NATIONAL REPORT: MALAYSIA

I. OVERVIEW AND EXECUTIVE SUMMARY

Executive Summary
Context and Country-Specific Issues

Low natural disasters in the country gives rise to complacency; the need for multi-disciplinary approaches to disaster reduction also contributed to the difficulty in initiating appropriate measures.
Much has yet to be done in this country.

II. RISK ASSESSMENT

Hazard Assessment

(see attach article) Annex A

Vulnerability Assessment

- **Population**

Population is concentrated over river side and low lying areas where the land is fertile.

A large proportion of population is also staying in cities where high-rise buildings are mushrooming. Such trend is on the increase with time.

Rapid national development has resulted in rapid industrial growth and rapid increase in infrastructures such as dams, hydro-electricity and other power plants and power lines, bridges which are highly succeptible to earthquake damages.

III MITIGATION ACTIVITIES

- **Status of Mitigation Strategies and Measures including:**

Fully agreed that measures listed need to be implemented. However, They have yet to be initiated in this country.

IV WARNING

- **Meteorological**

Malaysian Meteorological Service (MMS) monitors weather and in particular heavy rainfall, high wind and rough sea round the clock, warnings are given to appropriate agencies whenever required.

The MMS provides weather bulletins on a daily basis and necessary warnings of heavy rainfall and/or strong winds. It also provides information pertaining to surface wind velocity, precipitation and the state of the seas. This information is relayed to critical monitoring agencies such as the National Flood Control Centre, the Drainage and Irrigation Department, the Police, the Radio and TV networks, and to the Ministry of National Unity and Social Development. The information received is then used for flood forecasting and flood warning purposes. To reduce possible delays in data and information transmission, teleprinters and VHF radio communication

- **Geological**

MMS operates a network of 8 seismological stations located over the country to monitor earthquakes in and around the country.
The stations will be finally connected by dial-up telephone lines to enable easy access of data.

- **Drought**

- **ISSUES**

(No outstanding problems/issues)

V. INTERNATIONAL COOPERATION

1. MMS is working closely with the World Meteorological Organisation (WMO) in improving its capability in and system of detection and warning of severe meteorological hazards. This includes improving the capabilities of national meteorological and hydrometeorological agencies in dealing with issues related to climate change.

2. MMS, as the national agency representating the country in the ASEAN Sub-Committee on Meteorology and Geophysics, is actively involved in the formulation and execution of projects/activities which aim at natural disaster reduction. For example,

a) ASEAN-EC Geological Project to study the earth deformation in the region.

b) ASEAN Monsoon Climatology project to improve the understanding of the winter monsoon.

3. National involvement in the ASEAN Experts Group in Natural Disaster Management. (MKN can provide more information).

4. MMS could only provide some assistance related to its field of work and area of responsibility such as station maintenanca and monitoring.

VI. OVERALL EVALUATION AND FUTURE PROGRAMME

MMS is coordinating the planning and formation of a National Working Group on Seismic Risk Management to plan and implement activities necessary for seismic risk reduction in the country. Strategies identified to be implemented are the introduction of earthquake codes, land use planning and regulations and the need for disaster planning. It is felt that earthquake hazard management effort hold focus on large cities and on civil engineering projects which are most vulnarable to long period waves of distant earthquakes. There is a need to carry out research on subjects peculiar to local conditions. The areas of research should cover the response of the above mentioned types of contructions to earthquake waves and the effects of ground amplifications due to thick unconsolidated sediments underlying cities. There is a need to contruct seismic hazard maps as a first step towards the introduction of earthquake codes.

The Malaysian meteorological service is upgrading its monitoring capabilities. It is taking steps to link up its seismological stations to a computer system at its head office in Petaling Jaya, by dial-up telephone lines. Earthquake epicentral values can then be speedily determined and any rescue action if warrant, can be immediately inisiated.

Annex A

Natural Disasters in Malaysia

by

Malaysian Meteorological Service

1. Introduction

"Natural resources are plentiful in Malaysia. The weather is mild and there are no major calamities..." So goes the saying. Nevertheless, Malaysia is not completely free of natural disasters, we do have our fair share. With increasing population and its concentration in urban centres, natural disasters which in the past might not have induced severe damages and hence termed "mild" as the above saying goes may now exact a much heavier toll in the form of loss of more lives and greater damage to properties.

