



RECENT SIGNS OF WATER RELATED DISASTERS IN MALAYSIA

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OUTLINE

- Introduction
- Flood History in Malaysia
- Causes of Floods
- Recent Floods in Malaysia
- Climate Change and Future Floods
- Conclusion



INTRODUCTION

Malaysia is located in Humid Tropics with annual rainfall of 3,000mm. Malaysia had experienced various flood events.

Recent flood events:

- Kota Tinggi, southern part of Peninsular Malaysia
December 2006/ Jan 2007;

Causes of flooding in Malaysia:

- Natural Phenomenon
- Human Activities

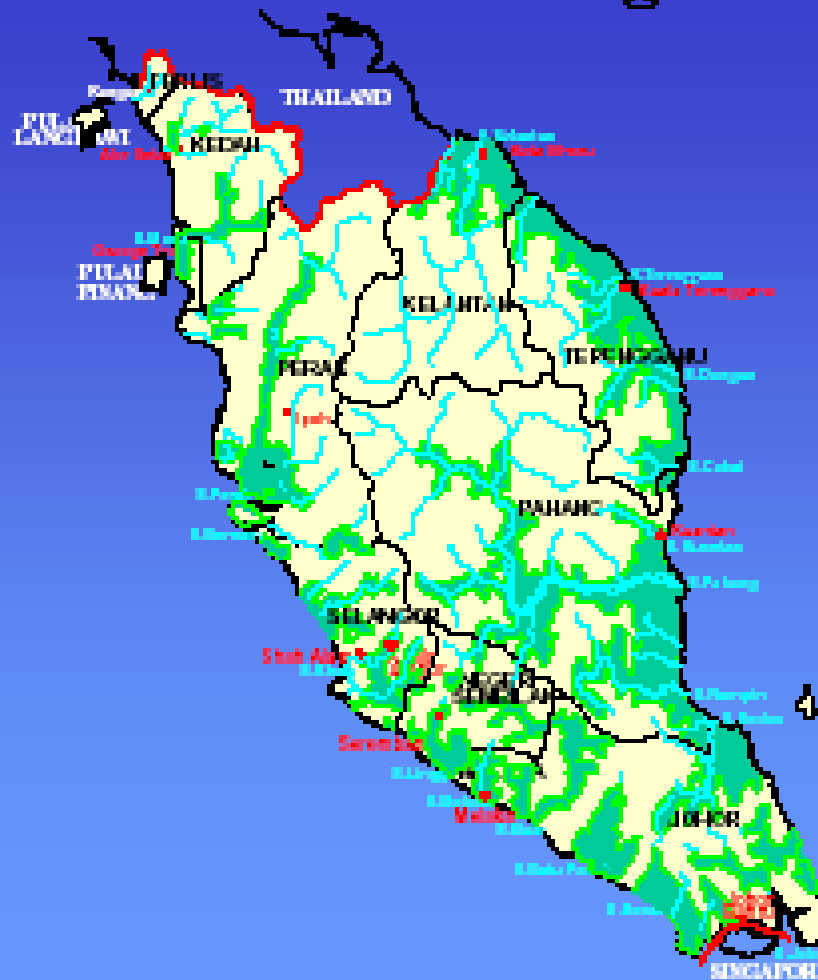
In Malaysia, flood area would be around 26,720 sq km which is about 9% of total land area of Malaysia affecting 4.9 million.

Average annual flood damage is estimated at RM 1 billion (USD 263 million).



