CLIMATE SERVICES IN MALAYSIA

Regional Seminar on Climate Services
in Regional Association V (South-West Pacific)
Honiara, Solomon Island,
1-4 November 2011

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Malaysian Meteorological Department
Ministry of Science, Technology and Innovation

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  - Services Provided by MMD
  - Weather and Climate Early Warning
  - Intensive Weather and Climate Monitoring
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  - Climate Change and Variability
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  - Reports and Breifing Session Benefited To People
  - National Climate Forum
  - National Framework For Climate Services
  - Long-term Capacity Building Requirement
  - Inisiative In Dealing With Long-term Climate Change

INTRODUCTION

Services Provided By MMD

Weather Forecast & Warning

Marine Meteorology & Oceanography

Climate

Agro-meteorology

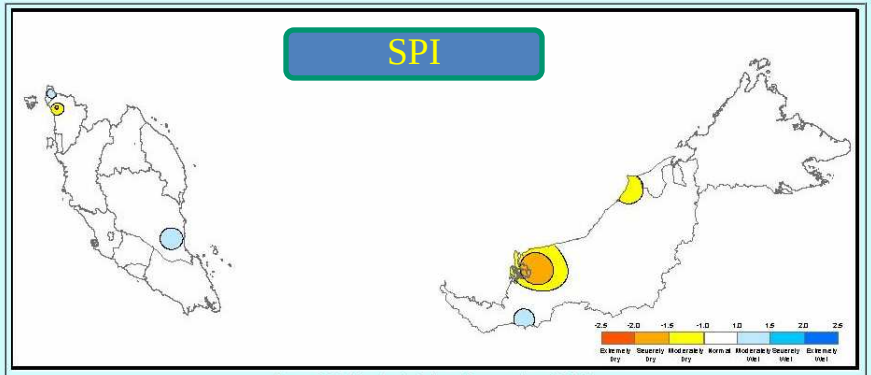
Seismology & Tsunami Warning

Cloud Seeding

Environmental Meteorology

Drought Monitoring

SPI



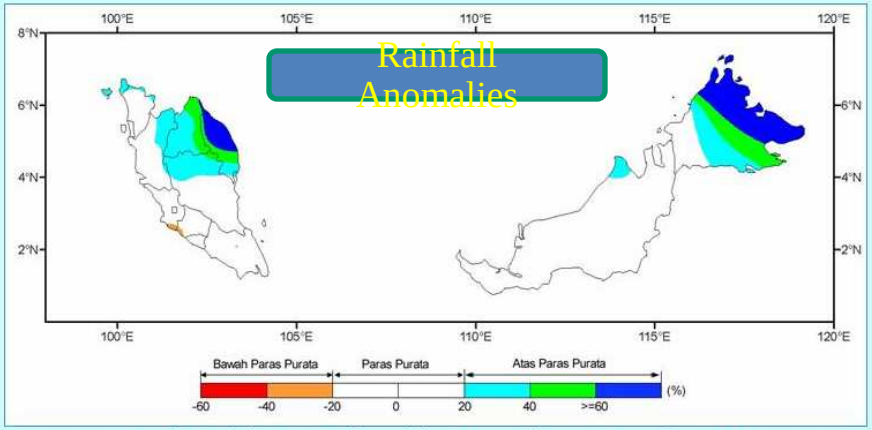
Peta SPI Untuk 1-Bulan (September 2011)

Jadual dan peta-peta SPI bagi 2 hingga 6 bulan boleh dilihat dengan klik link di bawah:

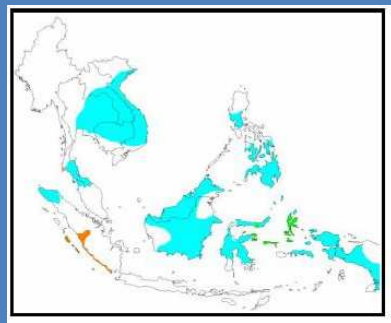
Jadual Indek SPI (mengikut bandar)

Peta SPI
i. 2 Bulan ii. 3 Bulan
iii. 4 Bulan iv. 5 Bulan v. 6 bulan

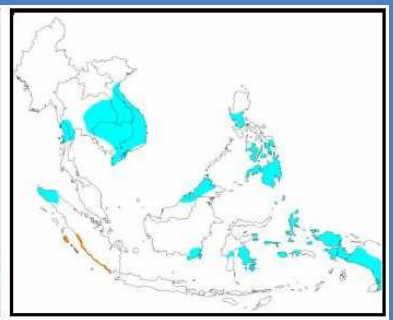
Rainfall Anomalies



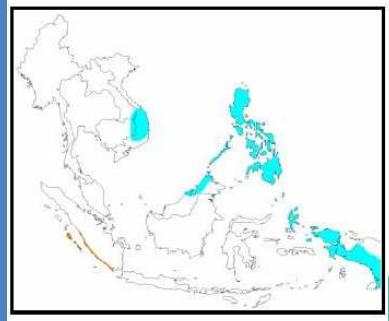
Anomali Jumlah Hujan Terkumpul dari Januari hingga September 2011



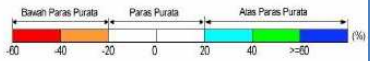
Rajah a: Jangkaan Peratusan Anomali Hujan Bagi September 2011



Rajah b: Jangkaan Peratusan Anomali Hujan Bagi Oktober 2011



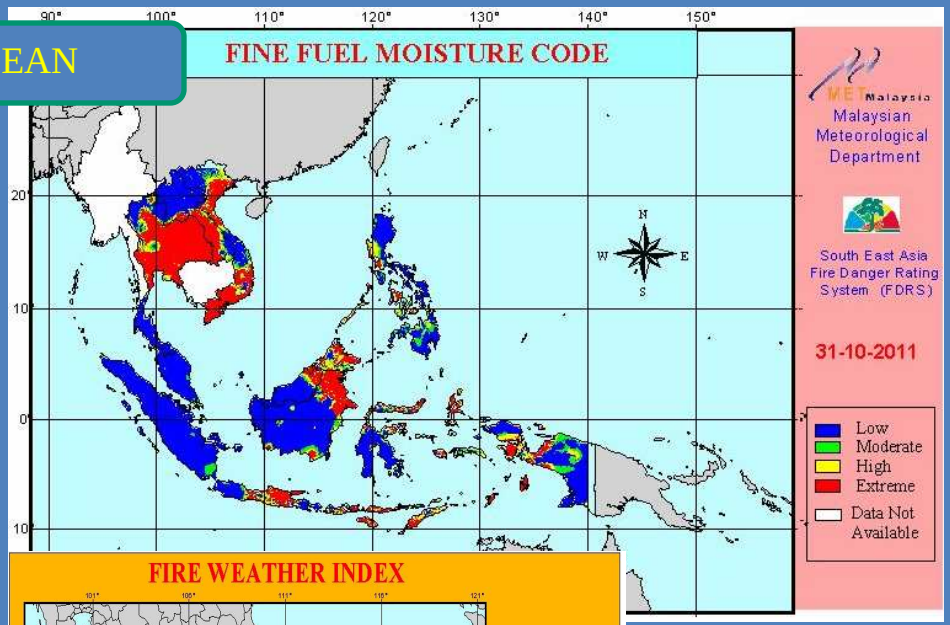
Rajah c: Jangkaan Peratusan Anomali Hujan Bagi November 2011

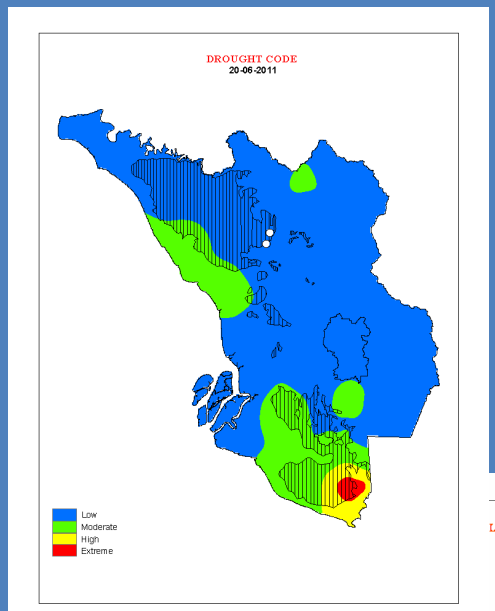


Expected Rainfall Anomalies

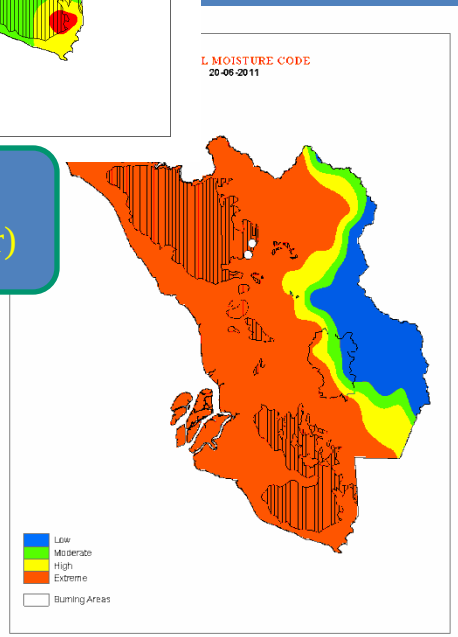
Fire Danger rating System (FDRS)