There are two categories of natural disasters in Malaysia, viz geotectonical and weather or climate related disasters. They are:-

Geotectonical type : - Earthquake

Weather/Climate related type:

- Monsoonal flood
- Flash flood
- Drought
- Strong wind
- Lightning stroke, and
- Coastal erosion

Natural disasters are acts of nature. Their occurrences cannot be avoided. However, with proper understanding of their behaviour, characteristics and distribution, coupled with appropriate mitigating measures taken in advance, it is possible to reduce their adverse impact or the degree of damages.

Natural disaster prevention/mitigation is basically an issue of economics. It is a question of how much has to be spent with respect to how much can be saved. The issue may become more complicated when life is involved though. Hence policy makers who are involved in natural disaster prevention/mitigation require accurate information on the actual risks the country is exposed to and the effective preventive or mitigating measures or techniques to be adopted.

This paper describes the various types of natural disasters that are encountered in this country and the associated hazards.

2. Earthquake

Malaysia is not a very seismic country.

For Peninsular Malaysia, there have been no known records of local earthquakes with the exception of earth tremors induced by the impounding of dams over Kenyir Dam area. The only potential hazard is from earthquakes originating from Sumatra. No casualty or damage to building has been reported so far. However, with the increasing number of high-rise buildings and large engineering constructions which are susceptible to damage from the long period seismic waves, there is certainly a cause for concern.

The state of Sabah, on the other hand, is moderately seismic. A number of local earthquakes of small to medium magnitude had occurred in the past. The larger ones resulted in minor cracks in masonry wall and narrow fissures in the ground. For example, the Lahad Datu earthquake on July 26, 1976, with a body wave magnitude of 5.8, resulted in damages to properties and buildings estimated at several hundreds of thousand ringgits. Figures 1 & 2 show the maximum observed intensities over Peninsular Malaysia, Sabah and Sarawak based on available reports of historical earthquakes. The isopleths are very approximate and the margin of error is large. However, it does give some indication on the degree of earthquake hazards our country is subjected to (Reference No. 1).

3. Monsoonal flood

Malaysia is under the canopy of the Asian Monsoon and a large part of it experiences seasonality of rainfall. During the period from November to February, the monsoonal activities are at their peaks. Cold continental air from the vast wilderness of the wintry Siberia bursts as northeasterly wind, surging towards the South China Sea with great strength. While travelling over the sea, it picks up moisture along the way. On reaching the coastal areas of Peninsular Malaysia and the state of Sarawak, it releases much of its moisture load in the form of relentless torrential rain lasting days even weeks causing severe monsoonal floods over the riverine areas.

Monsoonal flood is an annual affair in this country, though there are year to year variations in terms of severity, place and time of occurrences. At its worst, the flood could last for several weeks before receding, causing widespread damage to crops and properties, disrupting the livelihood of the people and even resulting in deaths. Monsoonal floods are not just confined to the exposed coastal areas of Peninsular Malaysia and Sarawak. Occasionally, it affects the west coast states of Peninsular Malaysia too. In 1971, Kuala Lumpur was badly hit by one which resulted in damages to property and disrupted socio-economic activities which ran into millions of ringgits (Refence No. 2).

4. Flash Flood

Flash flood is a common and frequent phenomenon in this country. It is caused by torrential downpour from thunderstorms which are particularly active during the periods of March-April-May and September-October-November. Flash floods occur in low lying areas where the drainage is poor or where siltation has taken place as a result of nearby housing or land development and clearing of forests. It lasts for several hours and basically a problem of drainage. Flash floods have caused damages to properties and have even claimed some lives. It can cause immense traffic jam if busy roads are flooded. (The highest precipitation recorded for durations of 1/2 hour, 1 hour and 2 hours and longer durations at some Malaysian stations are given in Table 1.)

5. Drought

Drought is the manifestation of the other extreme of inclement weather to flood. Fortunately, Malaysia being a maritime equatorial country, is not subjected to drought in the real sense of the word. Nevertheless, we are not entirely spared from the effects of long stretches of dry weather occasionally which disrupt water supplies and cause crop failures resulting in millions of ringgit loss of income and revenue. A typical case is associated with the prolonged below normal rainfall recieved in the northern Peninsular Malaysia in the late seventies, which caused severe water deficiency and forced the cancellation of the 1978 off-season crop in the MADA area. Direct losses incurred was valued at M$170 million (Reference No. 3). Another more recent example is the water supply problem in the state of Malacca. Arising from the relatively low rainfall received in the year 1990, the water supply in the state, particularly at the central Malacca district, was seriously disrupted for several months from the beginning of 1991. Water rationing had to be imposed from time to time. At its worst, there were no water flows from taps for days, causing much hardship and inconvenience to the general population. To the State Government not only there was a loss of revenue due to the disruption of water supply to the consumer but also large sum of money had to be spent to solve the problem and to provide water by other means to meet the minimum daily requirement of the people.

