

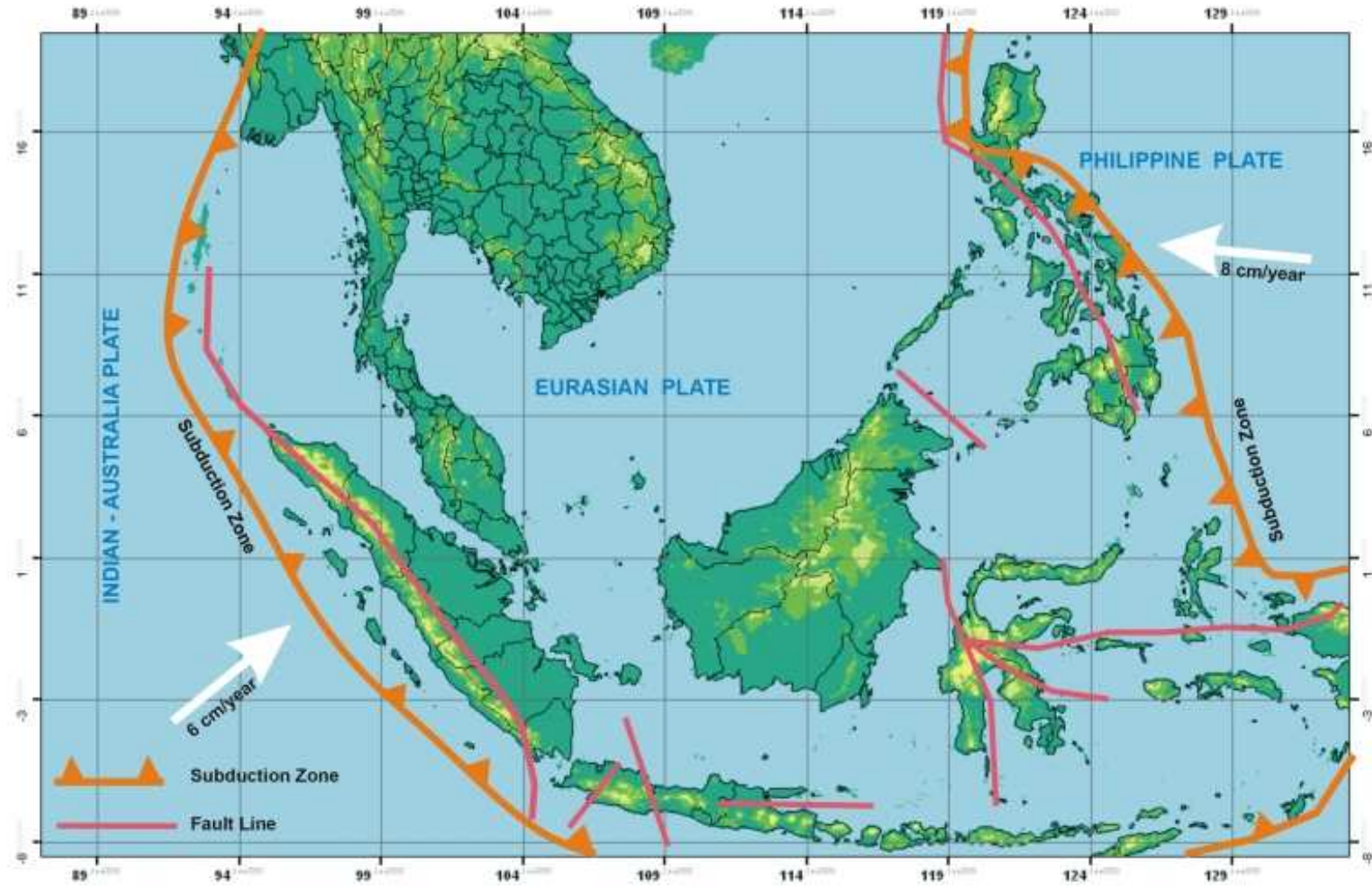
WMO Task Force on Social and Economic Applications of Public Weather Services

