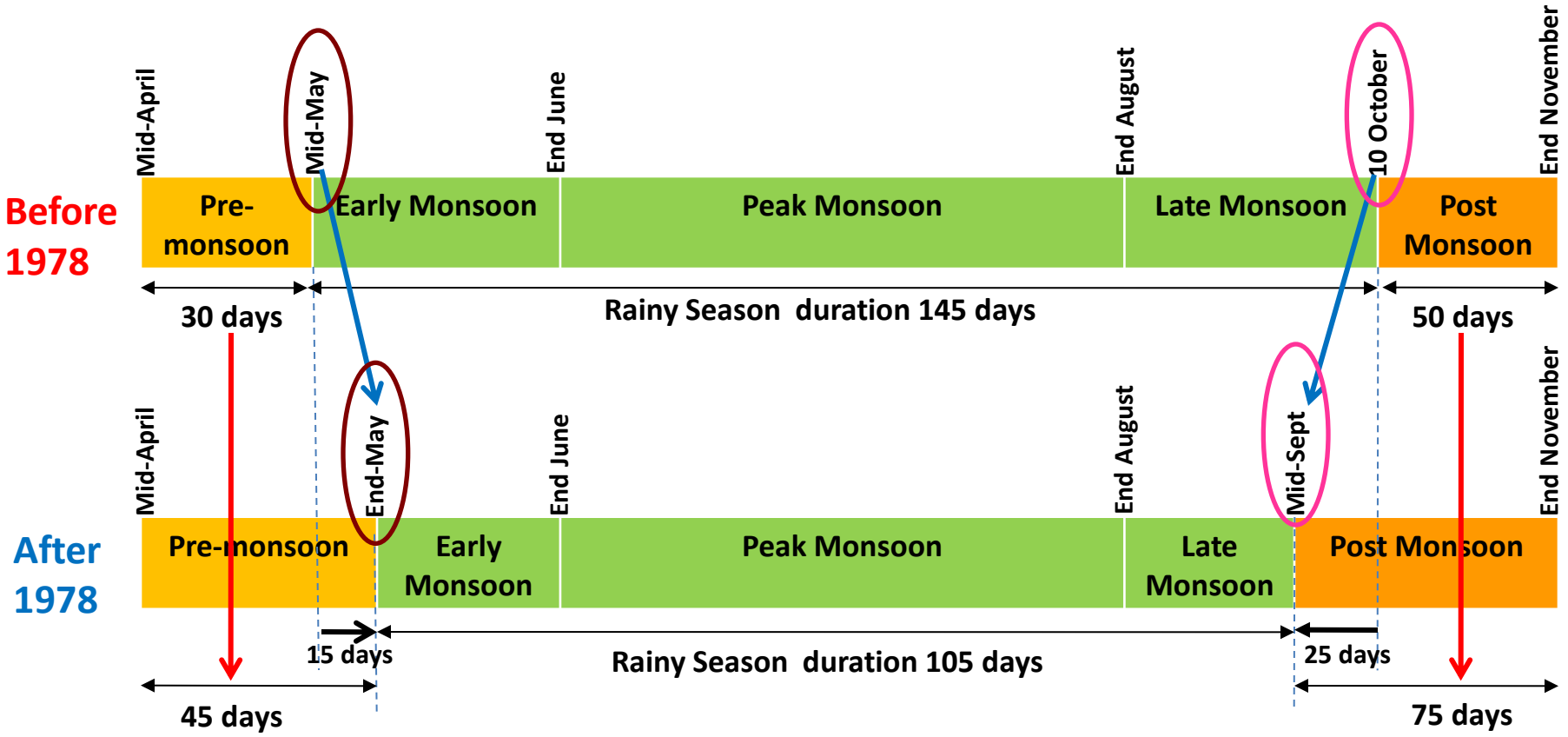
2000-2008

Changes in Monsoon Climatology (1950-2000)
Concluding Remarks by Tun Lwin, 2002.