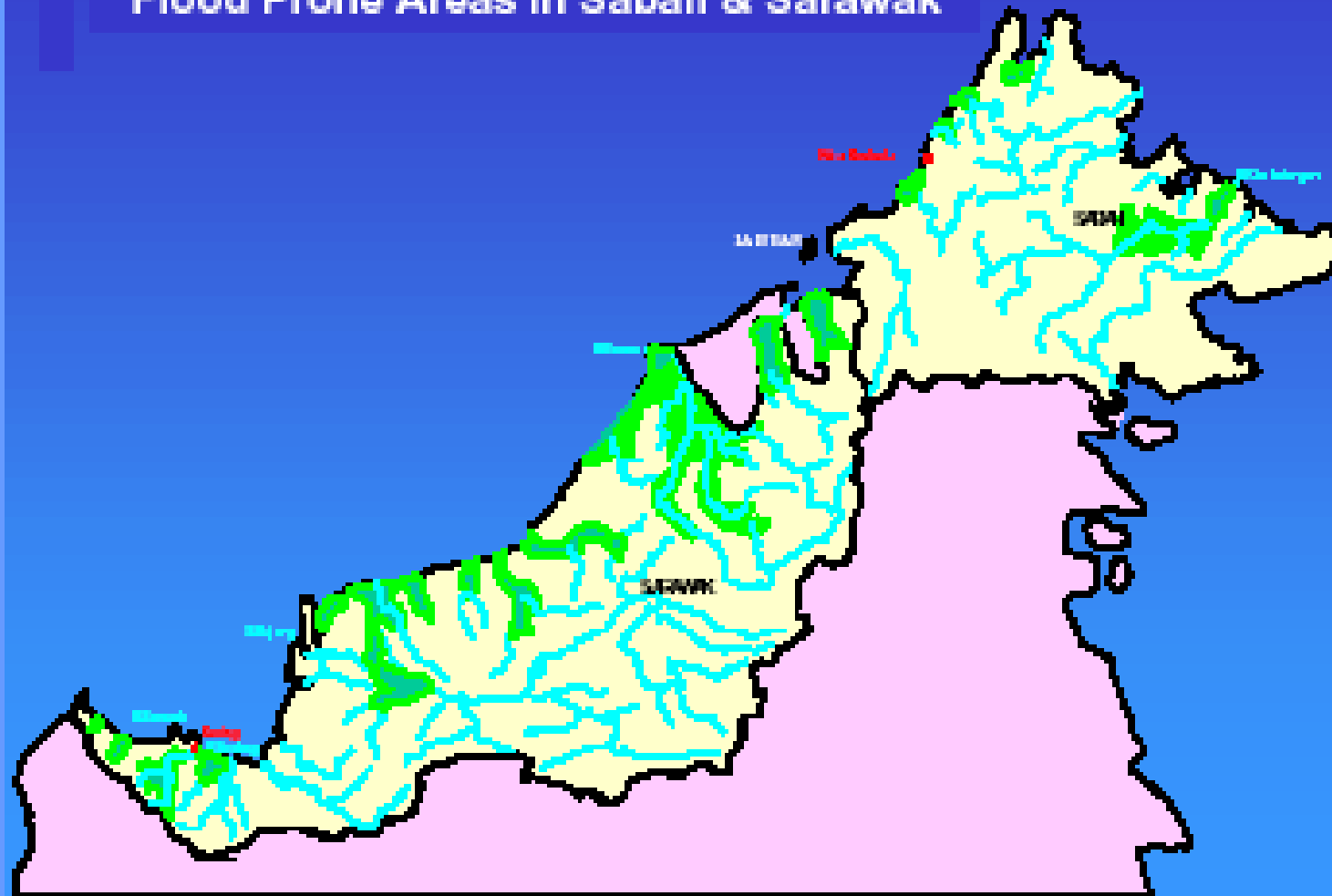
INTRODUCTION

Flood Prone Areas in Peninsular Malaysia



INTRODUCTION

Flood Prone Areas in Sabah & Sarawak



HISTORY OF FLOODS IN MALAYSIA



KUALA LUMPUR 1926

**SELANGOR CLUB PADANG
IN 1949**





MUDA RIVER AT 1949

KUALA LUMPUR AT 1971



CAUSES OF FLOODINGS

Causes of flooding in Malaysia:

a) Natural Phenomenon

- * Heavy Rainfall (Northeast Monsoon – Nov- Feb)
- * High Tide

a) Human Activities

- * Change in Landuse
- * Rapid Development
- * Effect of urbanisation
- * Inadequate Drainage Facilities
- * Obstructions in River