Geneva, 15-18 May 2006

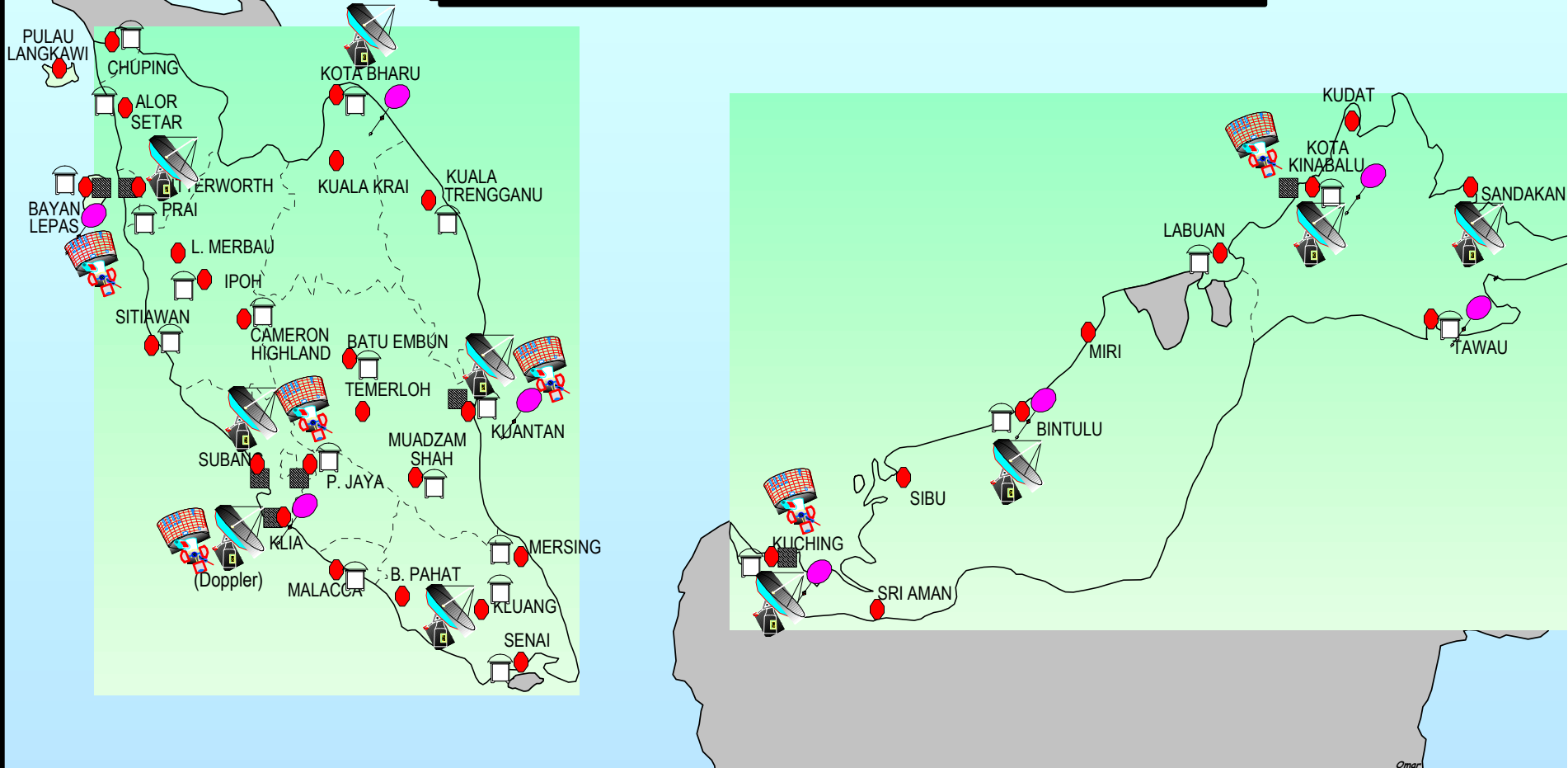
Providers of Weather, Climate and Water Information

KANG THEAN SHONG
MALAYSIAN METEOROLOGICAL DEPARTMENT
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION


LOCATION OF MALAYSIA





RANGKAIAN STESEN PENCERAPAN





Petunjuk


- 

STESEN KAJICUACA UTAMA (38 BUAH)
- 

STESEN PENCEMARAN UDARA (22 BUAH)
- 

STESEN UDARA ATAS (8 BUAH)
- 

STESEN RADAR KAJICUACA (10 BUAH)
- 

STESEN KAJICUACA SATELIT (6 BUAH)
- 

PEJABAT RAMALAN (8 BUAH)

CLIMATE of Malaysia

Equatorial climate – hot & humid

(i) Mesoscale and Orographic driven (Intermonsoons)

- **mostly convective in nature**
- **short duration and high intensity**
- **high spatial and temporal variability**
- **cause of flash floods, landslides and gusts**

(ii) NE Monsoon Rain (SW – generally dry)

- **large scale moisture convergence**
- **heavy rain lasting few days**
- **cause of major widespread floods**

Characteristics

- **diurnal and seasonal**
- **interannual variability (ENSO influence)**

TYPES OF WEATHER-RELATED DISASTERS

- Monsoon Flood
- Flash Floods Forest Fires
- Drought
- Earthquakes &
- Tropical Storms
- Haze and Tsunamis
- Landslides



DISASTER IN MALAYSIA



Drought, heat causing 'abortions' in fruit trees

25/4/98 NST

ALOR STAR, Fri. — The prolonged drought, coupled with the intense heat, have caused young fruit trees in Kedah to wilt and others to suffer from what is known as "abortions".

Harvest hit were durian orchards in and around Padang Temp, Sik and Bukit Tunggai, the majority of which depend on rainfall as the main source of water.

State Agriculture director Syed Farooq Fadil said "abortions" — where young fruits drop because of the hot weather and lack of water — occur naturally sometimes but the problem had become particularly serious this year. He added that trees which had started to flower could not bear fruits because it was too hot.