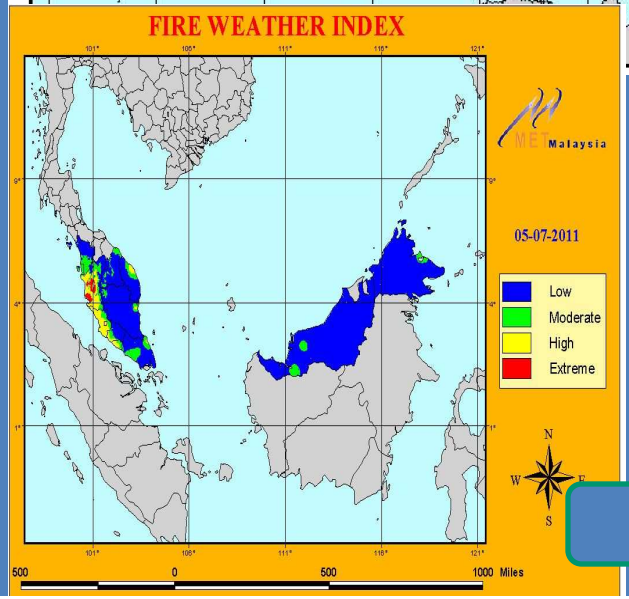
ASEAN





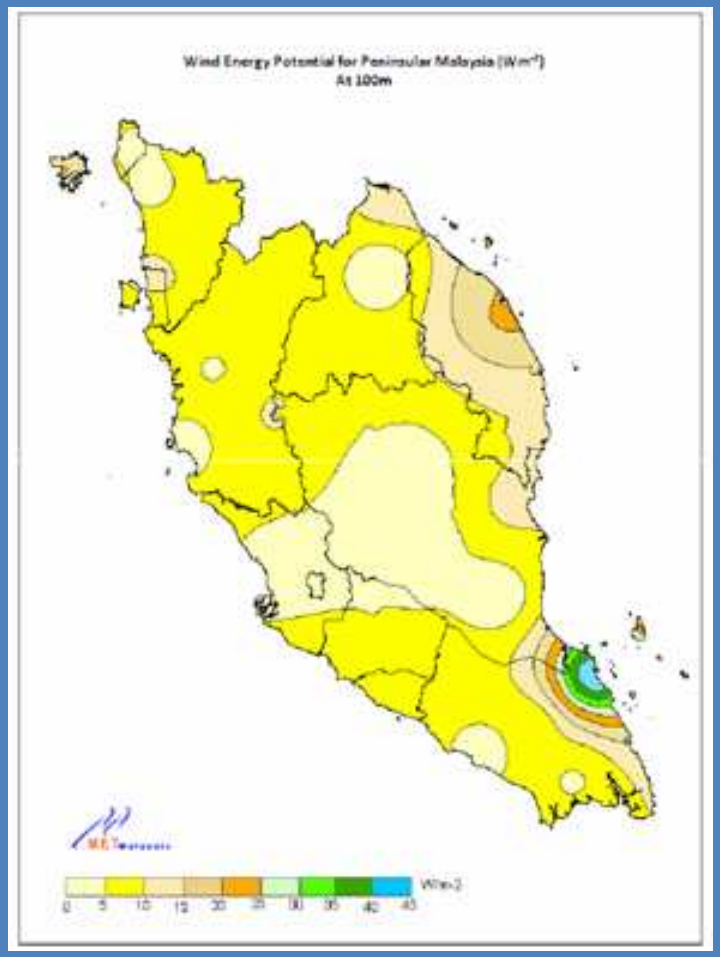
Specific Peat Areas (Selangor)



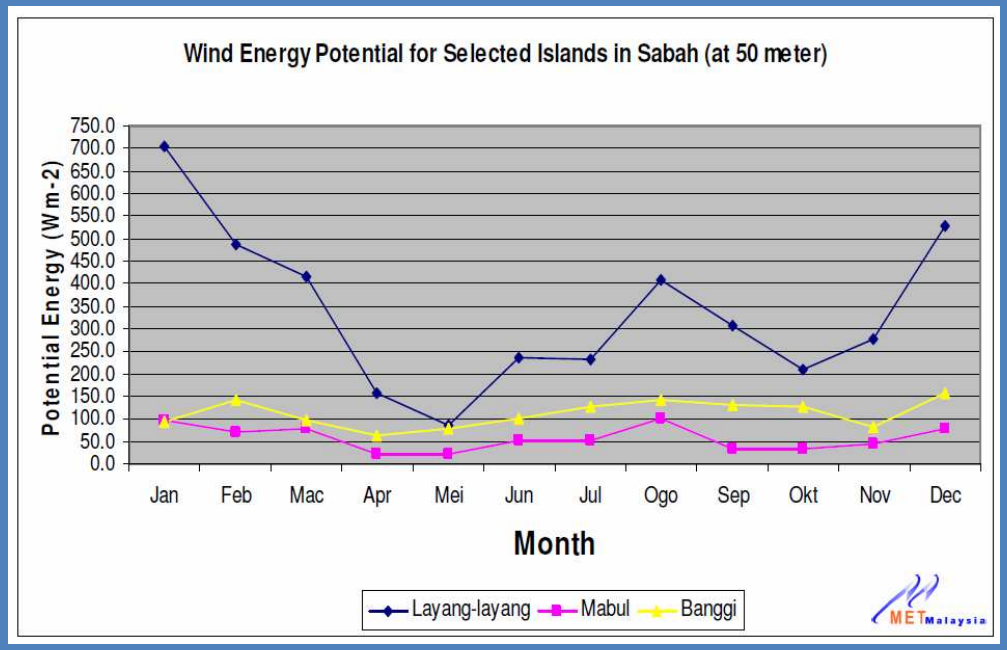


Malaysia

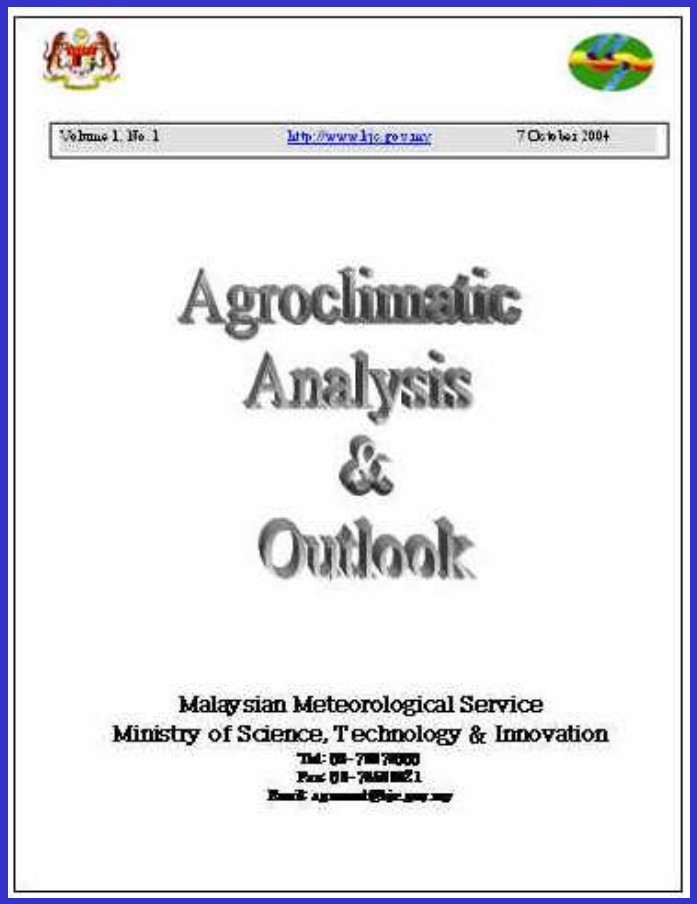
Renewable Energy



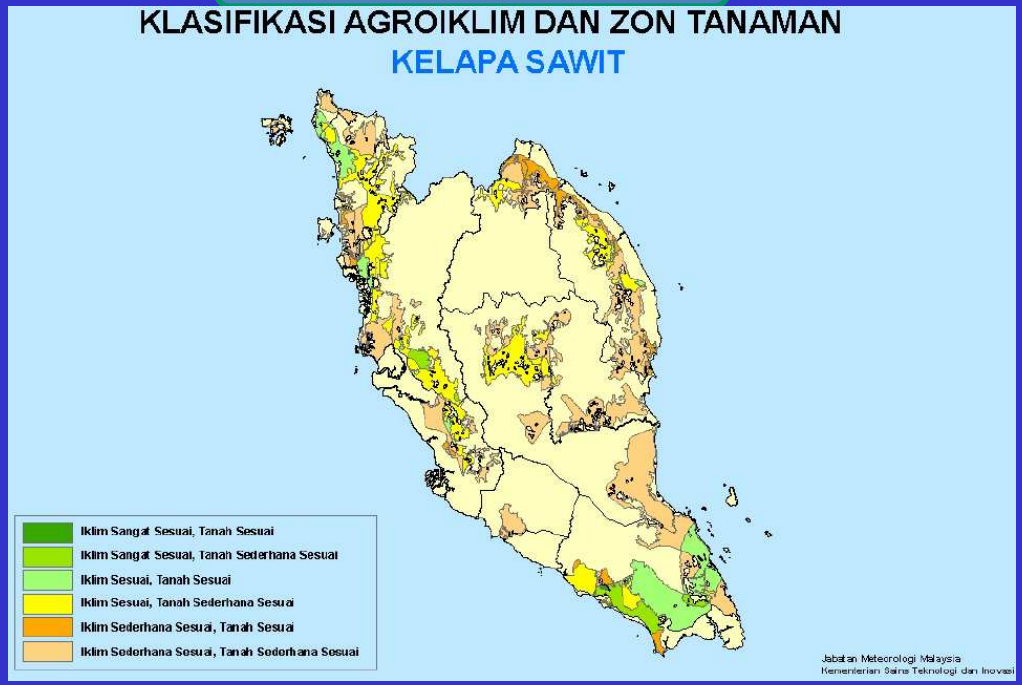
Wind Potential



Agrometeorology Products



Agroclimatic Zoning Map



Weather and Climate Early Warning

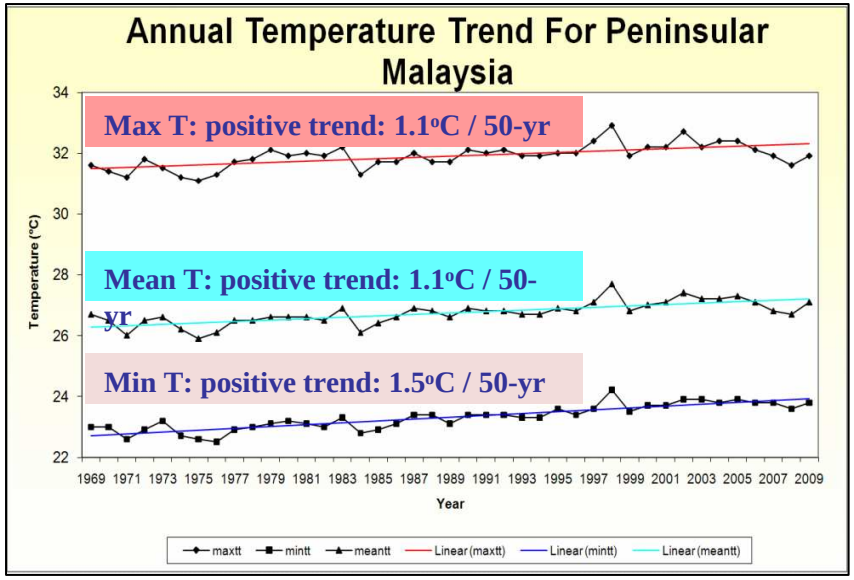
- **Heavy Rainfall Which Can caused Flood**
- **Strong Wind and Rough Sea**
- **Thunderstorms / Tornado (?)**
- **Tropical Storm/ Typhoon**
- **Forest Fire / Haze**
- **Drought**