6. Strong Winds

Malaysia is situated in the equatorial doldrums where the wind is generally light. Nevertheless strong winds do occur from time to time. There are three sources of strong winds in this country which could be damaging. The first is associated with the Asian monsoon that has been mentioned earlier. The second is associated with typhoon and the third is associated with the downdrafts from severe thunderstorm cells.

During the northeast monsoon season, the prevailing

northeasterly winds over the South China Sea freshen at intervals of several days to two weeks due to the outbreak of cold surges from Siberia through China. At the peak of the surge, seas are rough which greatly hamper marine and coastal activities, particularly over the South China Sea. Fishermen have to stay at home or their lives may be at risk. Off-shore economic activities such as oil drilling and coastal shipping operations, are much affected or hampered. In fact, the bay at the vicinity of Kuching in Sarawak is the scene of many shipping accidents caused by rough seas during the monsoon season.

Not to be left out is the strong wind associated with the tail effect of typhoons which very often move from east to west across the Philippines to the South China Sea before recurring to the north during the months of June to November. Though Malaysia is not subject to the full impact of these typhoons, strong winds due to their tail-effects very often result in rough sea conditions along the coastal areas of Sarawak and Sabah which are dangerous to fishing and shipping activities and oil rig operations.

Strong winds assocciated with severe thunderstorms, on the other hand, affect mainly inland areas. The downdrafts from a thunderstorm could generate gusts with speeds exceeding 30 metres per second or 60 knots per hour. Much damage, though always localized, has occurred in the past. Trees have been uprooted, crops and flimsy structures mainly buildings have been damaged. Sometimes, there were even loss of lives. Figure 3 shows the maximum gust speed likely to be exceeded on the average once in 50 years at 10 metres above ground in Peninsular Malaysia.

7. Lightning Stroke

Lightning stroke is another type of natural disaster associated with thunderstorms. Its severity depends on how well or rather how severe a thundercloud or cumulonimbus develops. There is therefore little wonder that severe lightning strokes often occur together with heavy downpours and strong downdrafts. In order to have an idea of the extent and distribution of lightning strokes in this country, it is suffice to examine the extent and distribution of thunderstorms instead. Table 2 gives the mean number of thunderstorm days at various places in the country. It is pertinent to note that Subang, situated at a very active area, experiences thunderstorms 224 days in a year on the average.

Lightning strokes are of many types but of particular concern to us is the cloud-to-ground discharge type which occasionally strikes power lines and other installations disrupting power supplies, damaging equipment and properties. In fact, death from direct lightning strokes are not infrequent in this country.

8. Coastal Erosion

Another type of natural disaster that Malaysia is subjected to is coastal erosion. It is mainly wave driven, the degree of which is proportional to the strength of the waves. Coastal erosion occurs along more than 1300 kilometres of Malaysia 4800 kilometres shoreline. In eroding areas, the average rate of shoreline retreat ranges from less than one metre per year to more than 100 metres per year. Along certain shore, coastal erosion seriously threatens important facilities. Affected activities include agriculture, community life, recreation, transportation and tourism (refence No. 4). In fact, under the current 5-year Development Plan, Malaysian needs M$300 million to combat coastal soil erosions.

9. Summary

Malaysia has its fair share of natural disasters, whose impacts though comparatively mild in the past, may be catastrophic if there were to occur now or in the future in densely populated and developed areas. Earthquakes, monsoonal floods, flash floods, strong winds, droughts and coastal erosions have been experienced before. Some of them have caused substantial economic damage and even resulted in loss of lives. Though we cannot prevent natural disasters, it is possible to mitigate their destruction and prevent unnecessary loss of lives. With proper planning and the adoption of effective strategies, the benefits can far outweigh the money and effort spent. Towards this end, government agencies charged with the relevant duties and responsibilities have to collaborate closely to initiate and implement appropriate measures to mitigate the impact of natural disasters.