A plant physiologist at MARDI's fruit Research Centre, Dr Masri Muhammad, who has been studying the effects of water stress on durians for the last 10 years said they were the most sensitive to drought.

He said even durian trees in MARDI's 30ha study site had shown high "abortion" rates and trees were beginning to wilt under high temperatures.

The department has advised farmers to carry out extra watering and provide shade for their trees to reduce the abortions.

However, Masri said, farmers who have approached MARDI for help have said that their meagre water sources had dried up.

MARDI recorded a high of 38.5 degrees Celsius in its Bukit Tunggai station last month and orchards in the same area have had heavy rain only twice in the last two months.

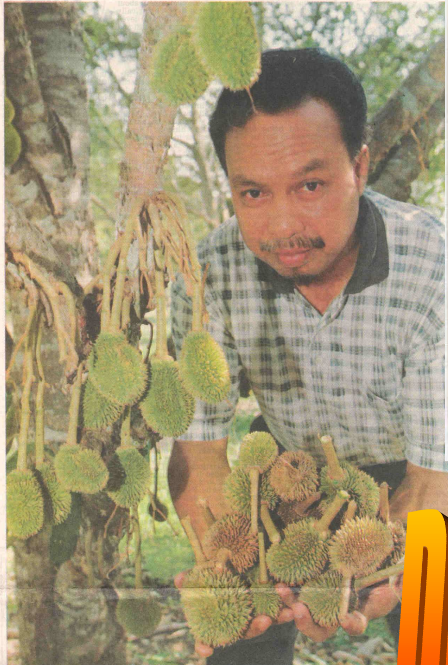
It is learnt that Kedah has a total of 14,911ha under fruit cultivation.

Major fruit crops in the State include durian (4,756 ha), banana (2,083 ha), rambutan (1,884 ha), cempedak (1,461 ha), mango (1,288 ha), mangosteen (915 ha) and pomelo (485 ha).

Kedah produces an estimated 18,228 tonnes of fruits annually.

IN KUALA LUMPUR, with harvests taking a severe beating from the drought, fruit lovers are finding it difficult to obtain favourites like durian, mango and starfruit.

The fruit distribution chain has been affected by



LOST HARVEST ... Masri showing the young durians which have dropped. Despite adequate supply and relatively healthy trees, the high temperatures have caused the fruits to drop.



KILLER STORM

At least 106 dead as tropical storm batters Sabah



GREG'S FURY ... the Sungai Pampang bridge linking Tambunan to Keningau was badly damaged after the storm battered the west coast of Sabah yesterday.

KOTA KINABALU At least 106 people were killed and 110 reported missing when the tropical storm Greg lashed Sabah yesterday.

State declared a full alert as the tropical storm left more than 3,000 families homeless in the interior.

In Keningau, rescue workers recovered 102 bodies. Two

each were found in Tuaran and Kota Kinabalu, police officers

Some victims never woke from their sleep as the storm, with winds peaking speeds of up to 240 km per hour, ripped through Labuan, Kota Kinabalu, Papia, and Tambunan.

Many bodies were stuck in the mud area in houses near the mud near Pampang River.

Some of the Keningau Army recruitment officer Capt Mohd Yusef Abdullah believed they had been buried alive.

They must have tried to escape from their homes which were swept into rivers and ended up in the mud," said

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Kapt Yusif, who saw a child's torso and another man buried in the mud near Pampang River.

At least six ships were blown across while dozens of fishing trawlers and boats capsized in waves rising up to three and four metres during the height of the storm in Keningau-Nabawan road links

were cut off because of some outlandish and washed away bridges. At present, three links have yet to be repaired.

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● TURN TO PAGE 3

DISASTER IN MALAYSIA



RATUSAN penduduk meninjau kawasan banjir lumpur di Kampung Sri Gunung Pulau, Pontian, Johor yang mengahyukan empat rumah dan pejabat Jabatan Hutera, semalam. Sementara itu, anggota Bomba dan Penyelamat meneruskan usaha mencari empat mangsa lagi yang masih hilang dalam kejadian itu (gambar kecil). — Gambar oleh Roslan Khamis

Bakar Said, berkata kejadian berlaku kira-kira jam 11 malam tadi apabila timbunan bakul, tangga kayu dan sampah sarap dihanyutkan air

LHAT MUKA 4



DETERMINED LOT ... Muslims who attended the Friday prayers in a mosque yesterday in Kuching had to cover their noses and mouths from the polluted air. — NST picture by Matzidi Dris



Weather, Water and Climate Information

- General weather forecast & severe weather warning - public, disaster management agencies, mass media and electricity, oil and gas companies.
- Marine Meteorological Forecast - marine activities and shipping agencies.
- Aviation Meteorological Forecast
- Monthly Agroclimatic Analysis & Outlook
- Seasonal monsoon weather
- 10 days Agromet & Monthly Climate outlook Weather Review
- Annual Climate Summary of Malaysia
- Seismic activities & Tsunami Warning
- Hot Spots Map & Fire Danger Rating System
- Climate & Environmental data for the relevant agencies.