Intensive Weather & Climate Monitoring

CURRENT STATUS

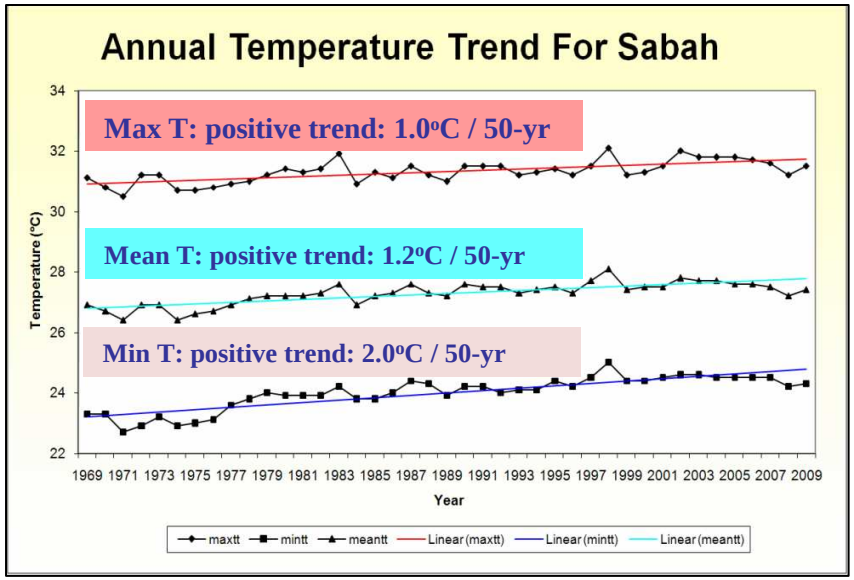
- Climate Change & Variability

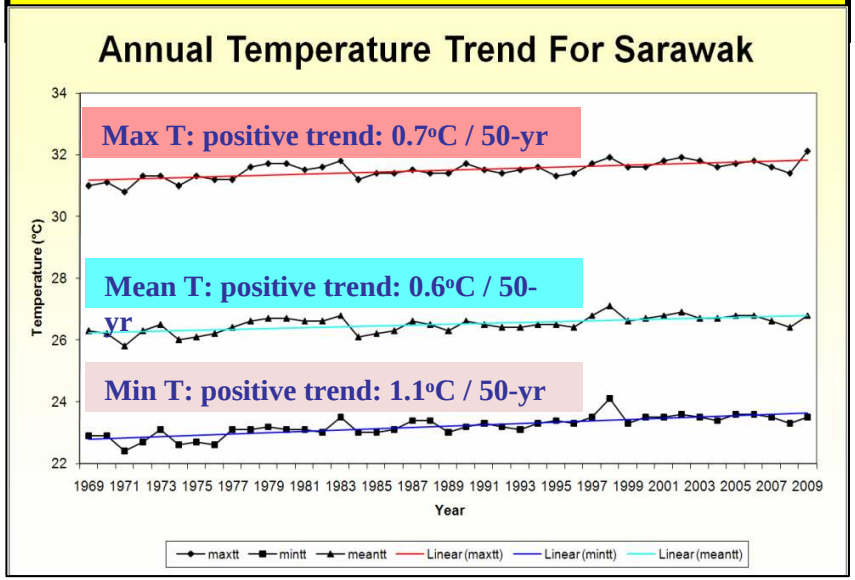
Climate Change Monitoring: Temperature Trend



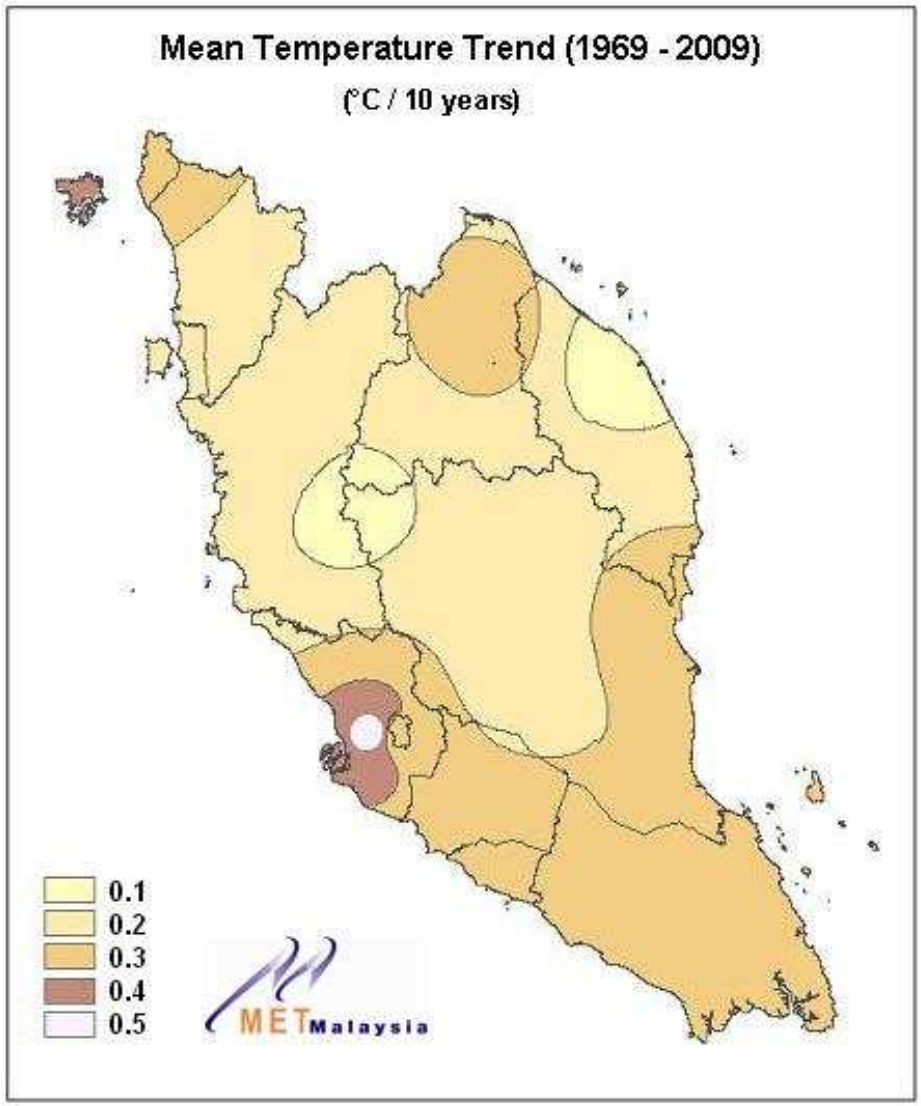
- 31 out of 36 Meteorological Stations recorded highest maximum temperature during 1990s and after
- Maximum temp. increased*: 0.7 – 1.1°C
- Mean temp. increased*: 0.6 – 1.2°C
- Minimum temp. increased*: 1.1 – 2.0°C

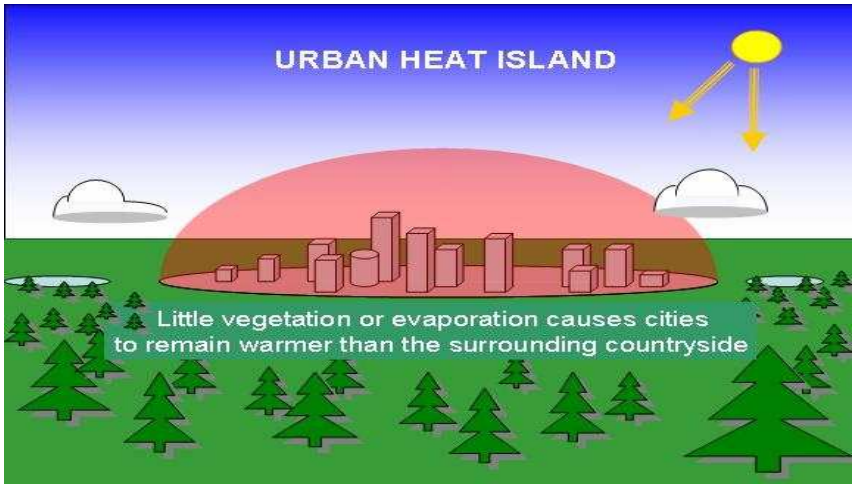
*per half century





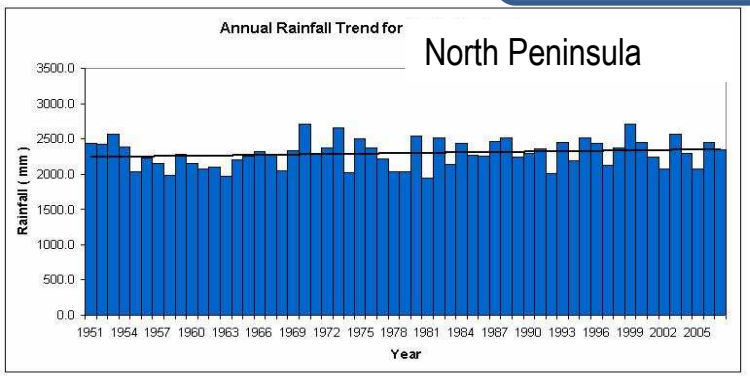
Spatial Distribution of Mean Temperature Trend

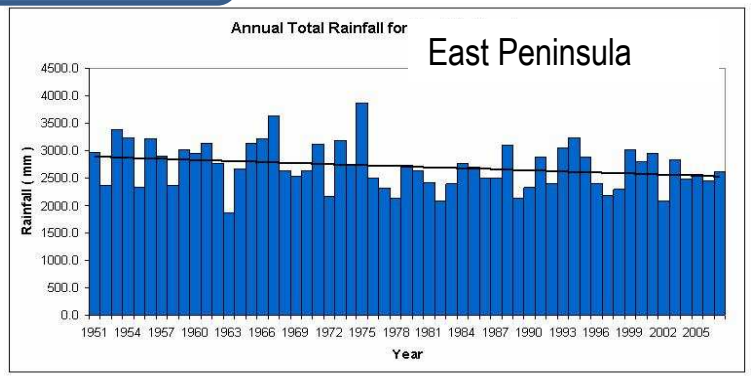


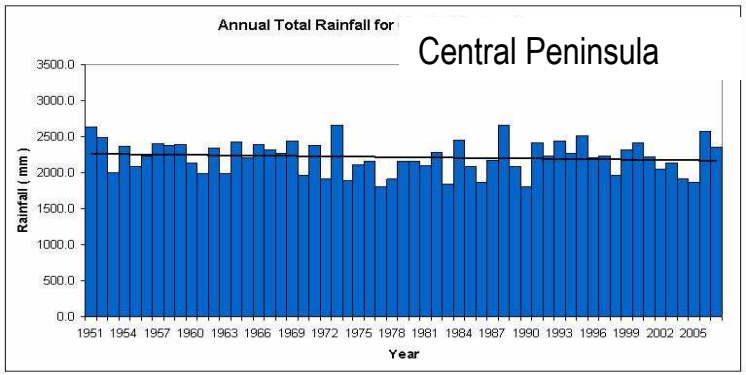


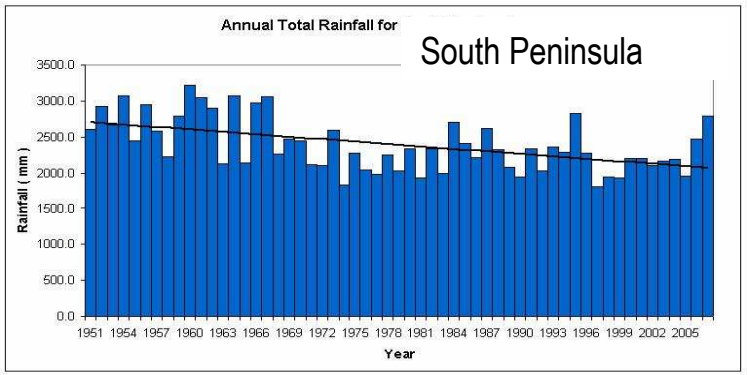
In urban areas with tall buildings (concrete & little vegetation), an atmospheric condition in which heat and pollutants create a haze dome that prevents warm air from rising and being cooled at a normal rate, especially in the absence of strong winds.