- Late onset after 1977
- Early withdrawal after 1977
- Shorter monsoon duration after 1977
- The Monsoon depressions become less significantly since 1980

CLIMATIC CAUSES

Extension of Pre- and Post-Monsoon Seasons After 1978



Table(1) Statistics of Historical Record of Bay Storms and Storms which crossed Myanmar Coast for the period 1877-2009

Month	Storms formed in the Bay of Bengal	Storms which crossed Myanmar coast
JAN	16(1%)	2(2%)
FEB	3(0%)	1(1%)
MAR	8(1%)	---
APR	33(3%)	15(18%)
MAY	96(7%)	27(33%)
JUN	121(9%)	1(1%)
JUL	185(14%)	---
AUG	201(15%)	--
SEP	216(17%)	---
OCT	201(15%)	14(17%)
NOV	146(11%)	14(17%)
DEC	77(6%)	9(11%)
Total	1303(100%)	83(100%)
Total	9.76	0.62

APRIL-MAY IS FIRST STORM SEASON OF MYANMAR
WITH POSSIBILITY OF 51% CHANCE OF LAND CROSSING.
44% of Pre-monsoon storms crossed Myanmar coast.

OCT-NOV-DEC IS SECOND STORM SEASON OF MYANMAR
WITH POSSIBILITY OF 45% CHANCE OF LAND CROSSING.
Only 9% of post-monsoon storms Crossed Myanmar coast.

Statistics of historical storms that formed in the Bay of Bengal and crossed Myanmar Coast during the Pre- and Post monsoon Periods

Pre-monsoon Period				Post-monsoon Period			
Month	Bay of Bengal	Crossed Myanmar	%	Month	Bay of Bengal	Crossed Myanmar	%
April	33	15	45	October	201	14	7
May	96	27	28	November	146	14	10
				December	77	9	12
Total	129	57	44	Total	424	37	9

CLIMATIC CAUSES

TORNADO ON 29th Morning (Ngwe Saung)

The photograph taken by Yangon-based French photographer Jean Philippe Forst shows a tornado forming near Ngwe Saung on the morning of April 29, as Cyclone Mala made landfall on the coast of Myanmar

TORNADO ON 28th Night (HLAING THAR YAR)

1. Recent Climate Adverse Weather Extremes in Myanmar

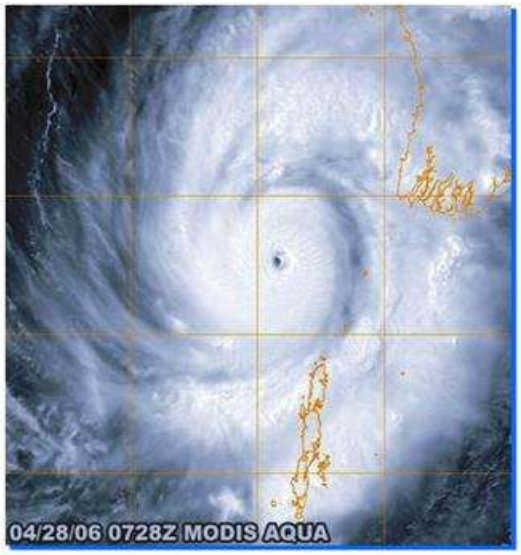
Abnormally increased incidences of tornados, thunder strikes, flash floods due to isolated heavy falls from thunderstorms, frequent flash floods and erosions were witnessed during the last couple of years starting from 2006. According to the available information from reports of national newspapers, Weekly periodical Journals, and from local stations of DMH,

In 2006	**16 cases of tornados**	**>100 fatalities by thunder strikes**
In 2007	**11 cases of tornados**	**> 60 fatalities by thunder strikes**
In 2008	**8 cases of tornados**	**> 40 fatalities by thunder strikes**
In 2009	**>10 cases of tornados**	**> 50 fatalities by thunder strikes**

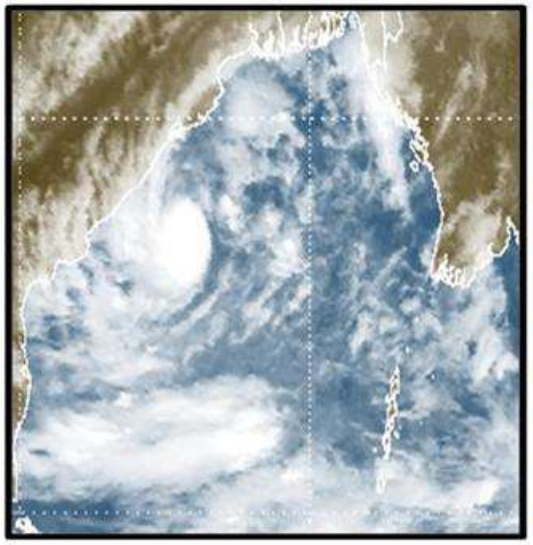
Never witnessed as it is now in the country weather history for the last 60 years

The last tornado incidence experienced in Yangon before 2006 was in 1957.