WEATHER PREDICTIONS

- 1 day short range weather forecast to media and on web page – weather for states and winds and sea conditions
- 3 days 6 hourly short range forecast for off shore oil and gas operation – weather, winds and waves
- 7 days medium range (i) weather forecast for major towns and tourist destinations and (ii) marine forecasts on web page – (i) weather and maximum and minimum temperatures and (ii) weather and wind and sea conditions & tides information
- Nowcasting to short-range weather warnings to disaster management agencies, media, and on web page

THE BIG CHALLENGE - Severe Weather Warning

Early Warning System

(i) Short duration heavy precipitation

- Target areas (Kuala Lumpur & Major cities)
- Sufficient lead time (hours)

(closure of SMART tunnel for traffic, still initial)

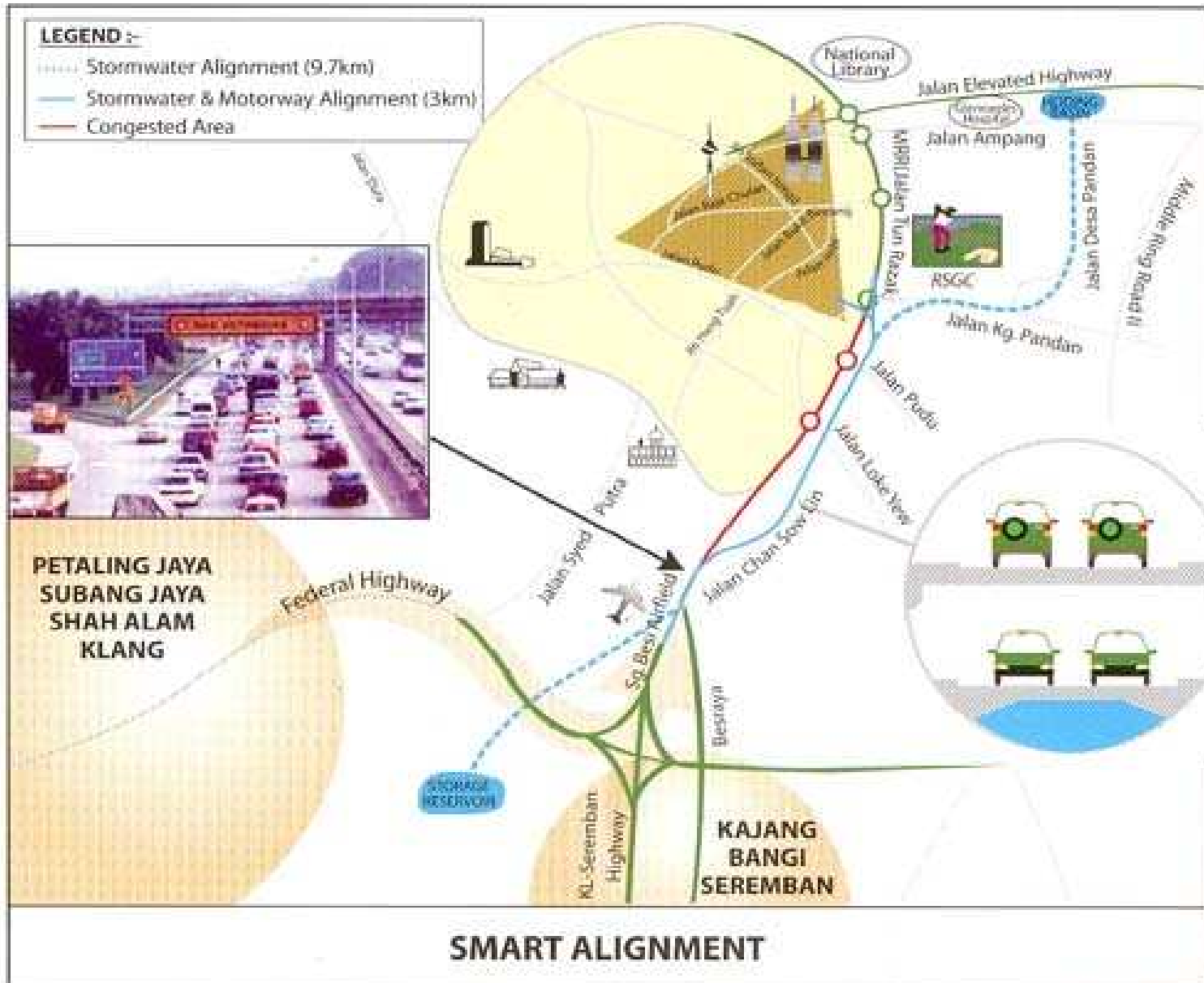
(ii) Widespread monsoon rain

- Location (most affected areas)
- Lead time more than a day

(Some mechanism is in place to provide advisories and warnings but more work needs to be done to forecast the intensity/severity and a more precise location)

(iii) Tropical Storm (Greg, Vamei)

SMART TUNNEL



10 - DAY AGROMETEOROLOGICAL BULLETIN

(Web)