TABLE 1. HIGHEST RAINFALL RECORDED FOR VARIOUS DURATIONS (mm)

	Length of Records	½ Hr	1 Hr	2 Hr	24 Hr	2 Days	3 Days	4 Days
East Coast of Pen. Malaysia								
Kota Bharu	54 years	81.0	127.5	167.6	809.6	1048.8	1185.2	1319.4
Kuala Terengganu	54 years	66.5	98.5	139.2	525.5	694.4	842.4	944.9
Kuantan	41 years	72.6	106.2	172.9	538.3	658.4	729.7	852.9
Mersing	55 years	75.5	117.8	140.7	434.3	620.1	854.0	1097.8
Central Western Pen. Malaysia								
Ipoh	45 years	78.9	113.1	144.0	186.7	216.4	218.9	271.3
Subang	23 years	89.7	116.1	117.1	176.3	242.6	271.0	290.8
Kaling Jaya	18 years	80.8	101.4	117.3	167.4	225.8	257.3	288.0
Sarawak								
Kuching	38 years	76.1	116.3	182.3	515.6	580.1	608.1	628.1
Sibu	27 years	91.5	127.9	154.5	221.4	224.1	241.6	251.3
Miri	36 years	73.7	97.0	151.1	308.6	392.7	564.4	736.3

TABLE 2. RECORD OF NUMBER OF DAYS WITH THUNDERSTORM

NO.	STATION	PERIOD OF RECORD	ANNUAL NUMBER OF THUNDERSTORM DAYS		
			MEAN	LOWEST	HIGHEST
1.	SENAI	1975–1990	205	182	226
2.	KLUANG	1975–1990	194	164	217
3.	MERSING	1979–1990	179	153	203
4.	ALOR STAR	1975–1990	166	111	203
5.	KOTA BHARU	1968–1990	113	87	144
6.	KUALA KRAI	1986–1990	177	166	188
7.	MALACCA	1972–1990	178	129	213
8.	TEMERLOH	1979–1990	101	67	125
9.	KUANTAN	1968–1990	146	134	179
10.	BAYAN LEPAS	1968–1990	187	142	228
11.	BUTTERWORTH	1985–1990	159	134	179
12.	IPOH	1975–1990	191	163	217
13.	SITIAWAN	1972–1990	193	174	228
14.	KOTA KINABALU	1969–1990	115	66	171
15.	LABUAN	1986–1990	128	74	159
16.	SANDAKAN	1974–1990	132	100	175
17.	TAWAU	1986–1990	69	47	94
18.	BINTULU	1973–1990	93	38	149
19.	KUCHING	1973–1990	171	122	226
20.	MIRI	1977–1990	102	39	143
21.	SIBU	1976–1990	110	80	150
22.	SRI AMAN	1986–1990	175	142	197
23.	SUBANG	1966–1990	224	195	269