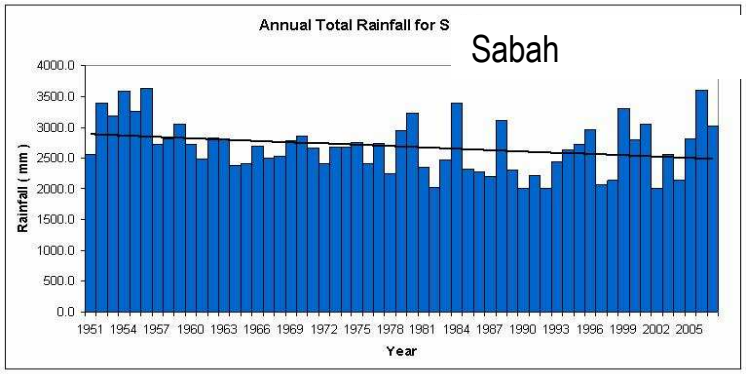
Rainfall Trend

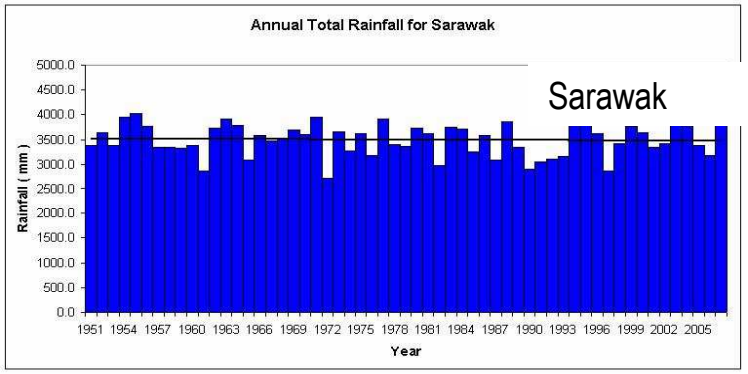






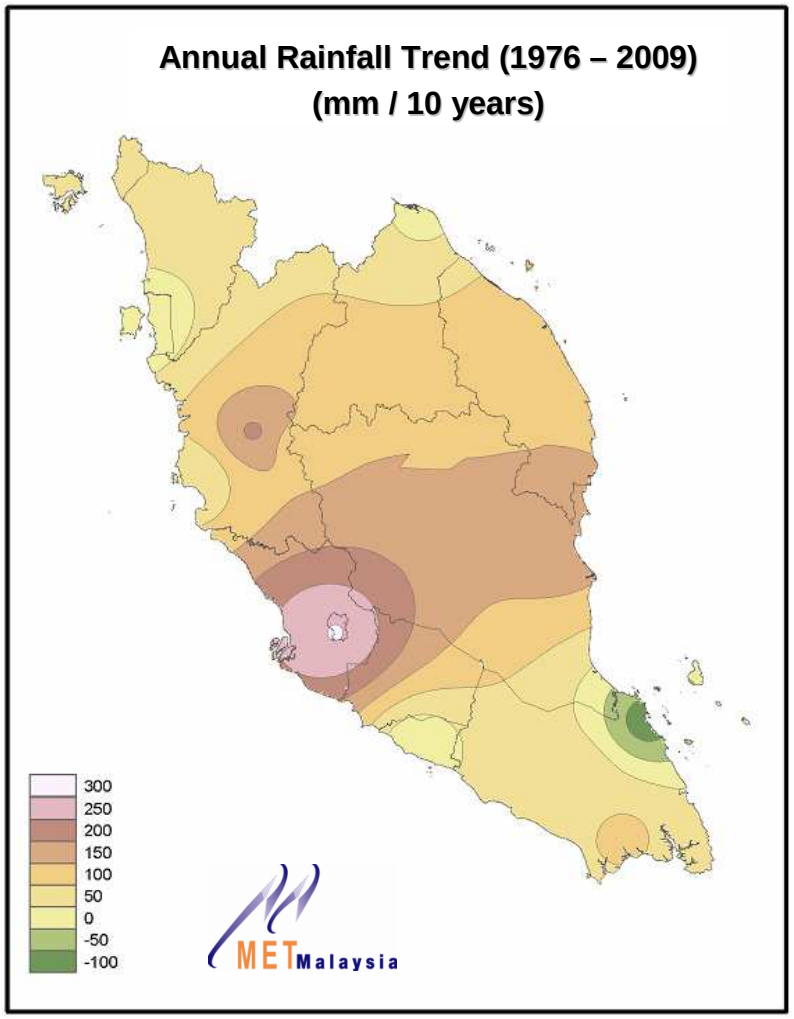






No overall clear trend of rainfall for the country
High variability of rainfall probably due to tropical climate

Spatial Distribution of Annual Rainfall Trend



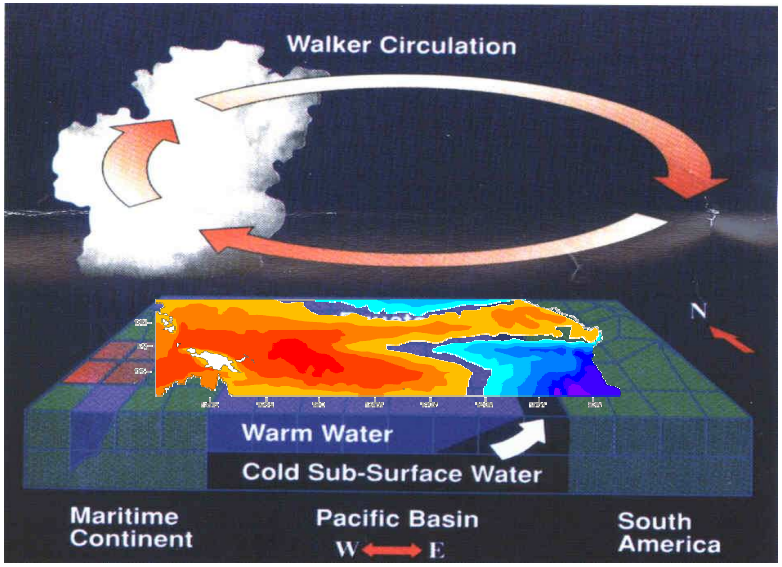
- Both positive (increase) & negative (decrease) trend of rainfall for the country
- Heat Island Effect could also change our climate
- Natural climate variability & global warming (together) has changed local/ regional to global

Natural Climate Variability:

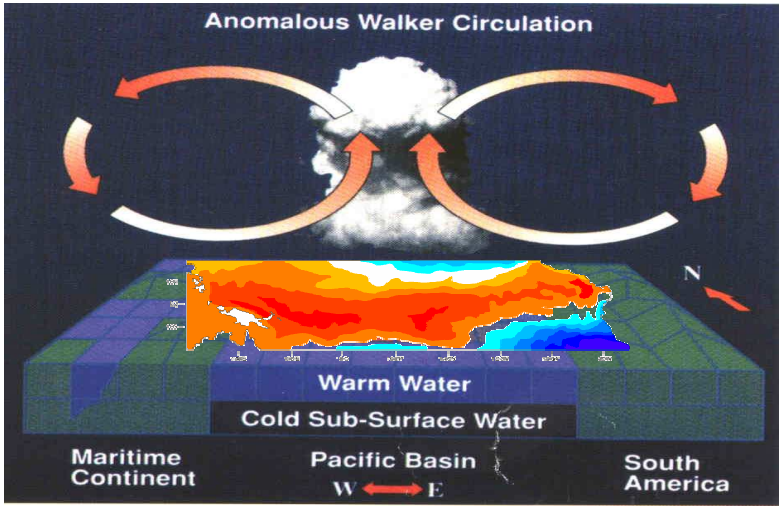
Internal Oscillations

e.g. El Niño / La Niña

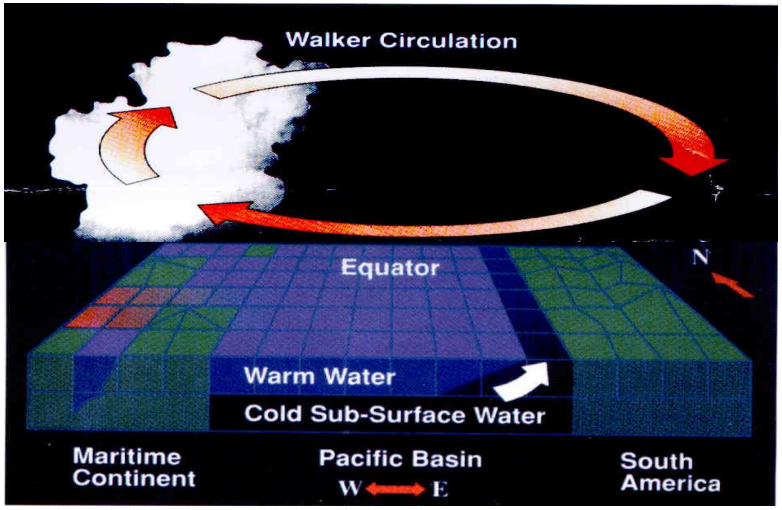
Normal



El Niño



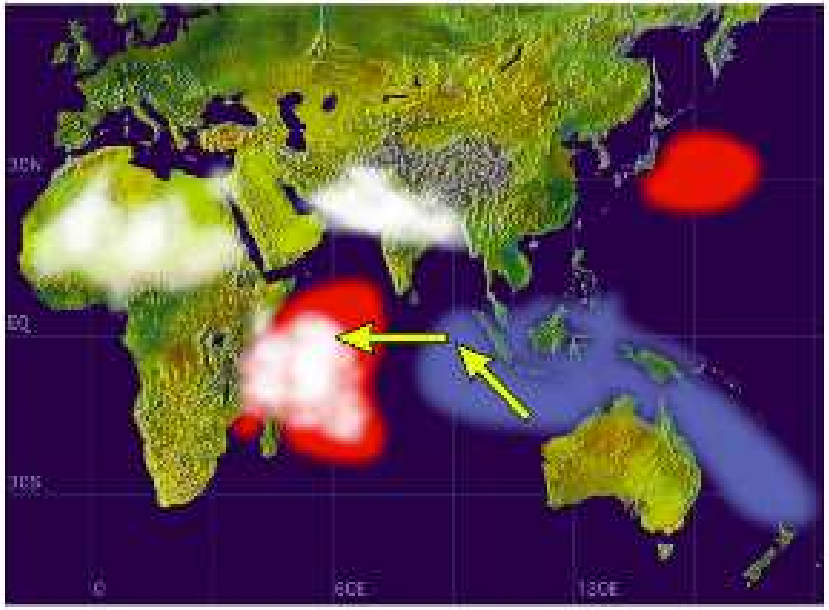
La Niña



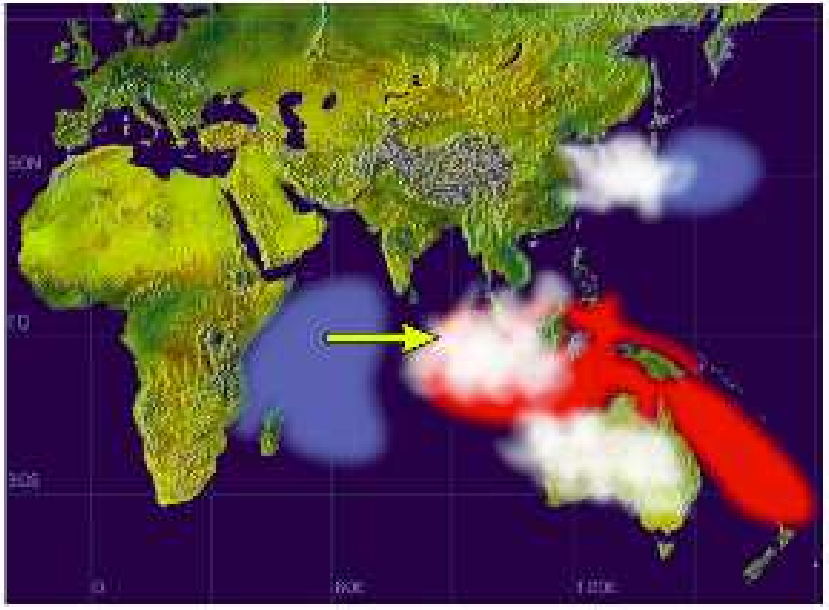
Natural Climate Variability:

Internal Oscillations, e.g. Indian Ocean Dipole (IOD)

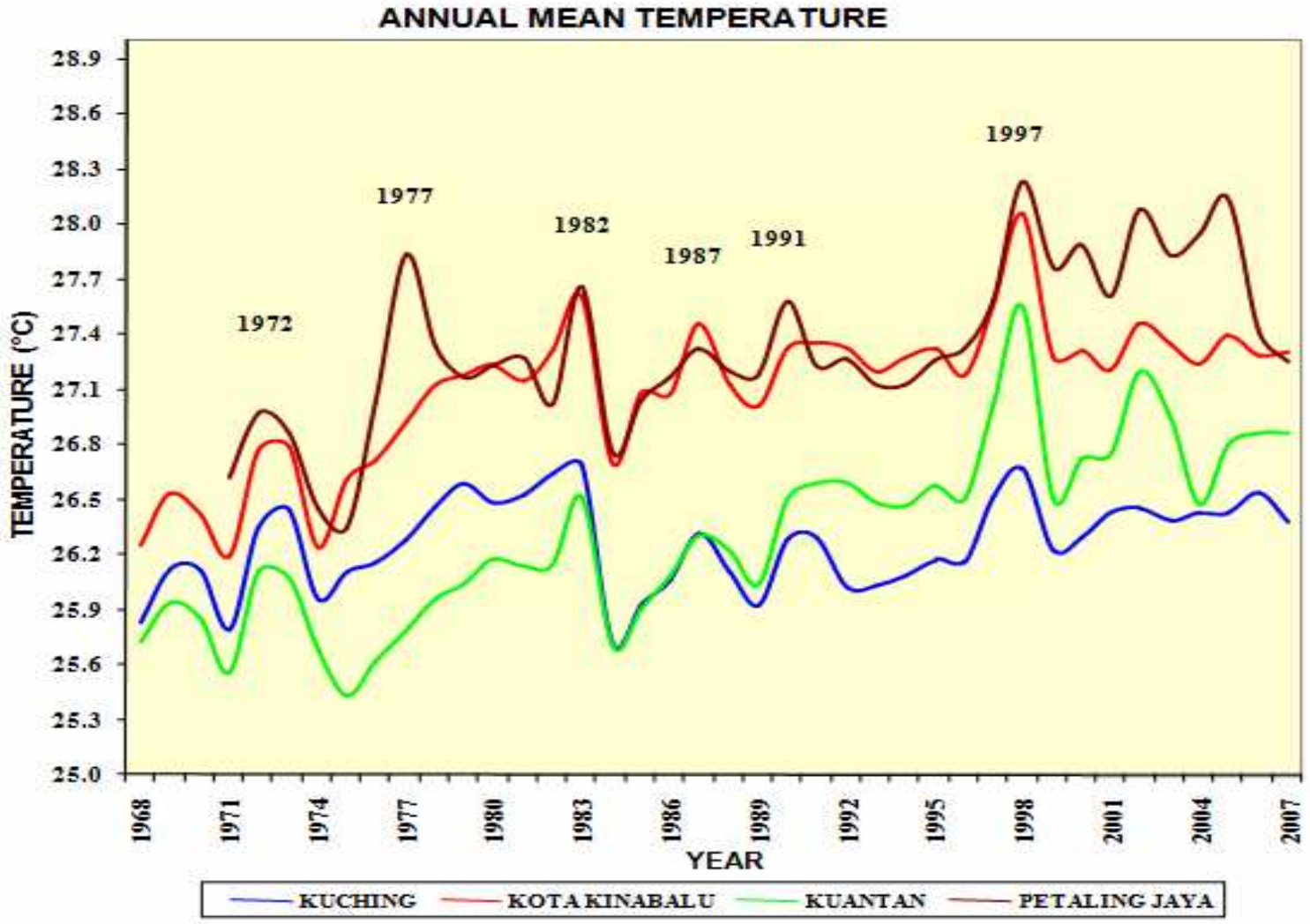
Positive Dipole Mode



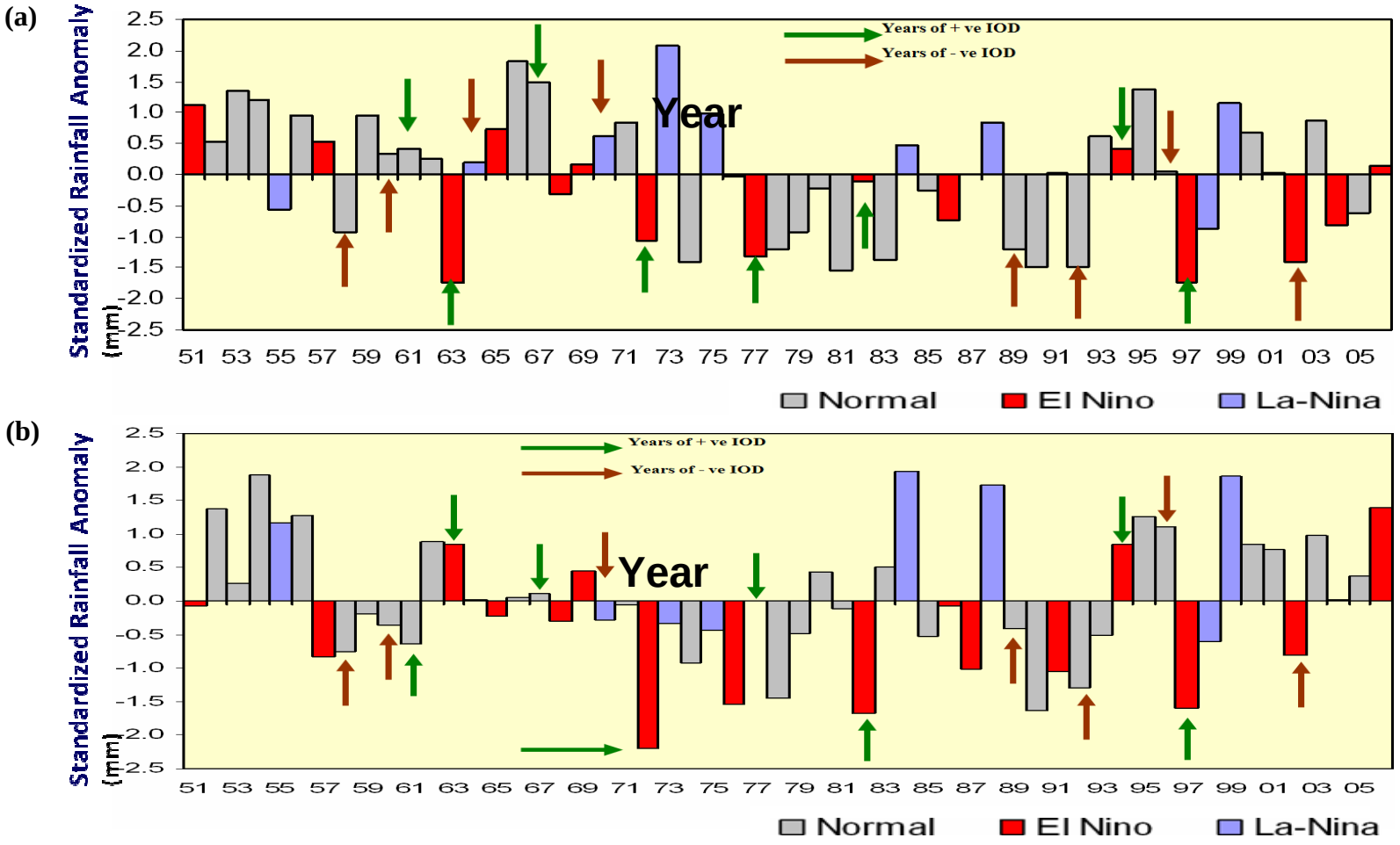
Negative Dipole Mode

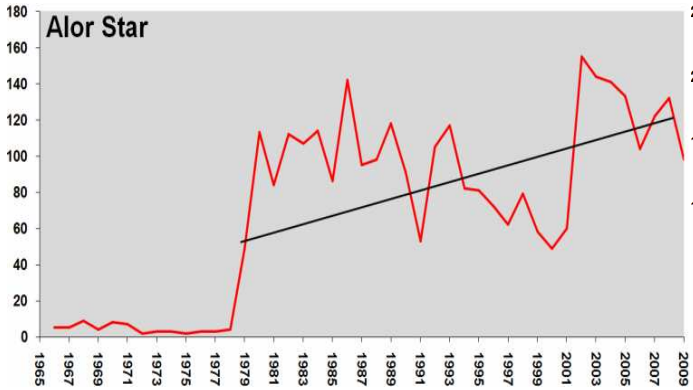


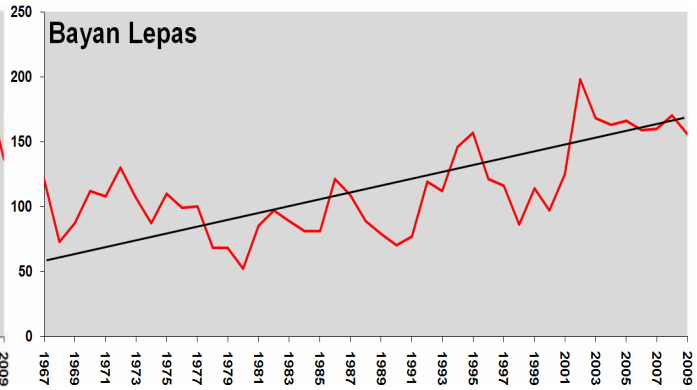
Effect Of El Niño On The Annual Mean Temperature Trend For 4 Meteorological Stations