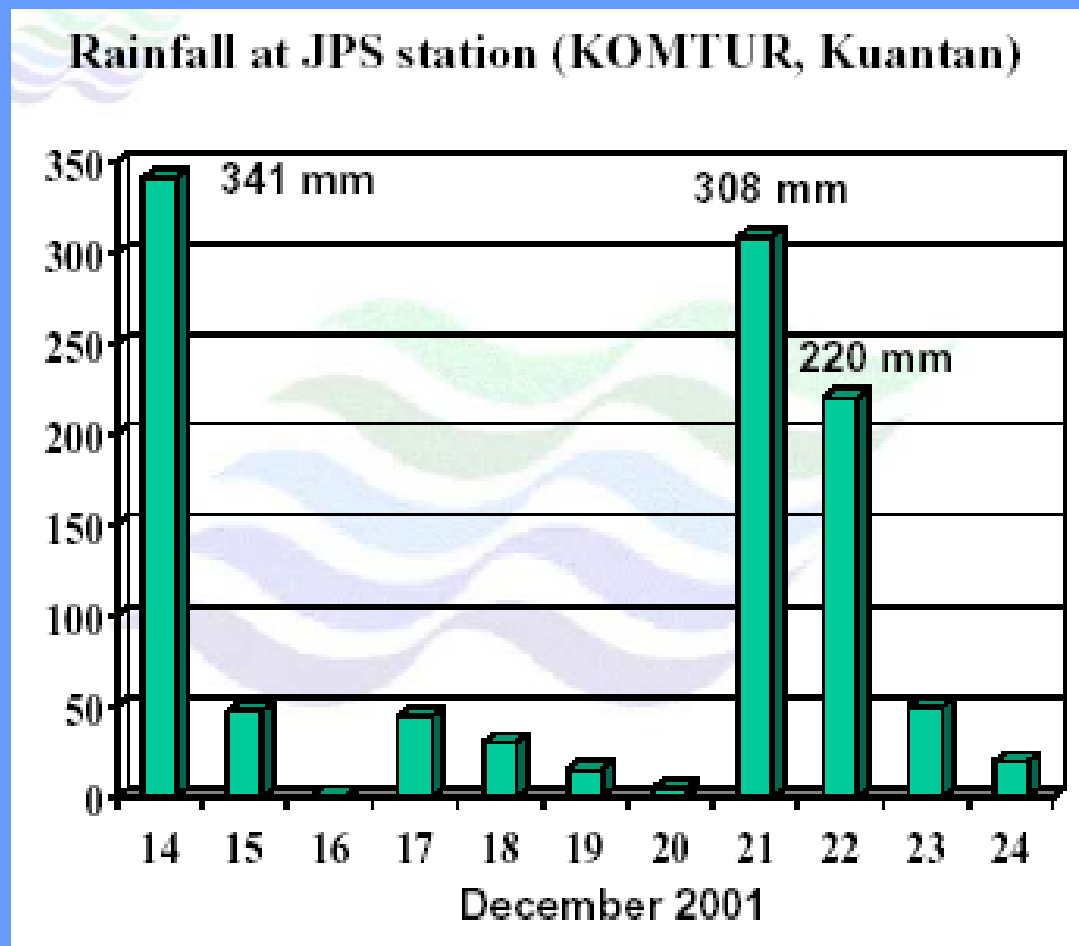


a) Natural Phenomenon – Heavy Rainfall

Date	Location	Rainfall Intensity	Monthly average Rainfall
26/04/01	JPS Ampang	103 mm/1 hr	288 mm
17/09/95	Butterworth	350 mm/day	338 mm
04/09/99	Bayan Lepas	288 mm/day	339 mm
22/12/95	Petaling Jaya	169 mm/day	263 mm



a) Natural Phenomenon – Heavy Rainfall



Pahang- December 2001



a) Natural Phenomenon – High Tides



BAHARU akibat konkrit air laut yang tiba-tiba mengakibatkan kesesakan lalu lintas yang teruk di sepanjang jambatan di Pelabuhan Klang, semalam.

Penduduk kelam-kabut
dilanda air pasang

Port Kelang October 1999



b) Human Activities - Change Landuse & Uncontrolled Land Clearing



b) Human Activities - Rapid Development & Effect of Urbanisation



**Increase In
Development
Area**

0 → 40 %

Runoff Quantity

Q → Increase 190 %

Velocity

V → Increase 2x

Tc → 50 % decrease

b) Human Activities - Inadequate Drainage Facilities



b) Human Activities - Obstructions in rivers



b) Human Activities-Obstructions in rivers



b) Human Activities-Solid Waste & Debris



RECENT FLOODS IN MALAYSIA

21-24 Dec 2006 at Johor

STESEN HUJAN	DAERAH	JUMLAH HUJAN MAKSIMUM (MM)		TEMPOH KALA ULANG (TAHUN)	
		24 JAM	48 JAM	24 JAM	48 JAM
Layang-layang	Kluang	234	300	60	80
Bukit Besar	Kota Tinggi	197	307	10	50
Ulu Sebol		279	319	80	60
Kota Tinggi		184	229	5	2



RECENT FLOODS IN MALAYSIA

13 – 17 Jan 2007 at Johor

STESEN HUJAN	DAERAH	JUMLAH HUJAN MAKSIMUM (MM)		TEMPOH ULANG (TAHUN)	
		24 JAM	48 JAM	24 JAM	48 JAM
Layang-layang	Kluang	123	318	3	>50
Bukit Besar	Kota Tinggi	199	420	46	>100
Ulu Sebol		136	473	5	>100
Kota Tinggi		205	335	33	>50

Nota:

Hujan Maksimum 24 jam = 11 Jan. 07 (09:00 hr) hingga 12 Jan. 07 (09:00 hr)

Hujan Maksimum 48 jam = 11 Jan. 07 (09:00 hr) hingga 13 Jan. 07 (09:00 hr)