CLIMATIC CAUSES



MALA-May 2006



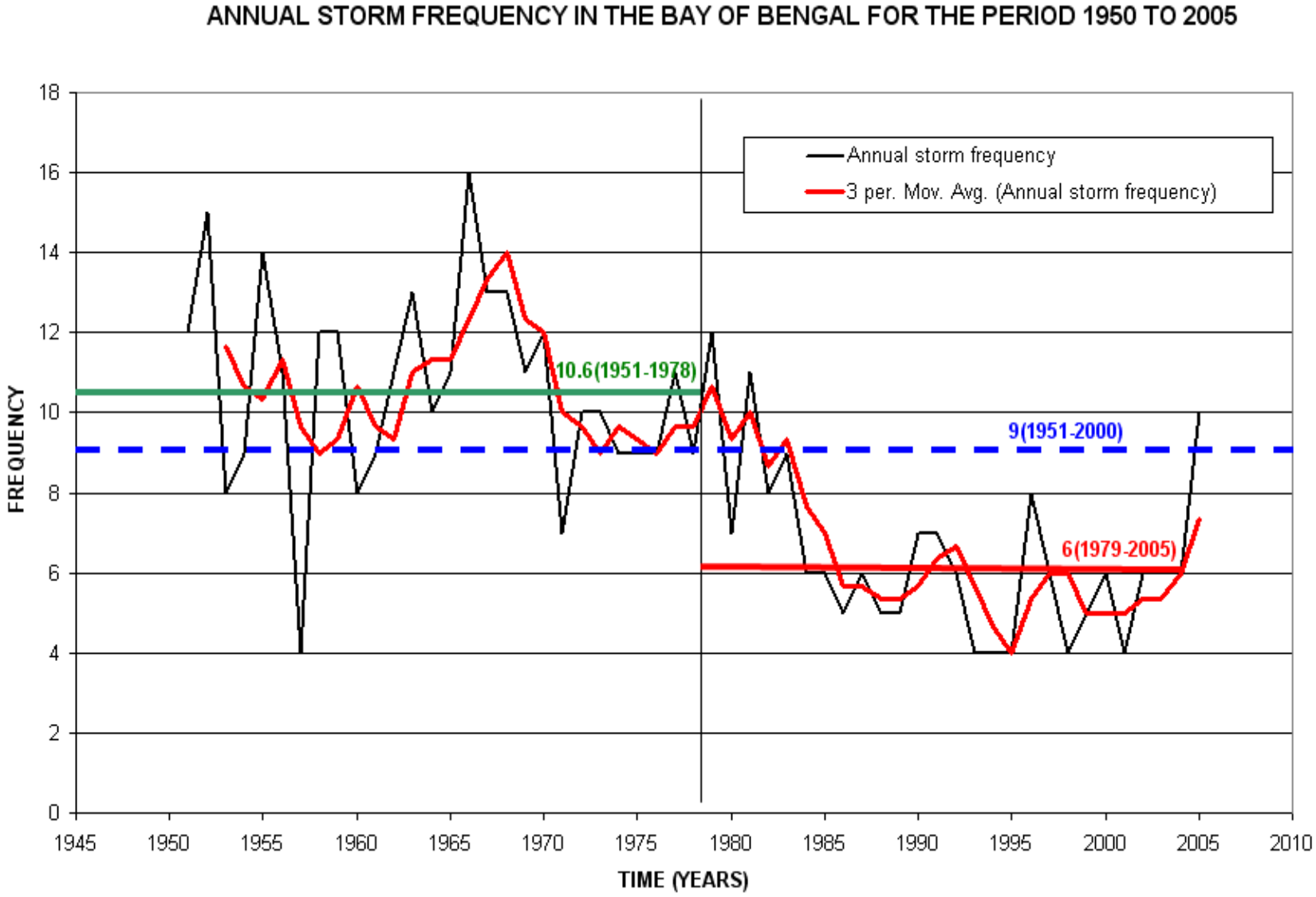
AKASH-May 2007

NARGIS-May 2008

In April and May 2009. two cyclones formed in the Bay of Bengal - Bijli and Aila.