1.0 SUMMARY

2.0 WEATHER ASSESSMENT

2.1 RAINFALL – Total, %age departure and extreme weather conditions (maps)

2.2 EVAPORATION – Mean daily (map)

2.3 SOLAR RADIATION – Mean daily (map)

2.4 TEMPERATURE – Mean daily and departure, max & min (descriptive)

3.0. SOIL MOISTURE DISTRIBUTION (map)

4.0. WEATHER OUTLOOK FOR THE COMING DECADE – Rainfall (map)

5.0 EXPECTED WEATHER IMPACT ON AGRICULTURE DURING THE COMING DECADE – Soil moisture related (descriptive)

Figure 1 : 10 days Rainfall Total (mm)

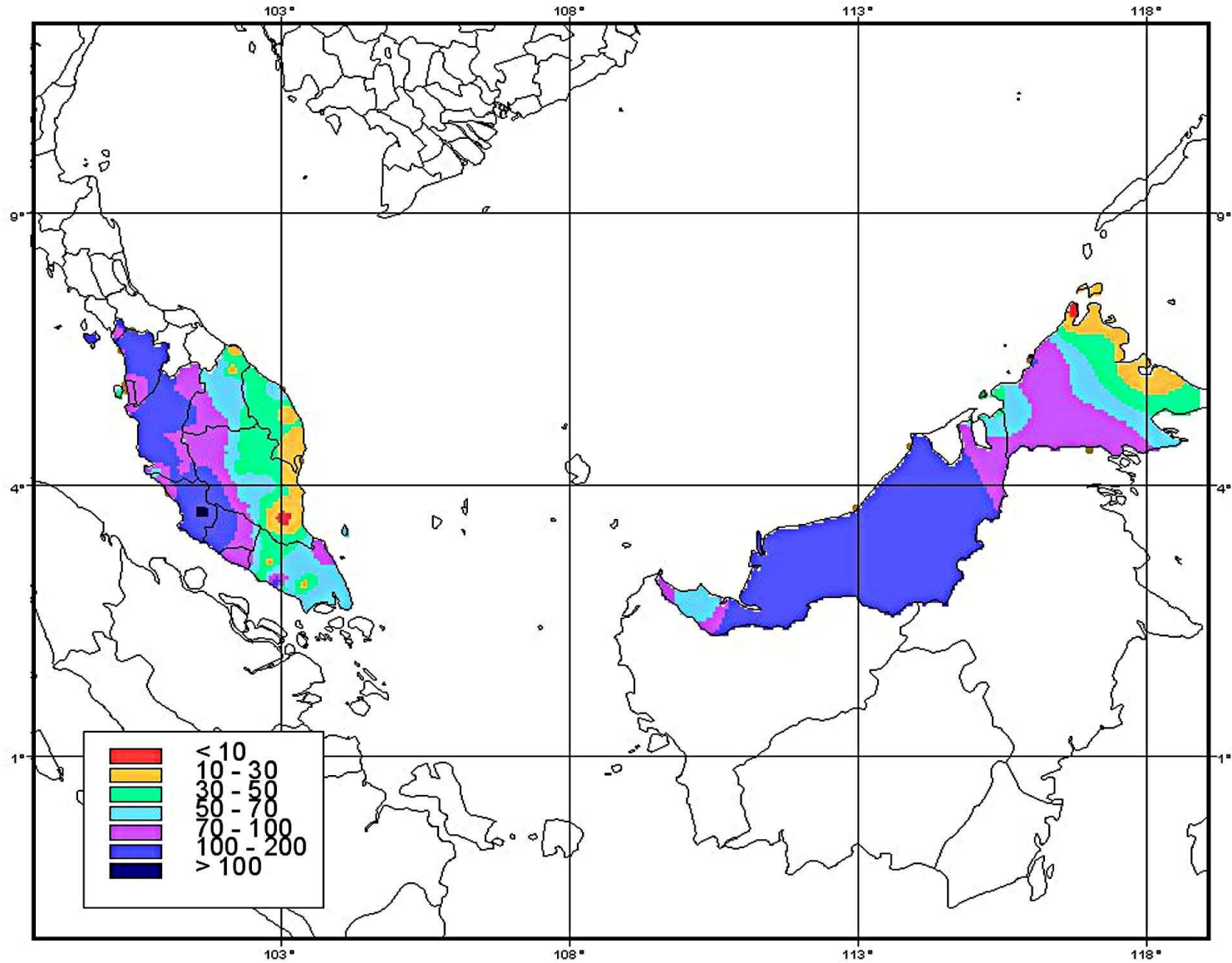


Figure 2 : Rainfall Percentage from Normal (%)