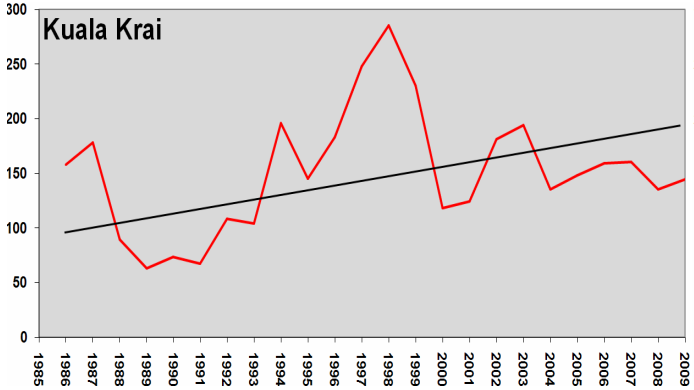


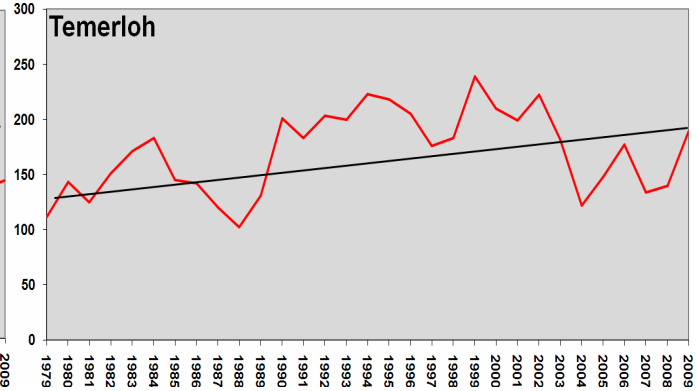
Long Term Standardized Rainfall Anomaly for Peninsula (Top) and Sabah & Sarawak (Bottom)

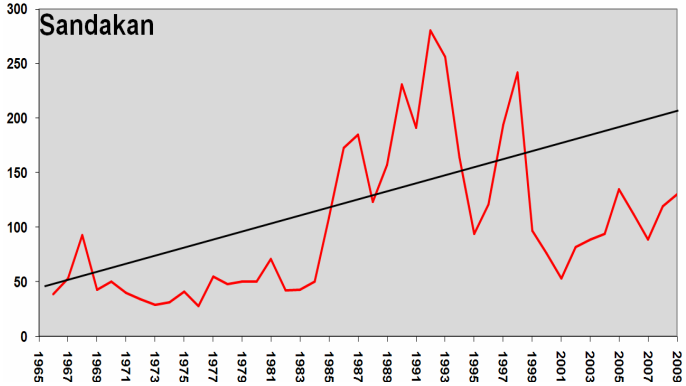


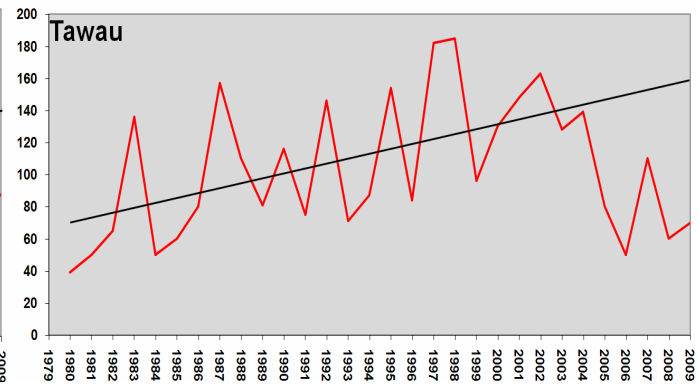






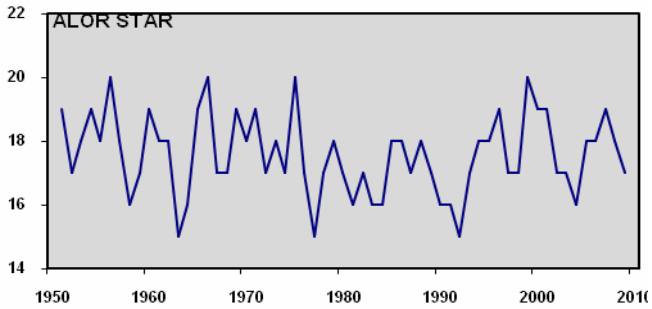


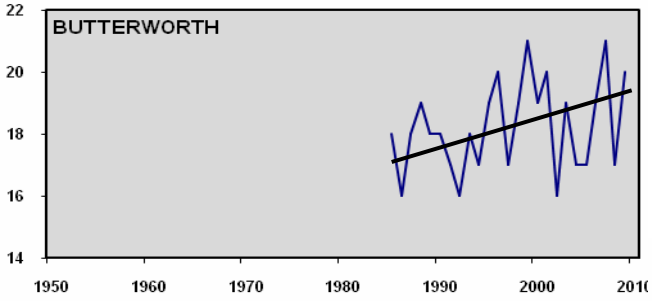


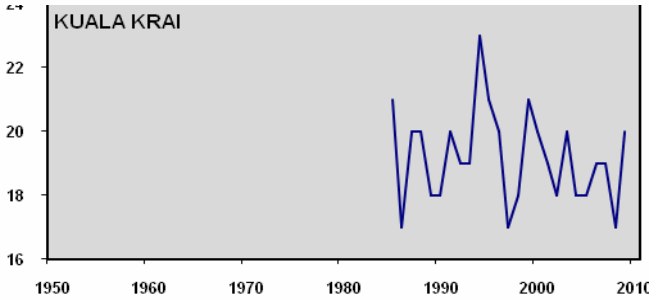


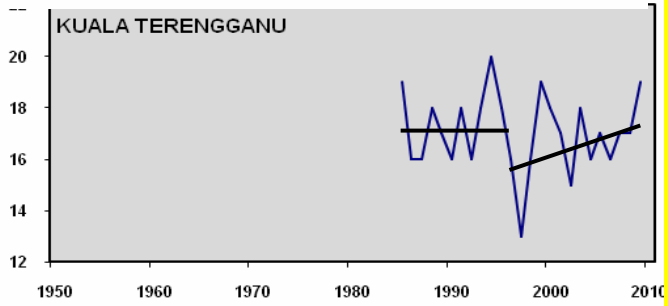
Extreme Wind Events

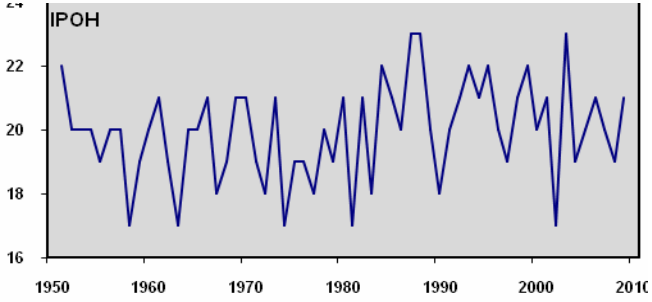
Increasing number of days of extreme wind events (exceeding 90th percentile of the most frequent wind speed in a year) in some parts of Malaysia

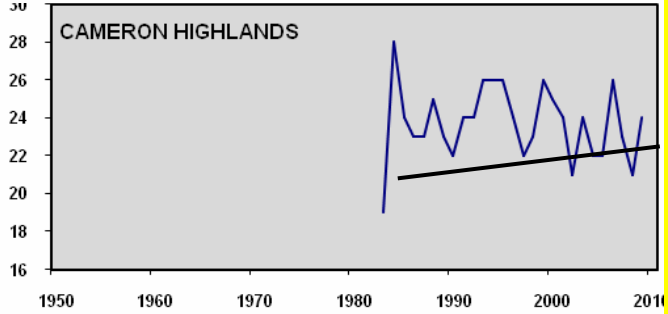


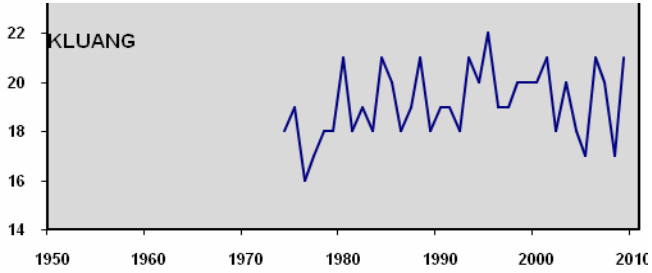








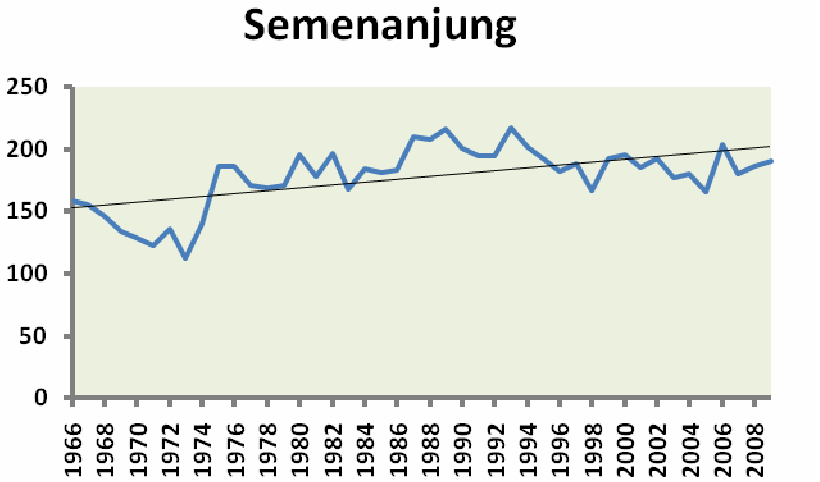


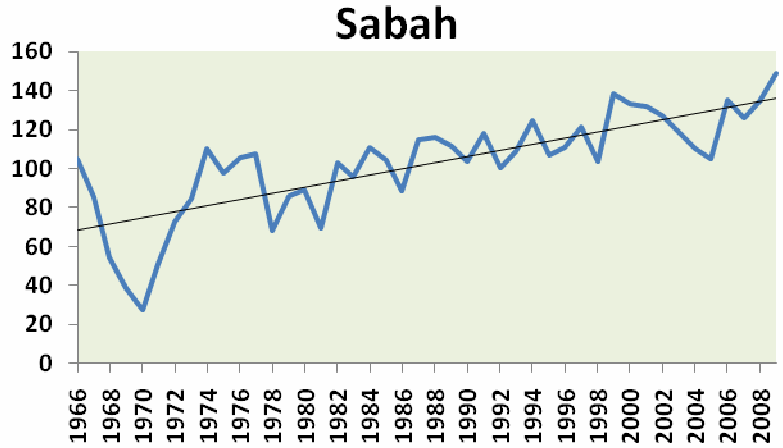


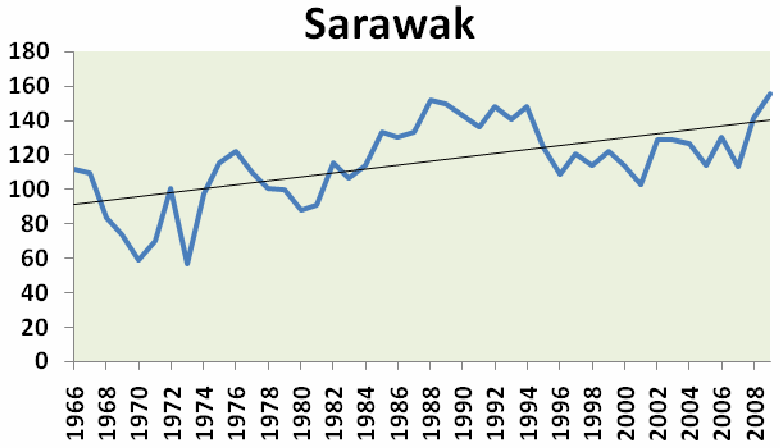
Extreme Rainfall Events

Since ~1980s: Increasing number of days of extreme rainfall event (exceeding 90th percentile of total rainfall) for several stations over the Peninsular Malaysia