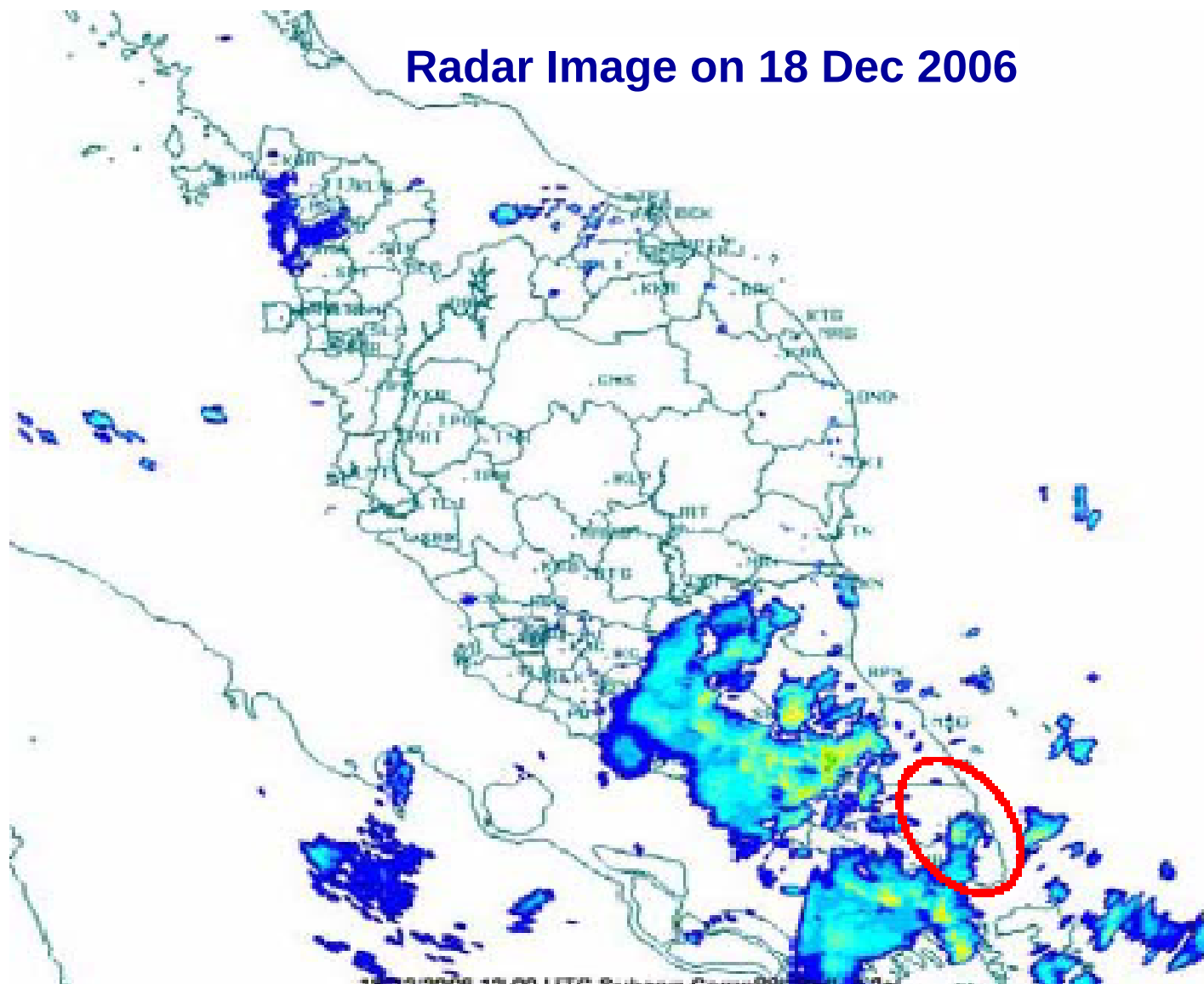


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RECENT FLOODS IN JOHOR, MALAYSIA