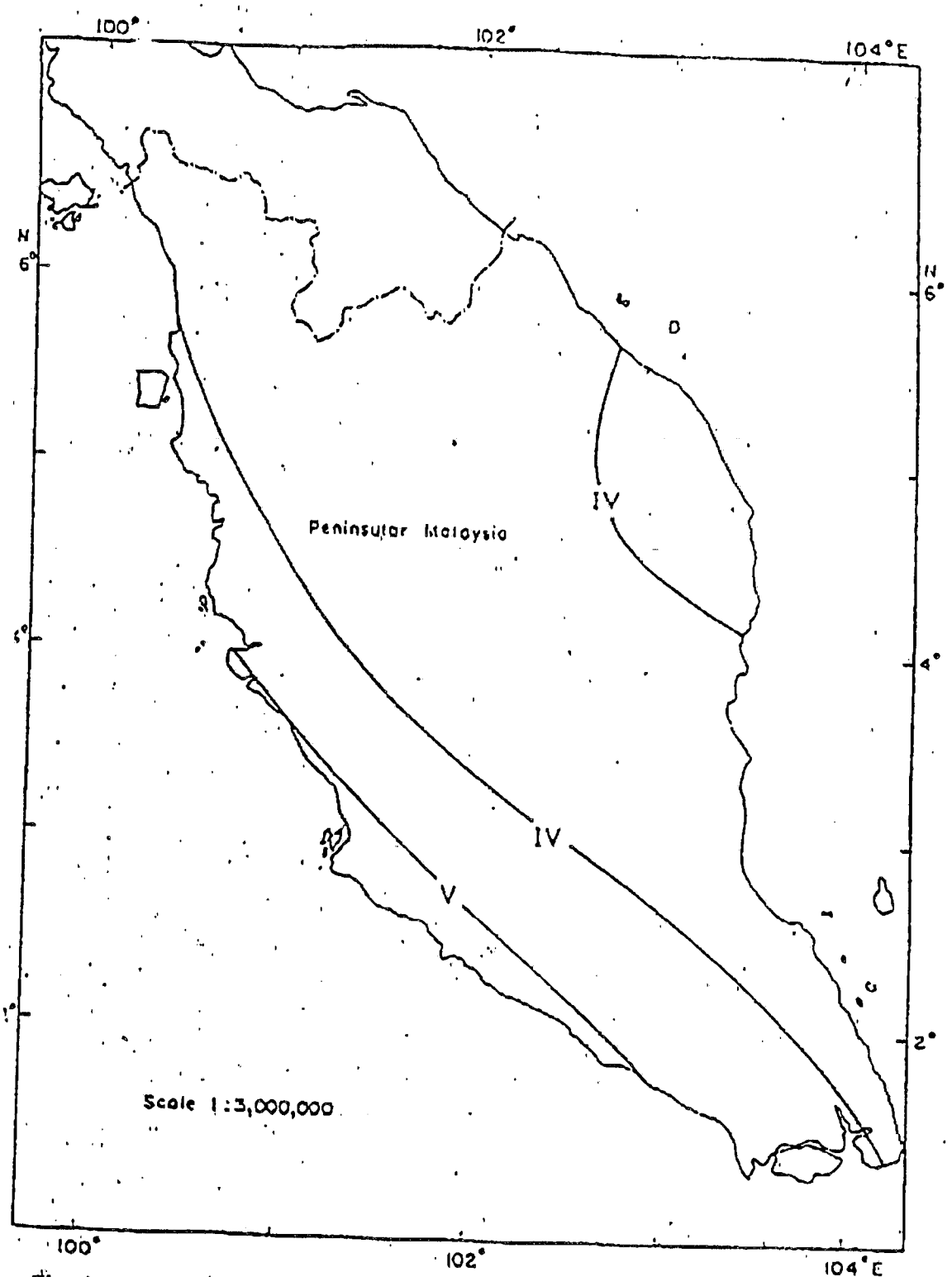


Fig. 1 Maximum Observed Intensity (MM Scale) Peninsular Malaysia (1805-1983).