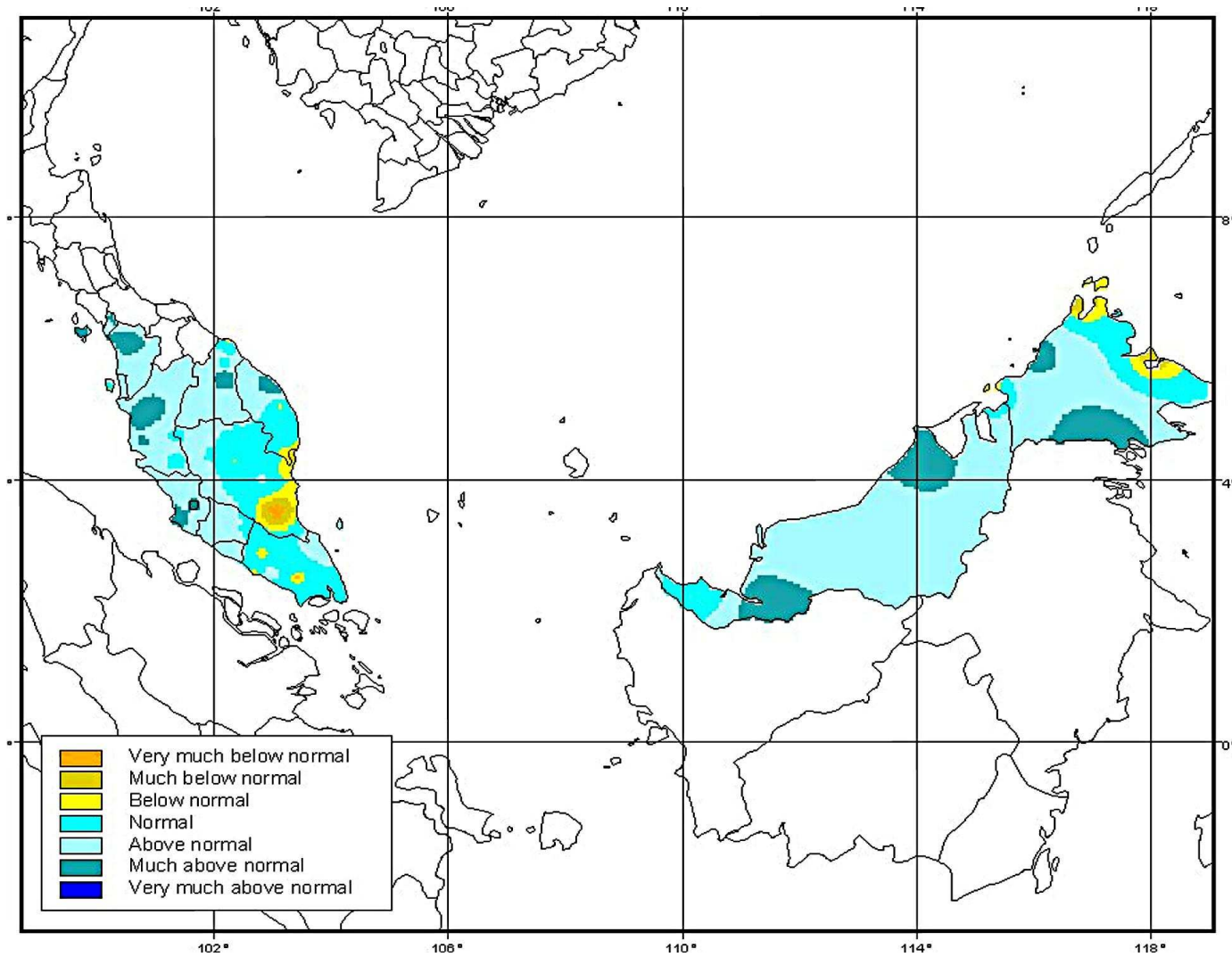


Figure 3 : Extreme Weather Conditions

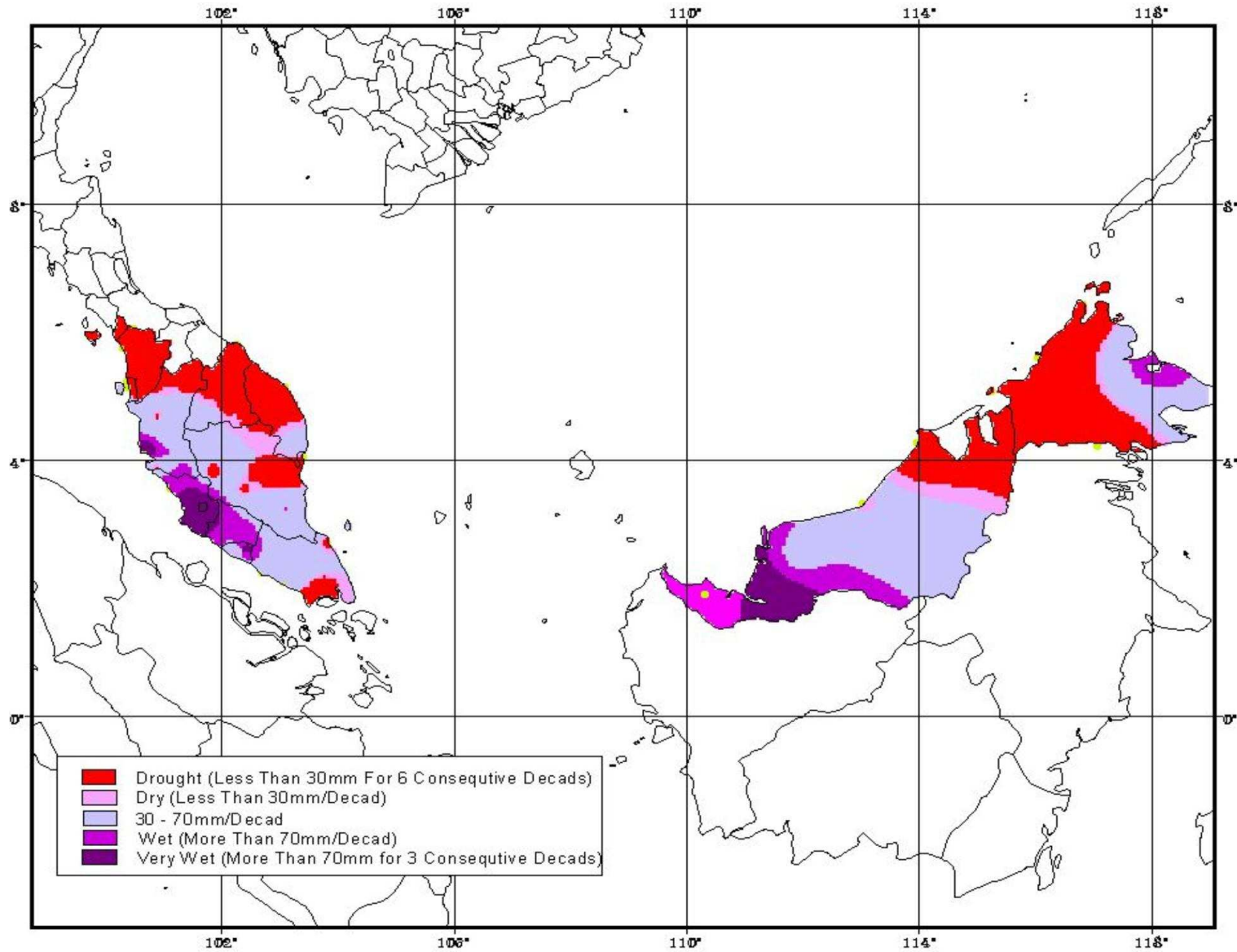


Figure 4: Mean Daily Evaporation (mm)