Radar Image on 18 Dec 2006

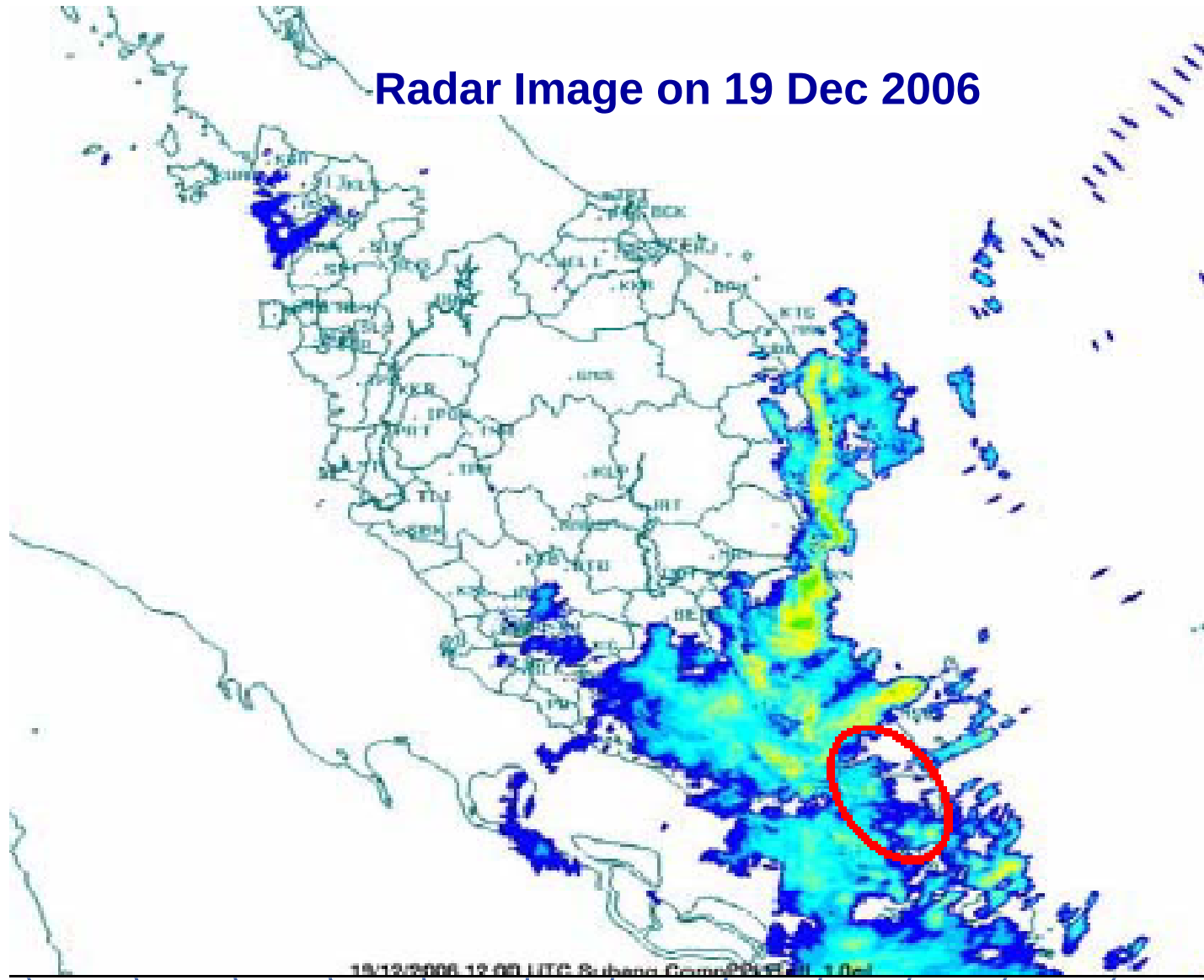


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RECENT FLOODS IN JOHOR, MALAYSIA

Radar Image on 19 Dec 2006

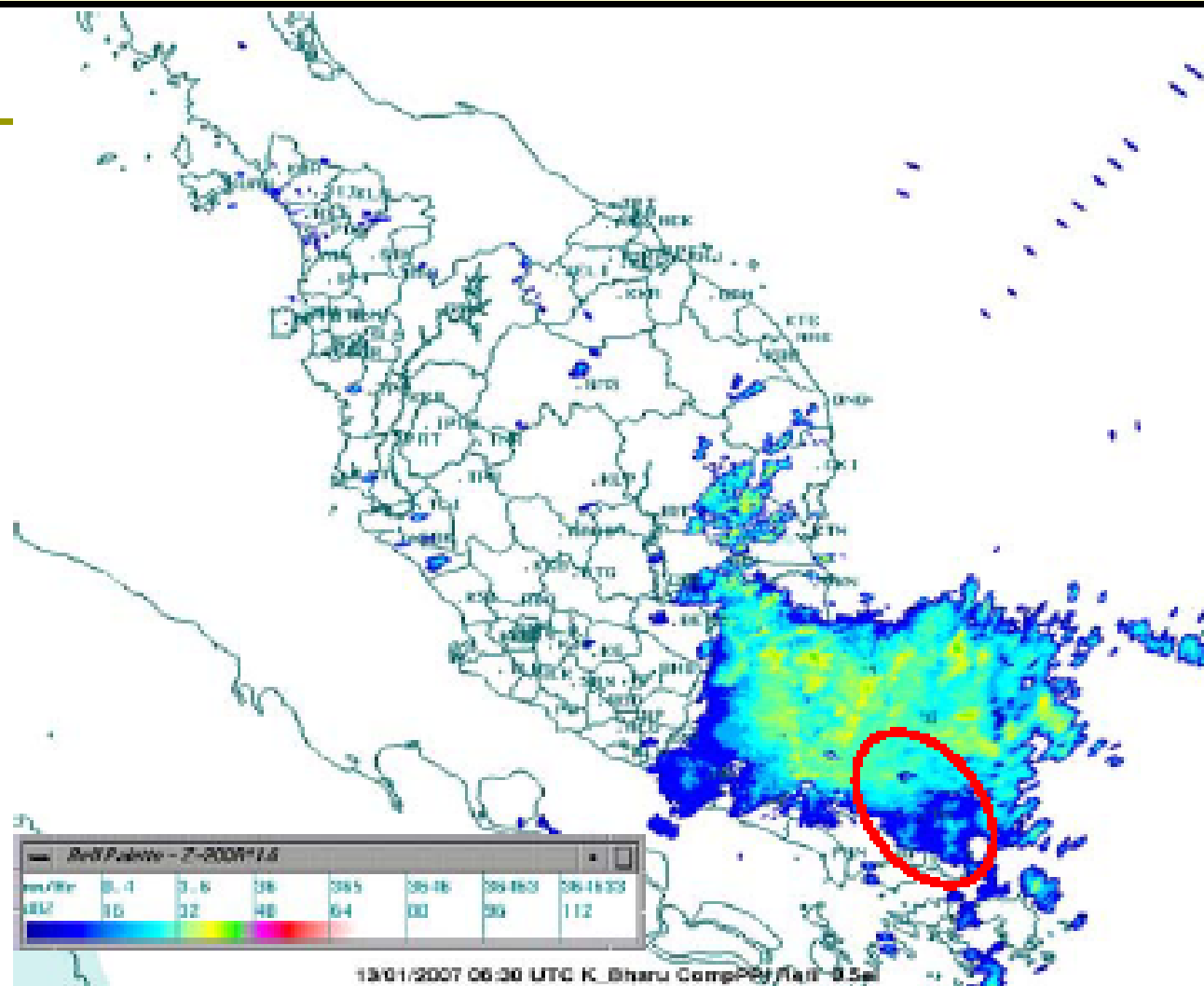


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RECENT FLOODS IN JOHOR, MALAYSIA