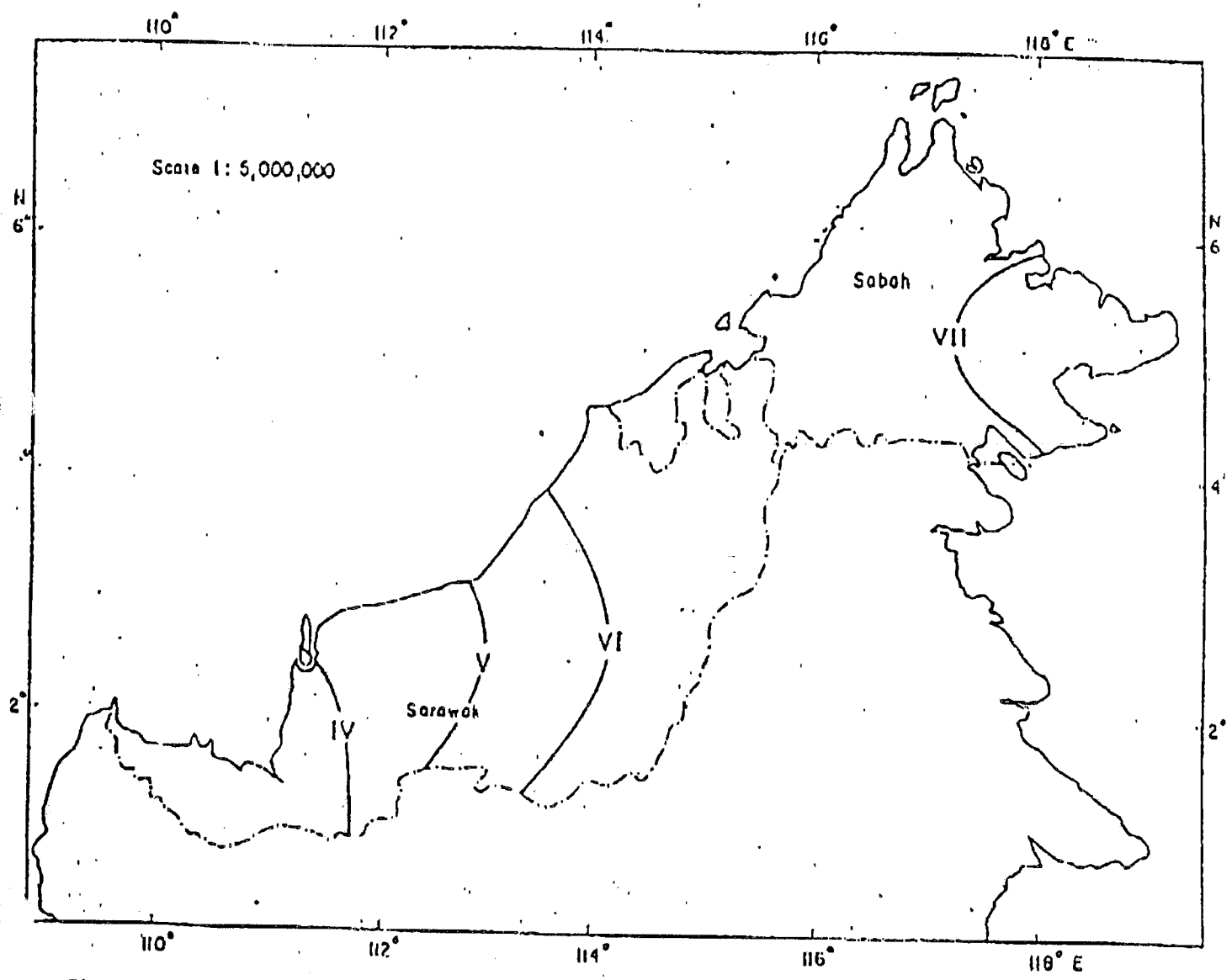


Fig. 2 Maximum Observed Intensity (MM Scale) Sabah and Sarawak (1875 - 1983)