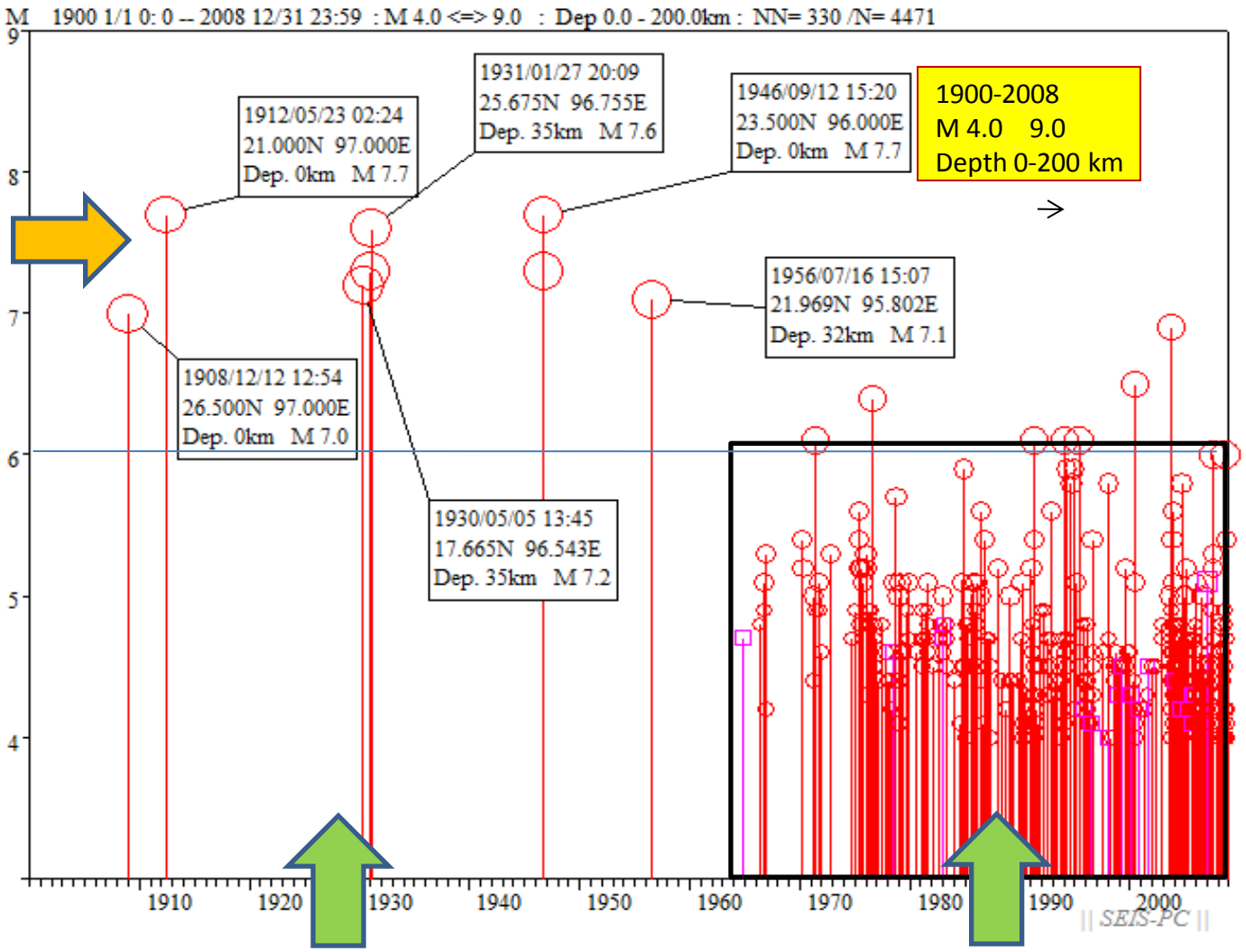
Both storms just missed Myanmar and had made landfall in Bangladesh.