Gema Radar Cuaca Pada Jam 2.30 Petang, 13 Januari 2007

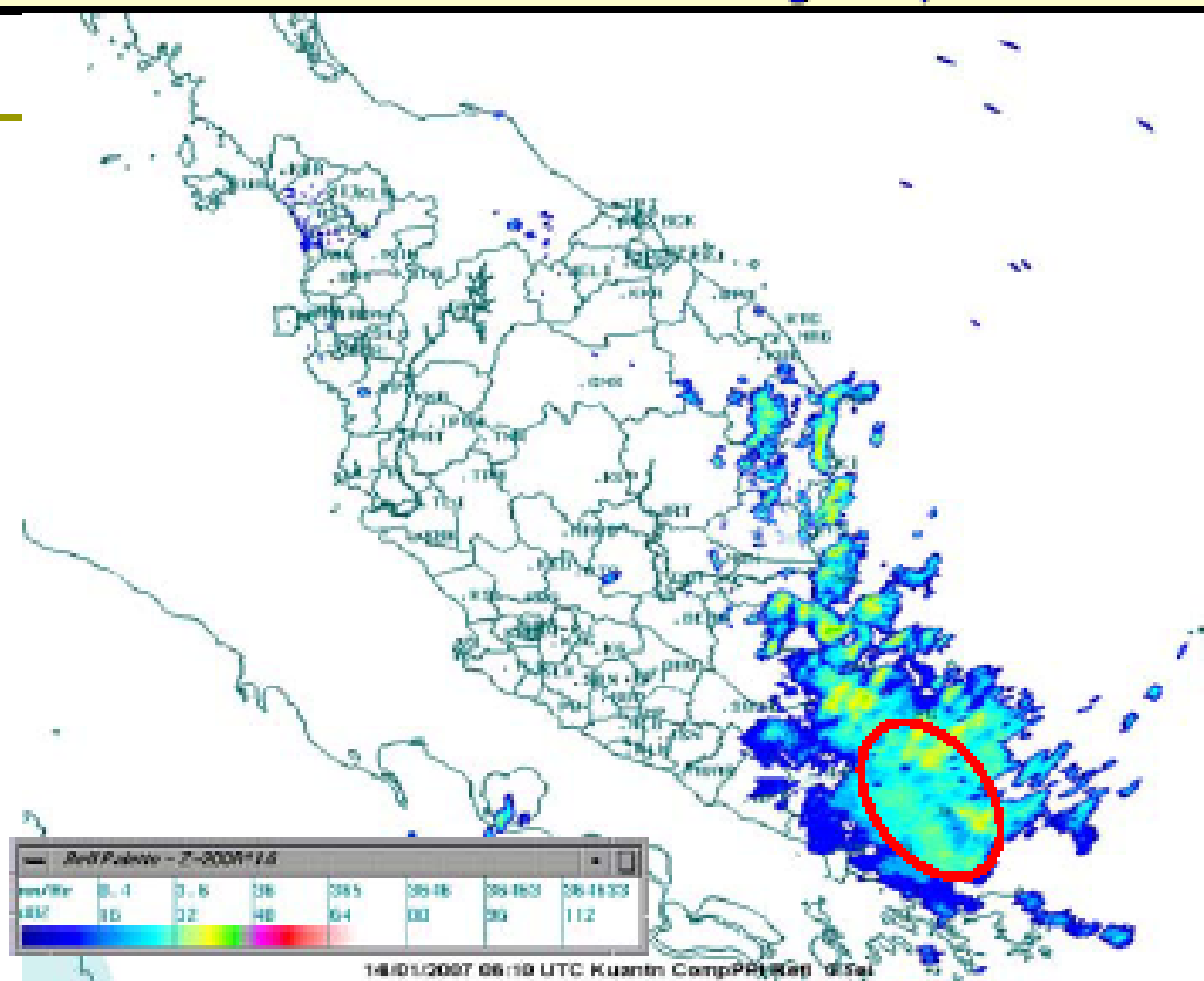


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RECENT FLOODS IN JOHOR, MALAYSIA