Average Number of Thunderstorm Days (Annual) Have Increased







Among the Extreme Weather Events in Pen. Malaysia: 2005 - 2009

e.g.
The abnormal severe floods over Peninsular Malaysia during winter monsoon of 2006/2007 and 2007/2008

Among the Extreme Weather Events in Pen. Malaysia: 2010 - 2011

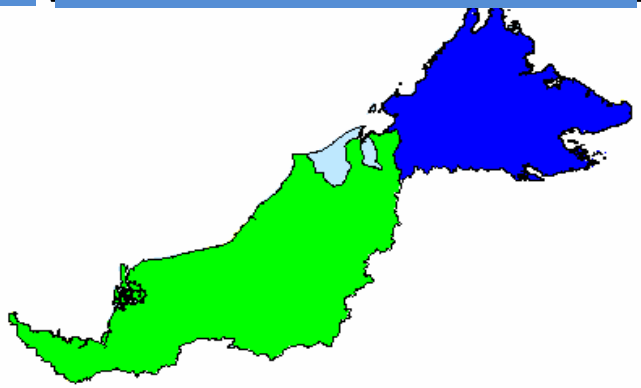
Among the Extreme Weather Events in Sabah & Sarawak: 2009

Flood: Beaufort – 13 Mar 09

Flash Flood: Tenom – 13 Mar 09

Flood: Kota Marudu – 13 Jan 09

Landslides: Miri – 30 Jan 09



Strong Waves: Kuching – 11 – 14 Jan

Flood: Kuching – 11 Jan 09

Flash Flood: Lahad Datu – 4 Feb 09

Among the Extreme Weather Events in Sabah & Sarawak: 2010 - 2011

Recent Severe Thunderstorm Event on 17 February 2011 in Petaling Jaya & Subang Jaya

Jalan Universiti, Petaling Jaya

Sek. Keb. Methodist, Sec 5, PJ

Jalan Kewajipan, Subang Jaya

Among the Water Spout Events: 2006 - 2010

Kudat, 2006

Tanjung Bungah, Penang, July 2007

Miri, April 2010

Malacca, November 2010

Pulau Tioman, June 2009

Pulau Pinang, 2010

Jejawi, Perlis, October 2010

Bkt. Kriang, Kedah, Mac 2011

Weather and Climate Forecast & Early Warning

Global climate and weather patterns have changed due to
- Natural climate variability
- Global warming

... Malaysia is not spared

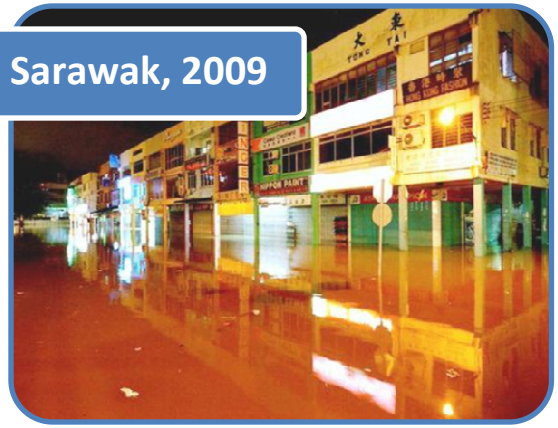
K.Lumpur, 2004

Kedah, 2005

Kudat , 2006

Johor, 2006/2007

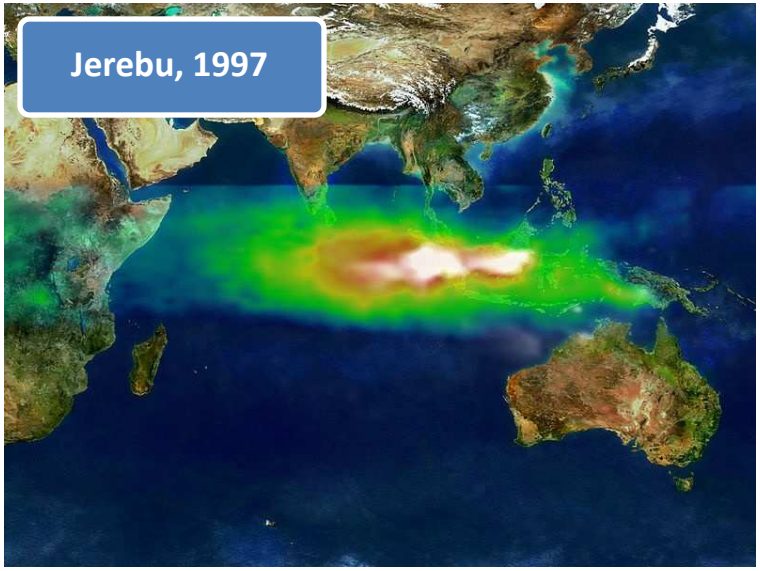
Sarawak, 2009



Kedah, 2010

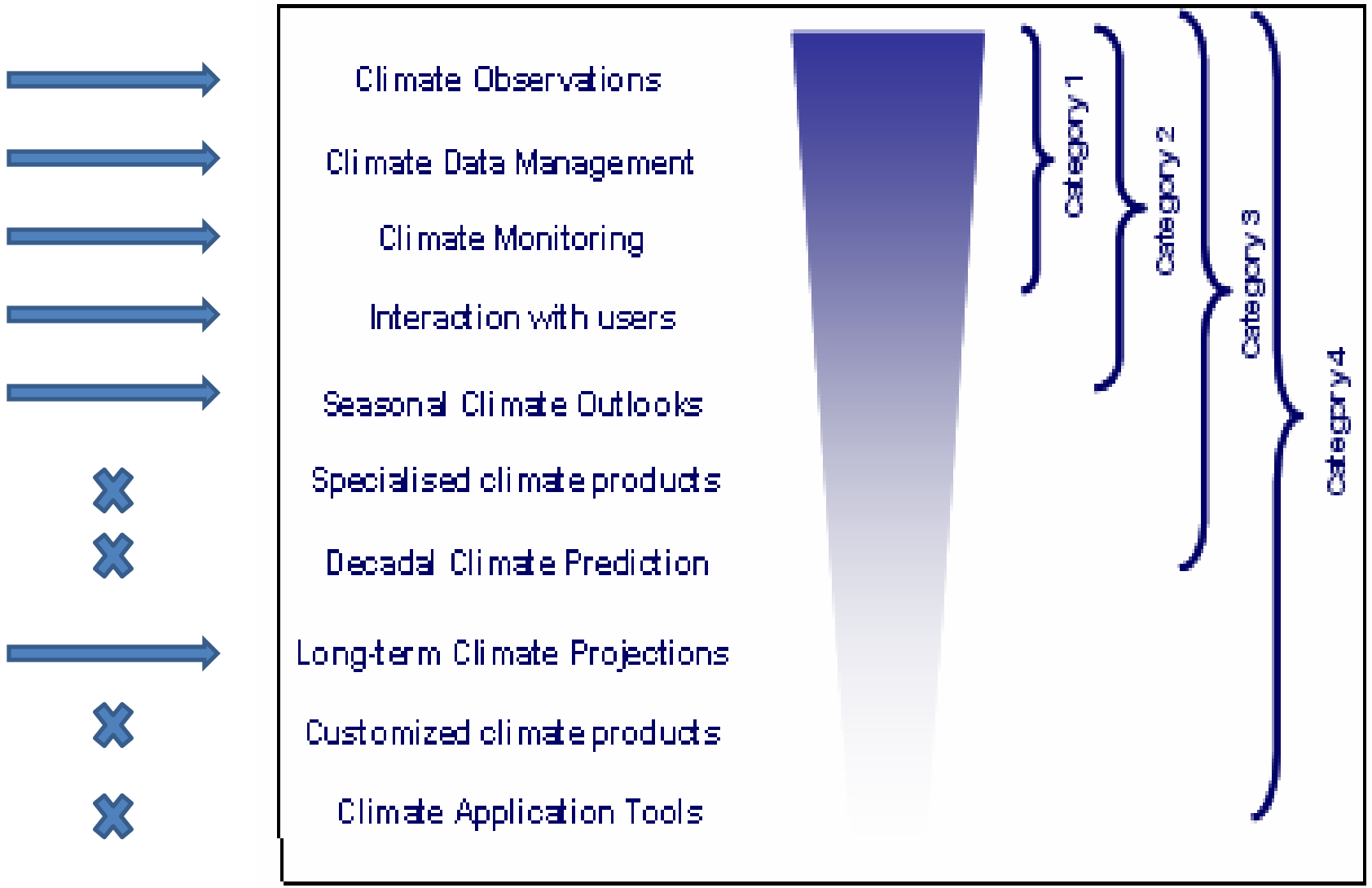
Johor, Jan 2011

IMPACT OF EXTREME WEATHER DURING SOUTHWEST MONSOON



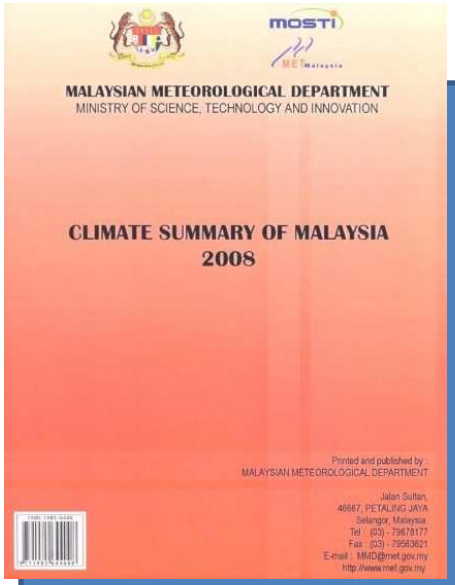
CURRENT CAPABILITIES

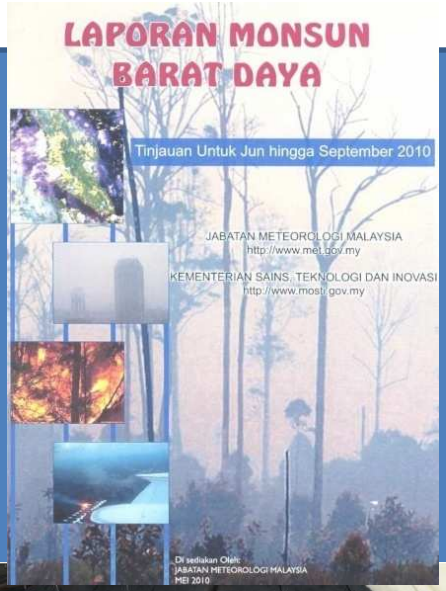
Current MMD's Capabilities in Providing Services