FREQUENCY VS INTENSITY PROBLEM



FREQUENCY VS INTENSITY PROBLEM

Strong Earthquakes

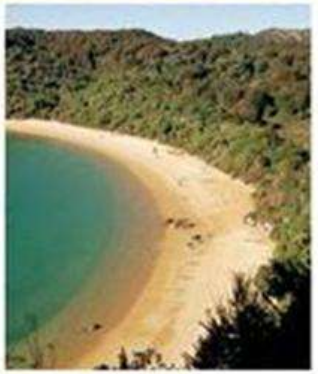


Lower Frequency
Higher Intensity

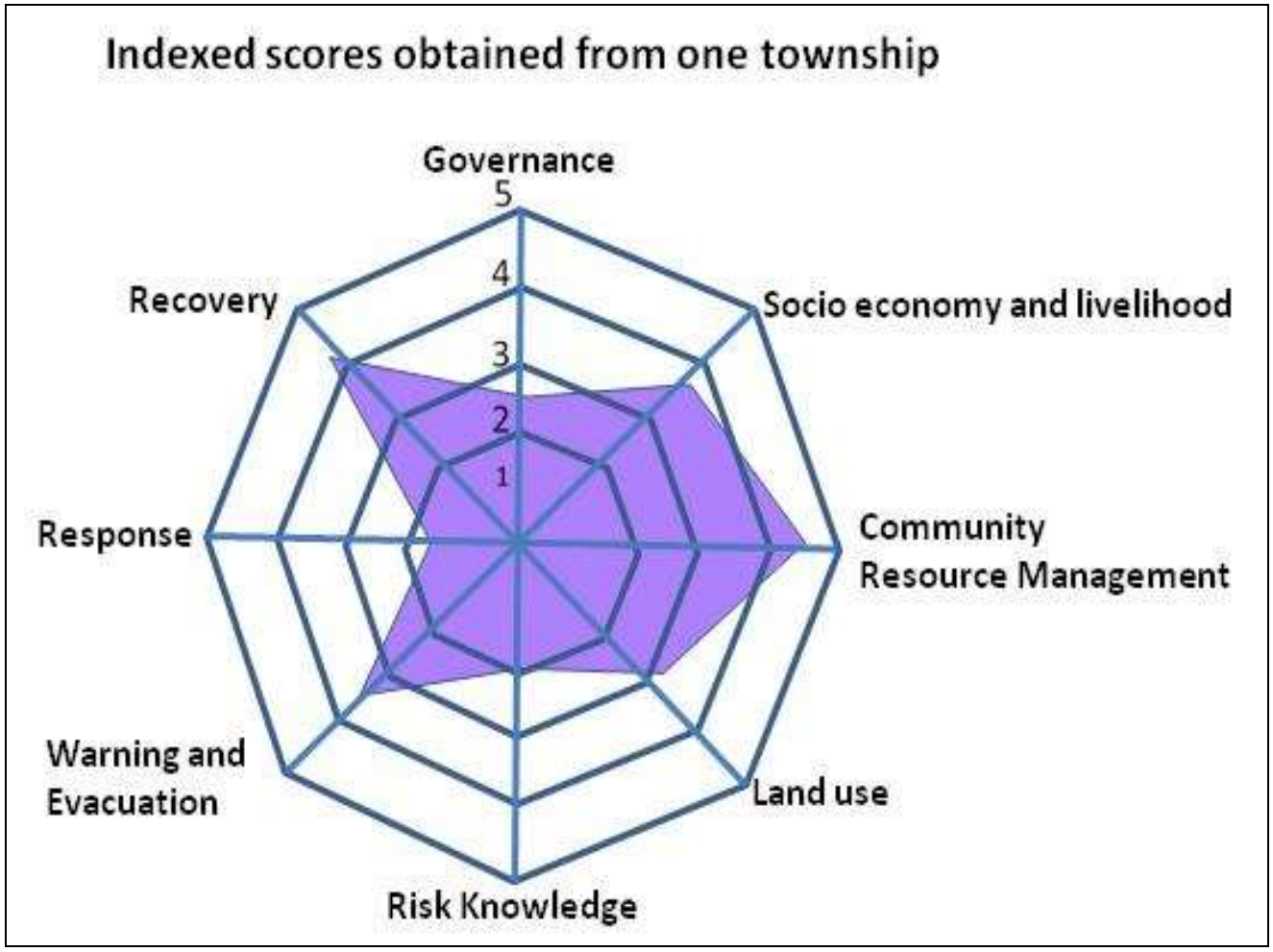
Higher Frequency
Lower Intensity

NON-CLIMATIC CAUSES

NON-CLIMATIC CAUSES

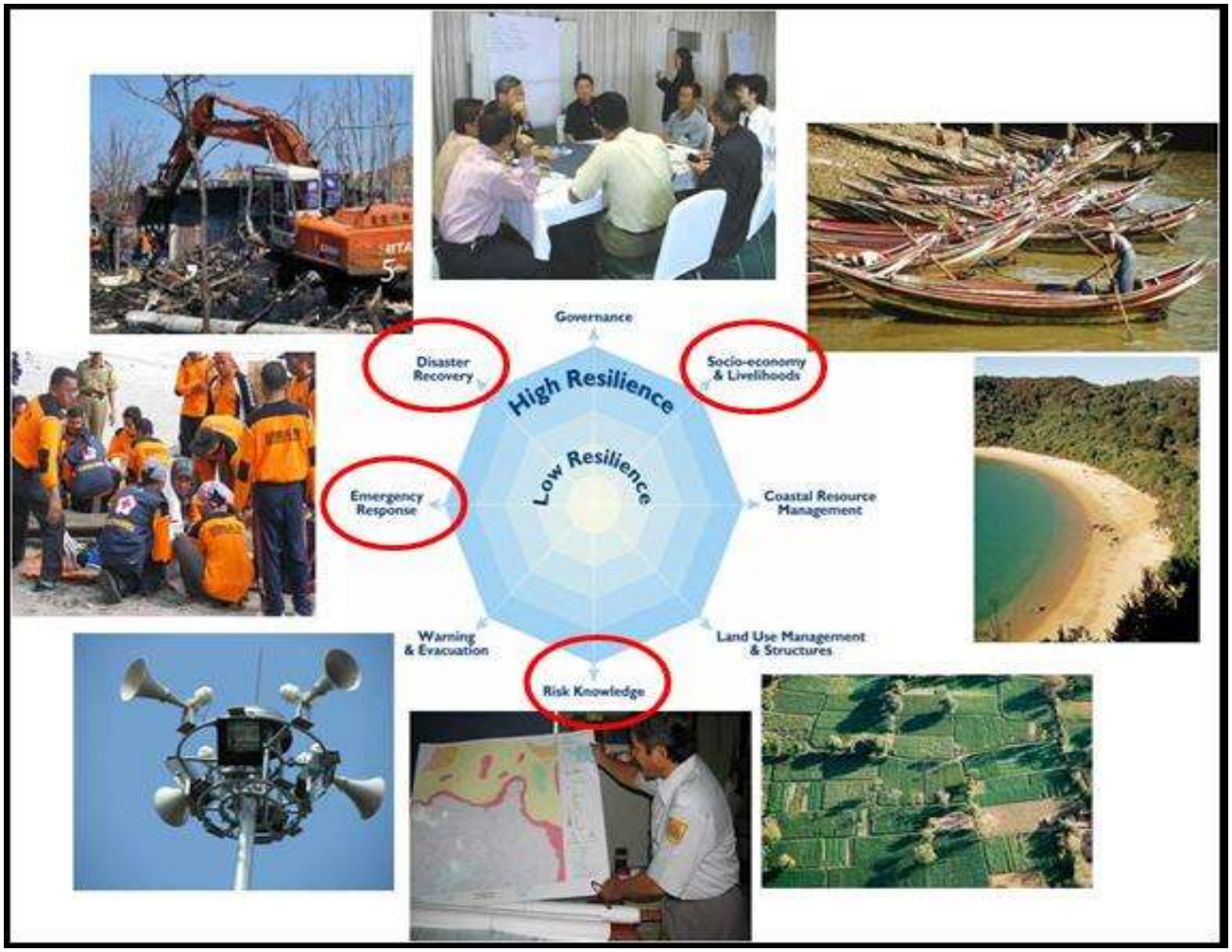


CCR Eight Benchmarks

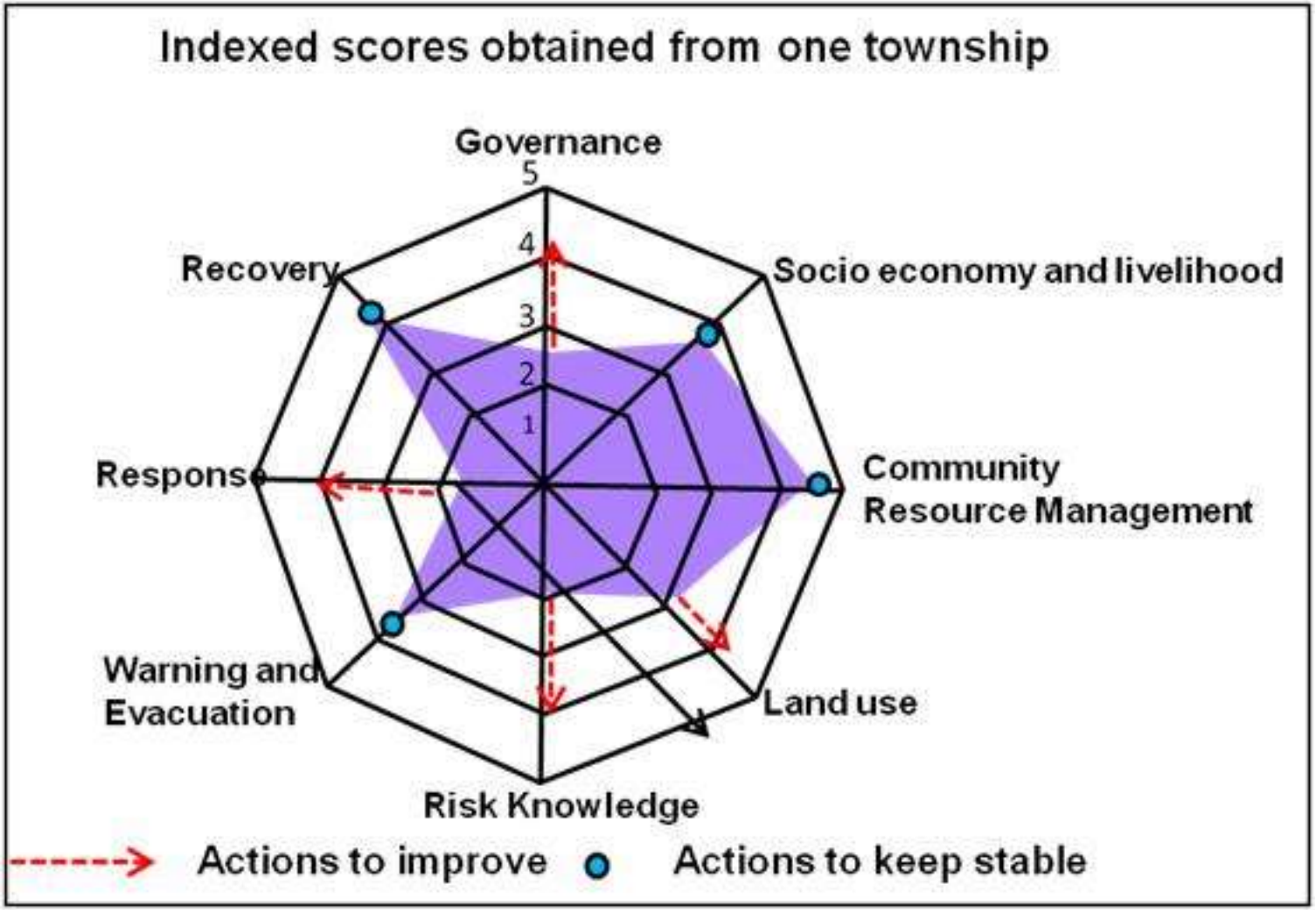


Irregular Shape in Performance Assessment for Nargis

CCR Benchmarks

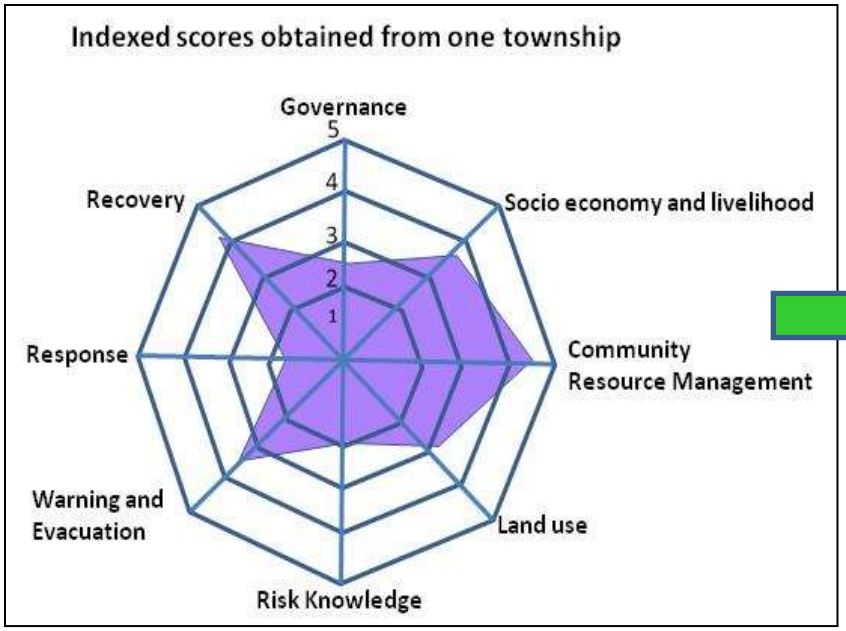


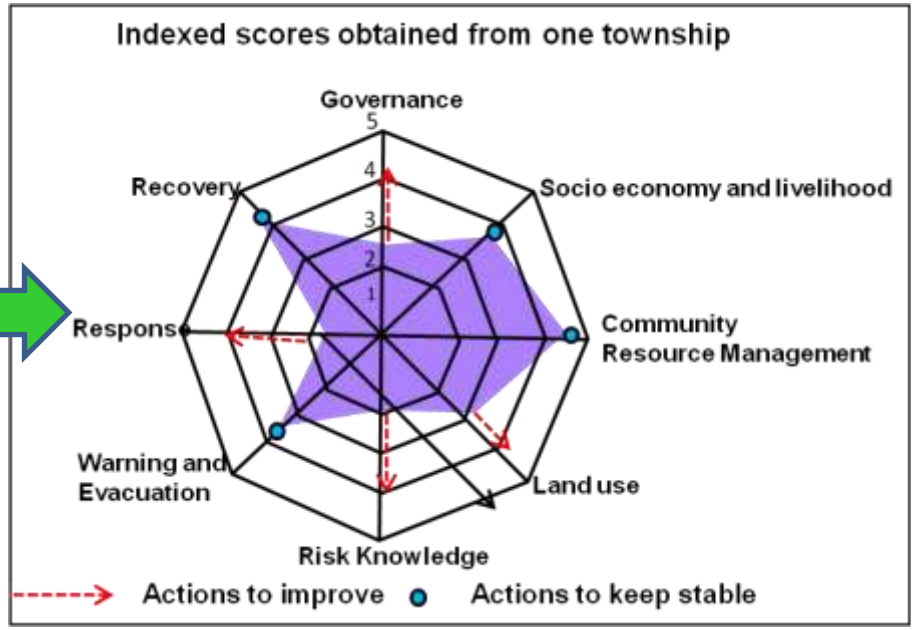
According to Rapid Assessment Benchmarks Scoring, the weakest ones in CCR during Nargis are **(1) Risk Knowledge and Public Education, (2) Disaster Recovery and (3) Socio-Economy Livelihood and (4) Emergency Response.** Other components like Emergency Response and Evacuation, Land use and Structural Design are also needed for improvement.