Gema Radar Cuaca Pada Jam 12.40 tengahari, 14 Januari 2007

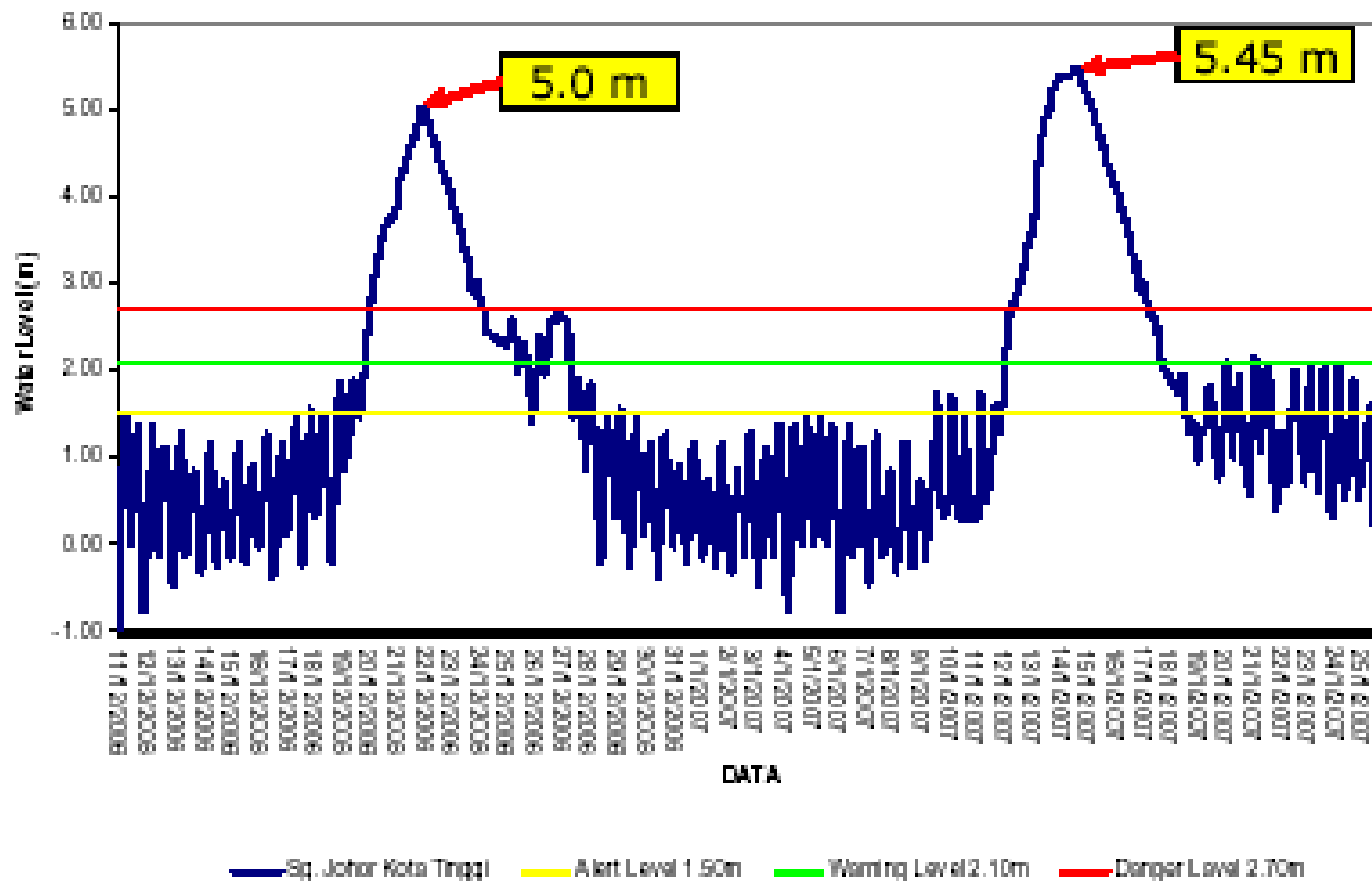


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RECENT FLOODS IN JOHOR, MALAYSIA

JPS Negeri Johor Stage Hydrograph From 11/12/2006 To 25/01/2007



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RECENT FLOODS IN JOHOR, MALAYSIA



18 DEC 2006



21 DEC 2006



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RECENT FLOODS IN JOHOR, MALAYSIA



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RECENT FLOODS IN JOHOR, MALAYSIA



CLIMATE CHANGE AND FUTURE FLOODS

Subregion Name		West Coast	Klang	Selangor	Terengganu	Kelantan	Pahang	Perak	Kedah	Johor
Maximum Monthly Precip (mm)	Historical	600.0	436.2	564.1	1271.2	929.7	633.6	722.9	626.7	591.7
	Future	560.3	601.3	525.7	1913.9	1128.5	684.6	767.8	705.3	538.2
	Diff.	-39.7	165.1	-38.4	+642.7	+198.8	+51.0	+44.9	+78.3	-53.5
	(%)	-6.6	+37.8	-6.8	+50.6	+21.4	+8.0	+6.21	+12.5	-9.0
Mean Monthly Precip (mm)	Historical	179.2	190.1	190.2	289.0	221.8	198.5	192.9	173.6	187.3
	Future	176.2	182.3	180.9	299.0	239.5	208.4	199.4	176.6	180.0
	Diff.	-3.0	-7.8	-9.3	+10.0	+17.7	+9.9	+6.5	+3.0	-7.3
	(%)	-1.7	-4.1	+4.9	+3.5	+7.9	+4.9	+3.4	+1.7	-3.9
Minimum Monthly Precip (mm)	Historical	12.4	12.8	12.2	33.6	15.4	24.5	9.0	2.1	13.3
	Future	7.9	5.9	8.3	14.0	10.9	16.6	4.1	1.1	5.2
	Diff.	-4.5	-6.9	-3.9	-19.6	-4.5	-7.9	-4.9	-1.0	-8.1
	(%)	-36.3	-53.9	-32	-58.3	-29.2	-32.2	-54.4	-50	-60.9