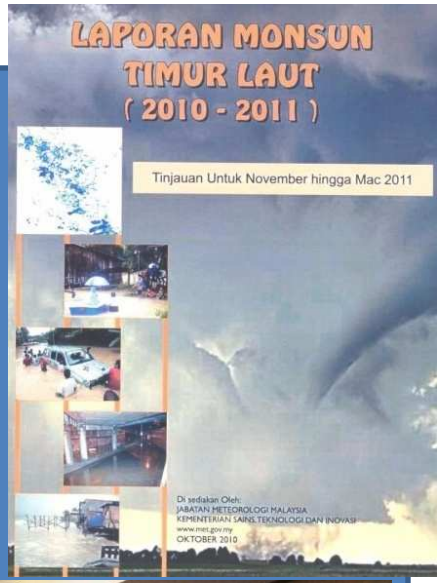


STRATEGY

In Place: Reports, Briefing Session & Public Awareness Beneficial to People





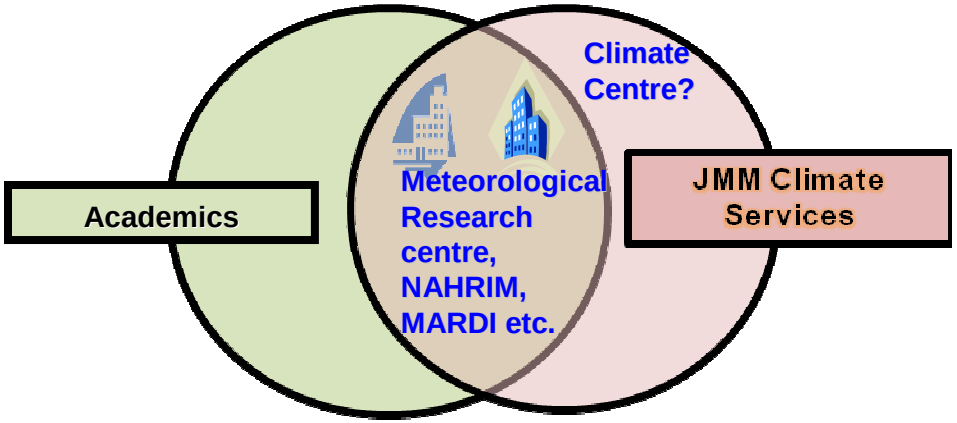


New
National Climate Forum

- 2 times a year(April & October) – started 2011.
- Inform current climate conditions and outlook
- Discuss precautionary measures
- Participants
  - Federal ministries and departments
  - State governments
  - Disaster management agencies
  - Water resource management agencies
  - Agricultural sector agencies
  - Health sector agencies
  - Research and higher learning institutes
  - Local authorities
  - NGOs

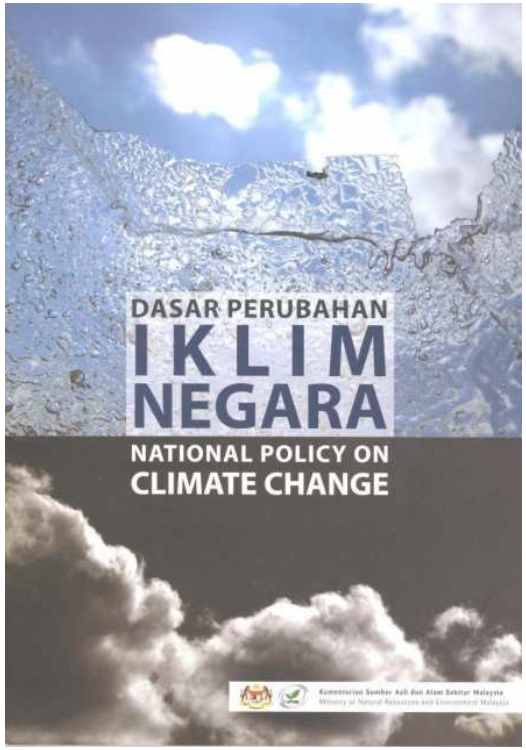
Requirement for Long-term Capacity Building

- **Capacity Building**
  - MMD, JPS, NAHRIM etc.
  - Users
- **Climate & Hidrology Database**
  - National Committee on Global Climate Observing System (GCOS)
- **Details information**
  - Dam
  - Agriculture
  - Risk / Hazard Maps

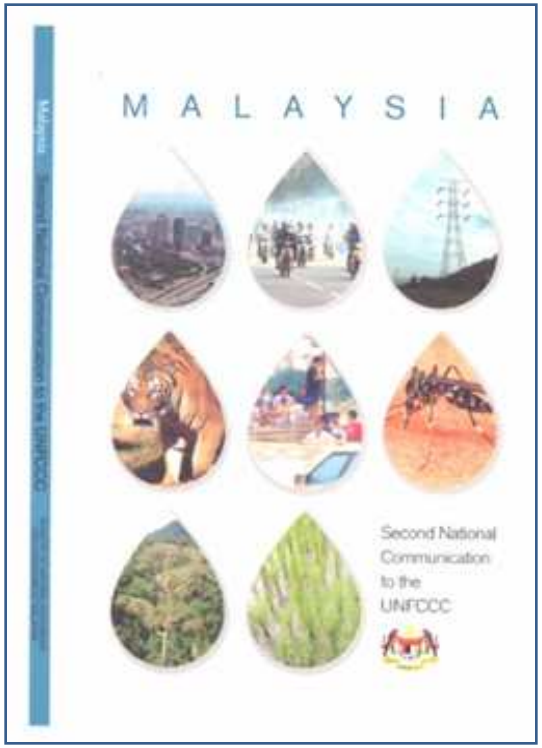


Need to Establish National Climate Centre(?)

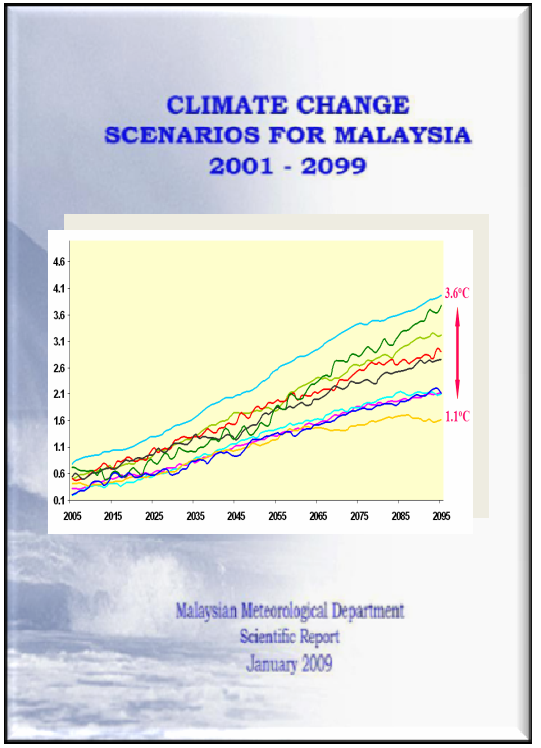
Initiative in Dealing With Long-term Climate Change



National Climate Change Policy (2010)

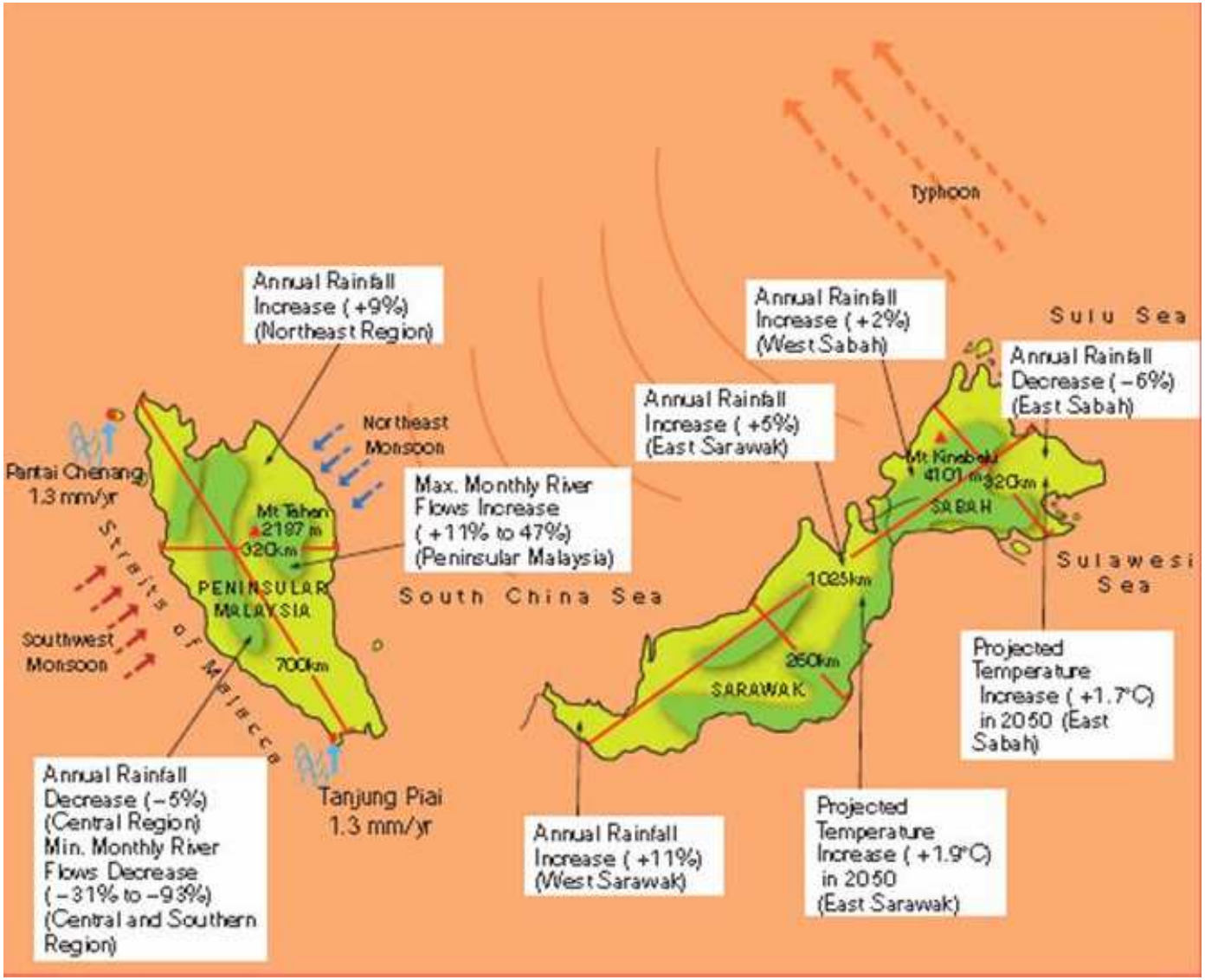


Second National Communication (NC2) to the UNFCCC (2010)



Climate Change Scenario Modelling Products

Climate Change Projection 2050



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