Actions to keep stability and Actions to improve in CCR

CCR Benchmarks Scoring in Nargis Area





Irregular Shape in Performance Assessment for Nargis

Actions to keep stability and actions to improve

Ref: ADPC and DMH Joint Rapid Assessment.

NON-CLIMATIC CAUSES

Some underlying causes for livelihoods in threat

1. Extent of Environmental Degradation
2. Deforestation and over-exploitation of forest resources
3. Over harvesting of Fisheries
4. Salinisation and salt farms
5. Erosion of river embankments

Environmental Governance

1. Pursuing development priorities over environmental sustainability
2. Poor implementation and enforcement of laws and policies
3. Inadequate coordination
4. Lack of technical capacity
5. Weak land-use planning
6. Inadequate information on natural resources
7. Serious under-investment

UNEP, ADB REPORTS, FIELD SURVEYS (MCCW)

UNDERLYING CAUSES

High vulnerability drivers

Pressure Drivers

- Firewood Collection
- Shrimp Farming
- Agricultural Expansion
- Palm Oil Production
- Logging for Timber
- Road Building

Cutting-off Mangroves

Change of mangrove forests in Ayeyarwady delta

1975

2001

1990

2008

Forest Department, Ministry Of Forestry

Shrimp Farming

Firewood Collection

Logging for Timber

Charcoal Production

Agricultural Expansion

Palm Oil Production

Mining

Road Building

Fire

Cattle Ranching

People's livelihoods rely mainly on the natural environment

Livelihoods in Delta

Mounting Pressure imposed by Population Growth

The population growth is mounting pressure on safe drinking-water, food security and livelihoods. According to the EPA report of NCEA, the trend and magnitude of this indicator is high and increasing. There will be 62 million population in total by the year 2015 and improving access to safe drinking water supply and food security will be required for another 20 million peoples as of safe water supply and food security.

Mounting Pressure imposed by Population Growth

Paddy yields and fish catching are declining due to climate changes in the Delta Region.

Moreover, the impact of Nragis has caused huge loss in work forces, field equipments, and problems in farming.

There will be a need of improving water supply and food production yearly for 4 million peoples and it is far above than what was annually used to accomplish in the past for improving access of 2.5 million peoples to safe water supply.

CONCLUSION

Disaster Management
is a social science issue.
It needs to develop in
all benchmark components
proportionately.
A multi-displeneary,
multi-agency,
multi-sectoral approaches
are a must.


THANK YOU