Ogos
2007

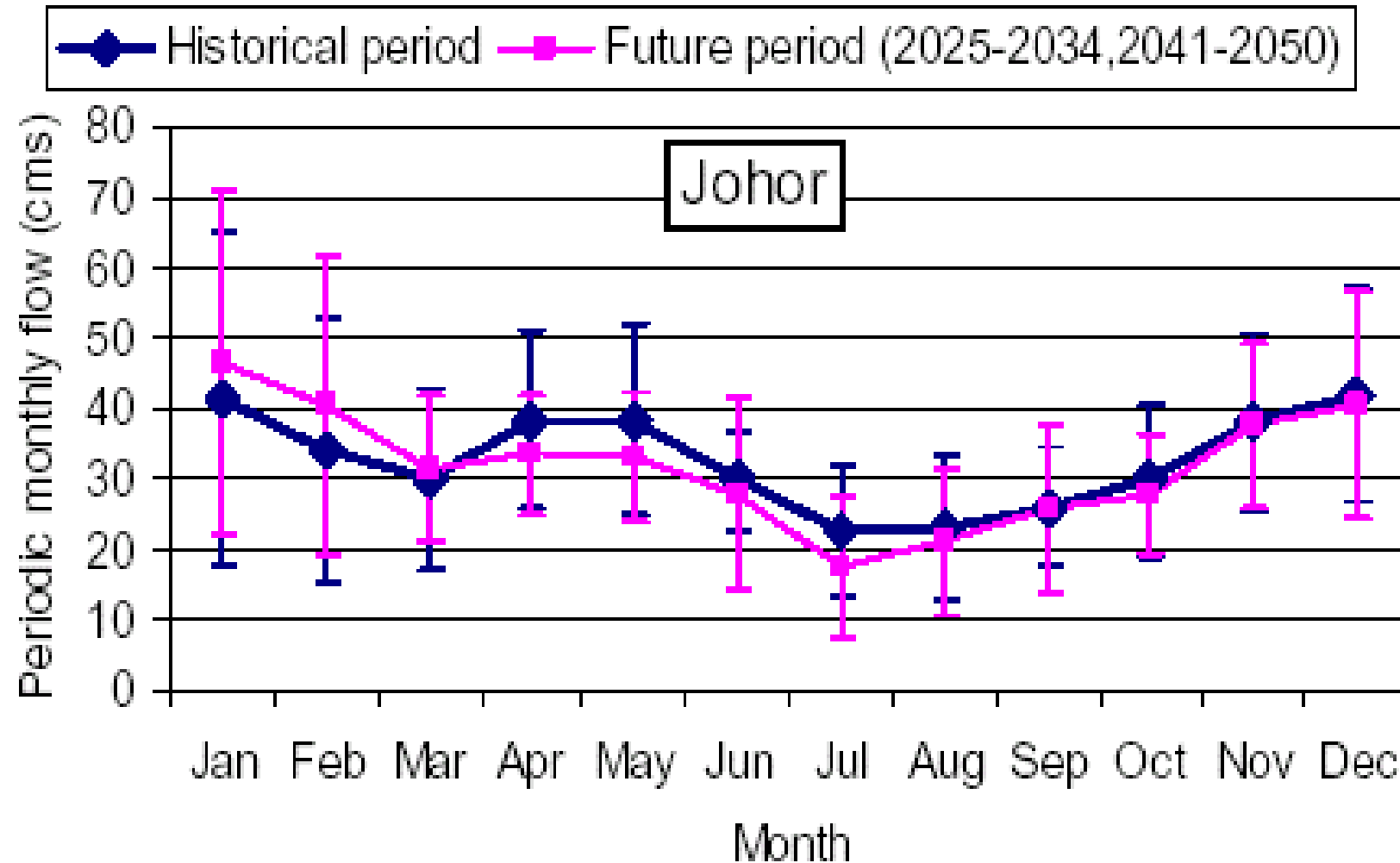


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CLIMATE CHANGE AND FUTURE FLOODS

Simulated Monthly River Flow - Periodic Means and Standard Deviations



CLIMATE CHANGE AND FUTURE FLOODS

River		Klang	Selangor	Dungun	Kelantan	Pahang	Perak	Muda	Johor
Maximum Monthly Flows (cms)	Historical	31.2	107.9	398.4	1535.1	1697.4	523.7	307.4	82.7
	Future	45.8	108.5	569.5	1950.7	2176.6	578.2	340.0	94.0
	Diff.	+14.6	+0.6	+171.1	+415.6	+479.2	+54.5	+32.6	+11.3
	(%)	+46.8	+0.6	+42.9	+27.1	+28.2	+10.4	+10.6	+13.7
Mean Monthly Flows (cms)	Historical	14.4	40.7	93.4	535.9	669.6	286.4	105.6	32.7
	Future	13.3	37.5	98.3	601.7	718.1	299.7	104.0	31.8
	Diff.	-1.1	-3.2	+4.9	+65.8	+48.5	+13.3	-1.6	-0.9
	(%)	-7.6	-7.9	+5.2	+12.3	+7.2	+4.6	-1.5	-2.8
Minimum Monthly Flows (cms)	Historical	2.6	7.1	13.1	158.4	156.3	183.6	25.3	9.8
	Future	3.5	0.5	10.8	125.8	122.7	139.2	5.3	6.8
	Diff.	+0.9	-6.6	-2.3	-32.6	-33.6	-44.4	-20	-3
	(%)	+34.6	-93.0	-17.6	-20.6	-21.5	-24.2	-79.1	-30.6

OGOS
2007



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CONCLUSION

Floods in Malaysia are related to monsoon circulation and variability

Floods are due to natural phenomenon and exacerbated by rapid development

In the wake of climate change, more extreme rainfalls are expected which would lead to more extreme floods

Both curative and preventive measures are needed to manage floods to an acceptable level



Thank You..