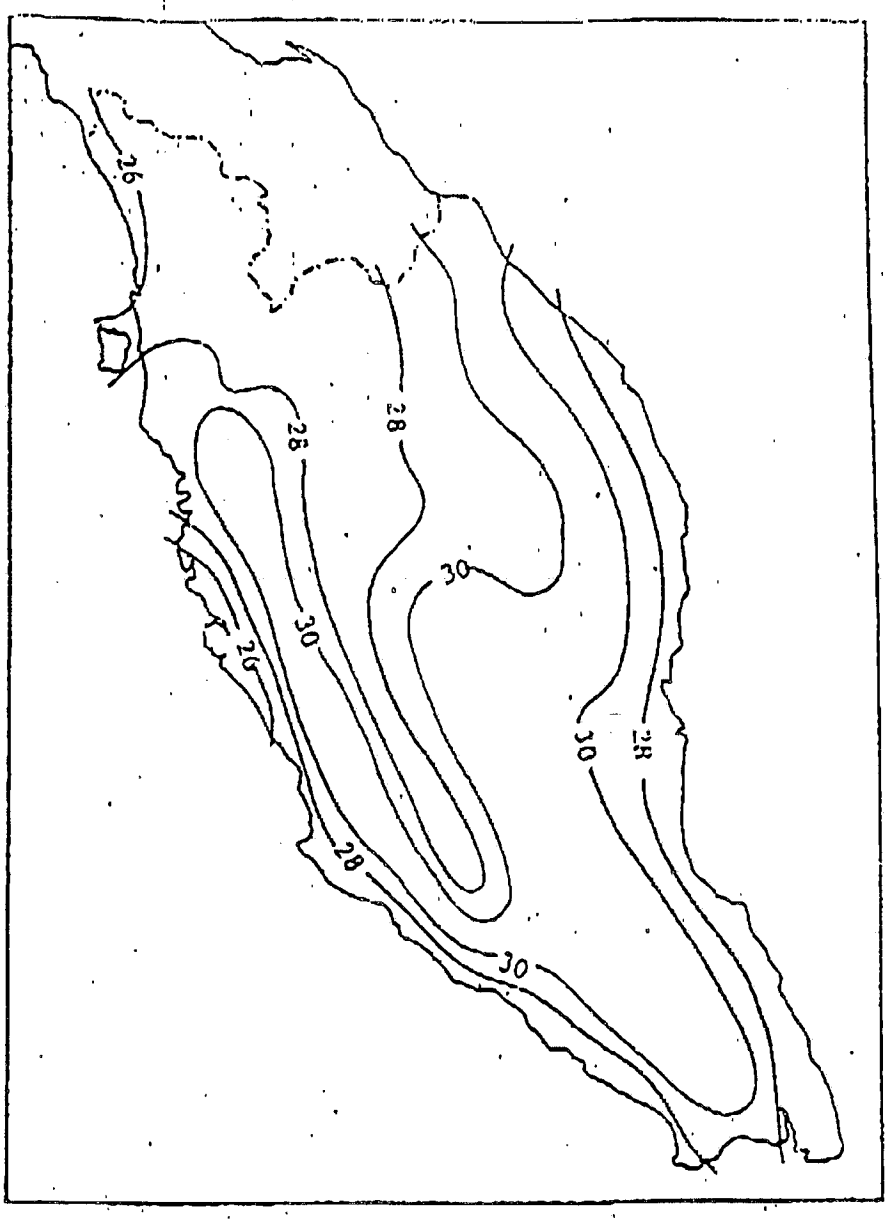
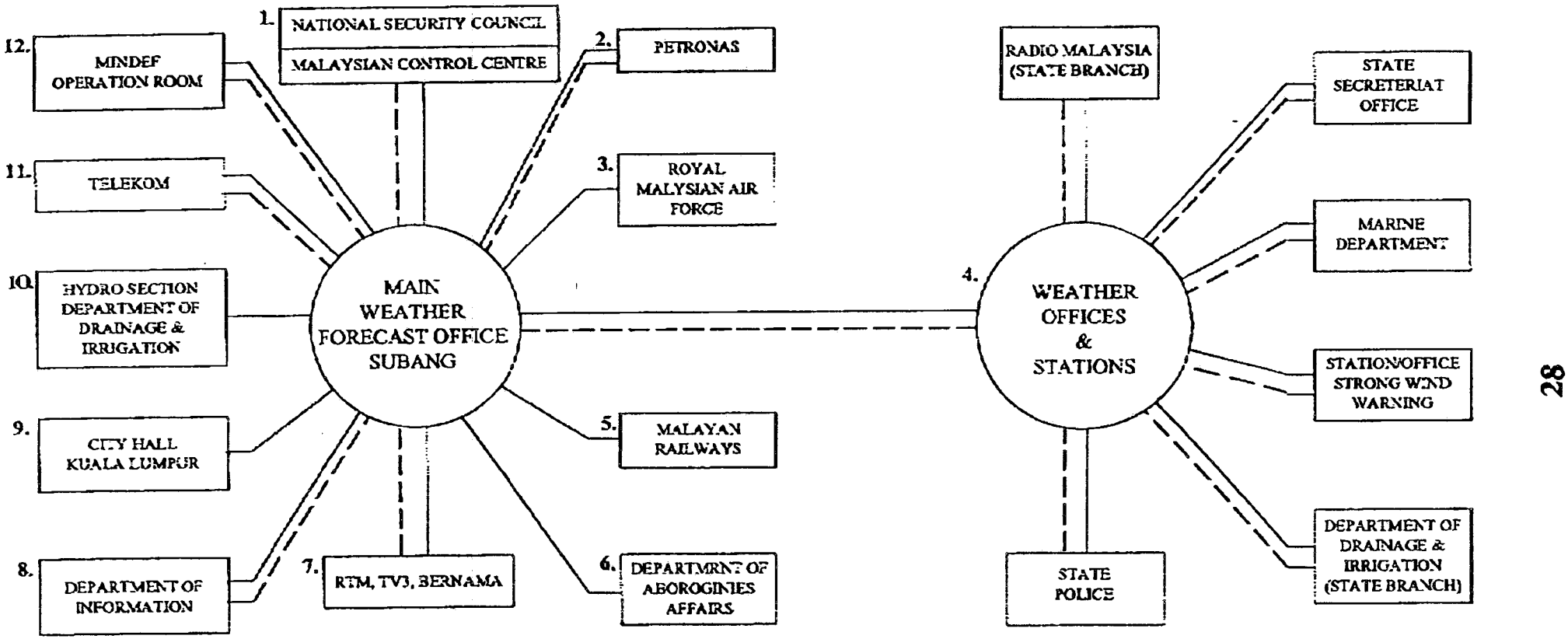


Figure 3.: Distribution of basic wind speed (V) in Peninsular Malaysia. Maximum gust speed in m/s likely to be exceeded on the average only once in 50 years at 10 m above the ground in open level country

TRANSMISSION OF WEATHER WARNING AND SEA CONDITION IN PENINSULAR MALAYSIA

NATIONAL LEVEL IN PENINSULAR MALAYSIA

STATE LEVEL IN PENINSULAR MALAYSIA



LEGEND

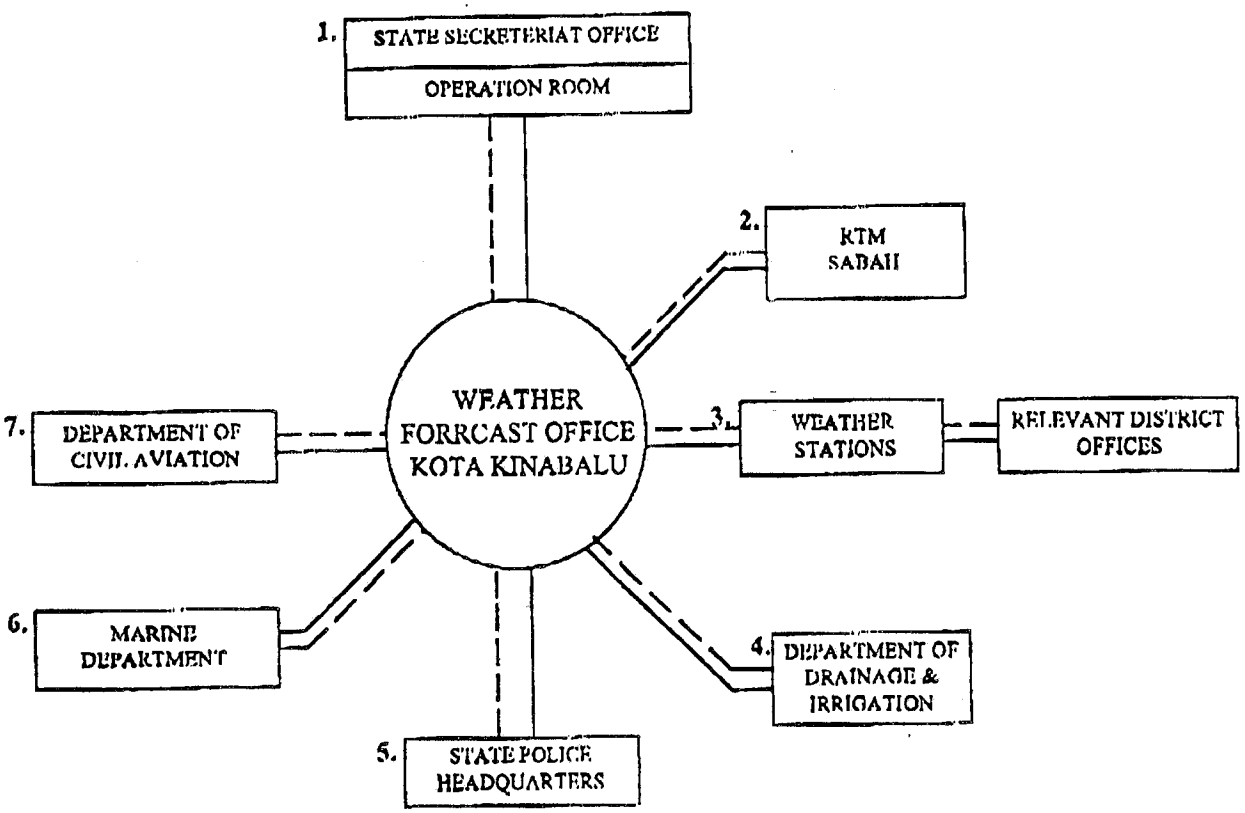
——— TRANSMISSION OF HEAVY RAINFALL WARNING

— — — TRANSMISSION OF STRONG WIND AND ROUGH SEA WARNING

NOTE: (1) Advise on heavy rainfall is transmitted to authorities 1, 3, 4, and 10 only.

(2) Advise on strong wind is transmitted to authorities 1, 2 and 4.

TRANSMISSION OF WEATHER WARNING AND SEA CONDITION IN SABAH



LEGEND

——— TRANSMISSION OF HEAVY RAINFALL WARNING

— — — TRANSMISSION OF STRONG WIND AND ROUGH SEA WARNING

NOTE: (1) Advise on heavy rainfall is transmitted to authorities 1, 3, 4, and 5 only.
(2) Advise on strong wind is teransmitted to authorities 1, 3, 5 and 6.