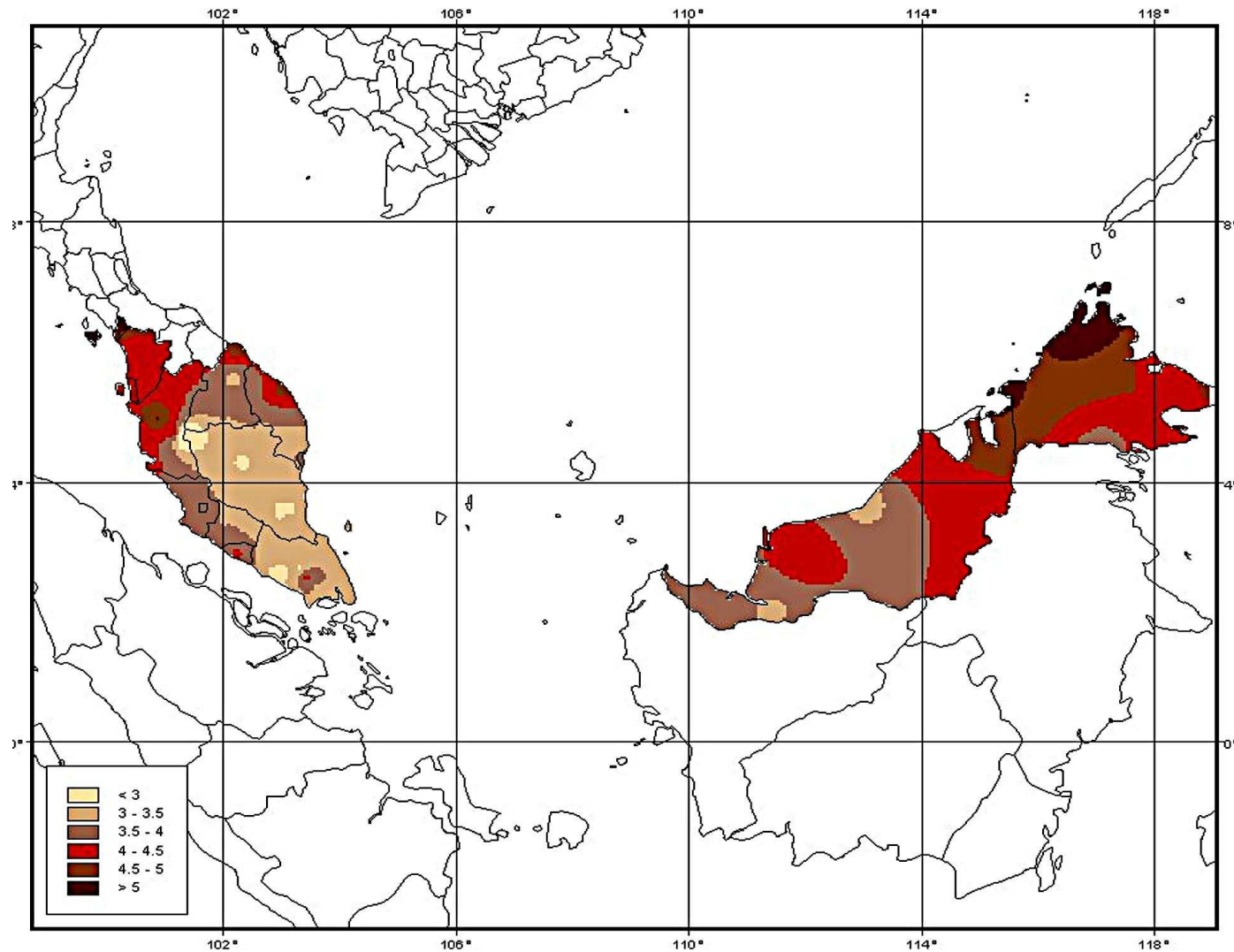


Figure 5 : Mean Daily Solar Radiation (MJm^{-2})

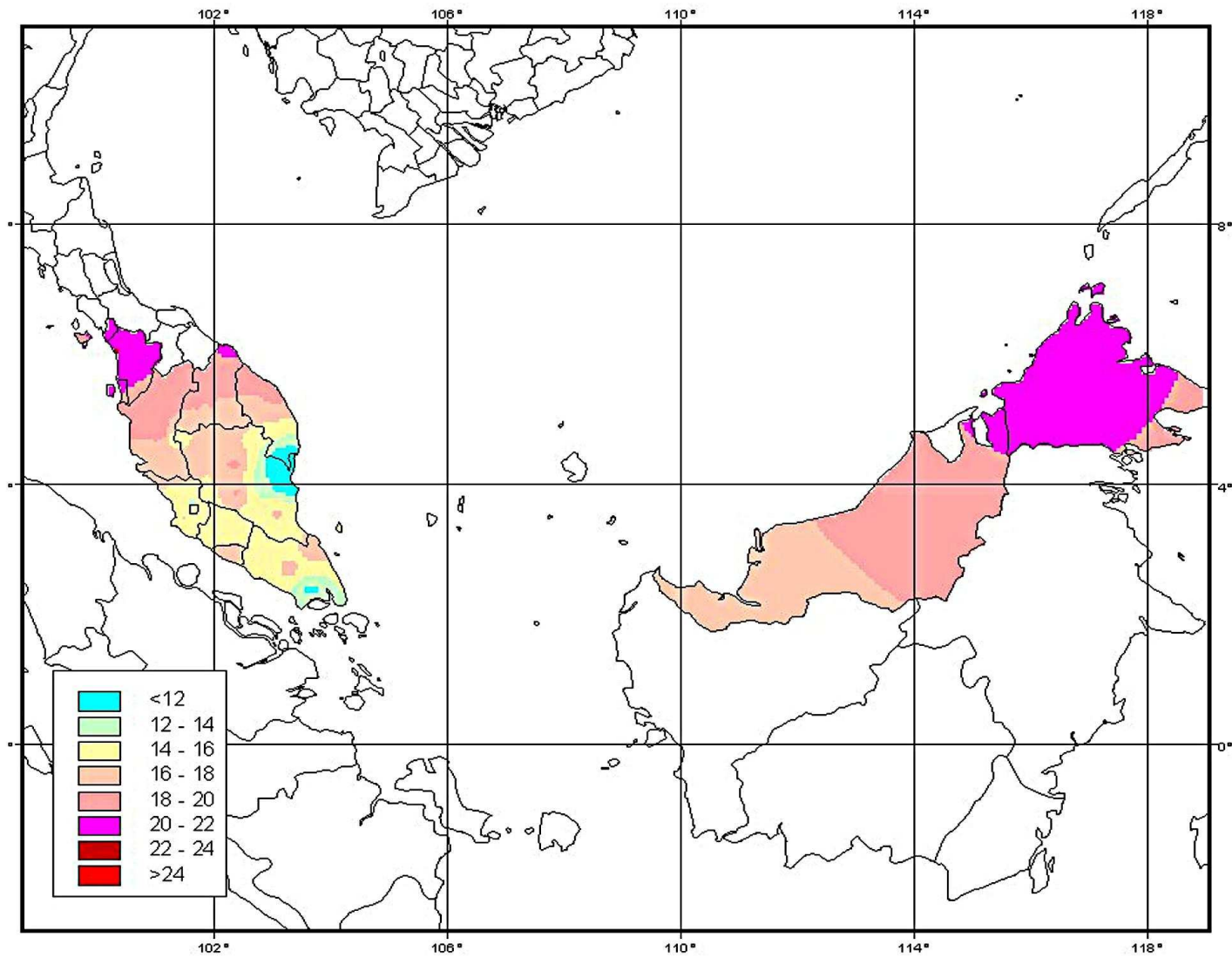


Fig. 6 : Deviation from normal of mean temperature (°C) at 29 Principal Meteorological Stations in Malaysia

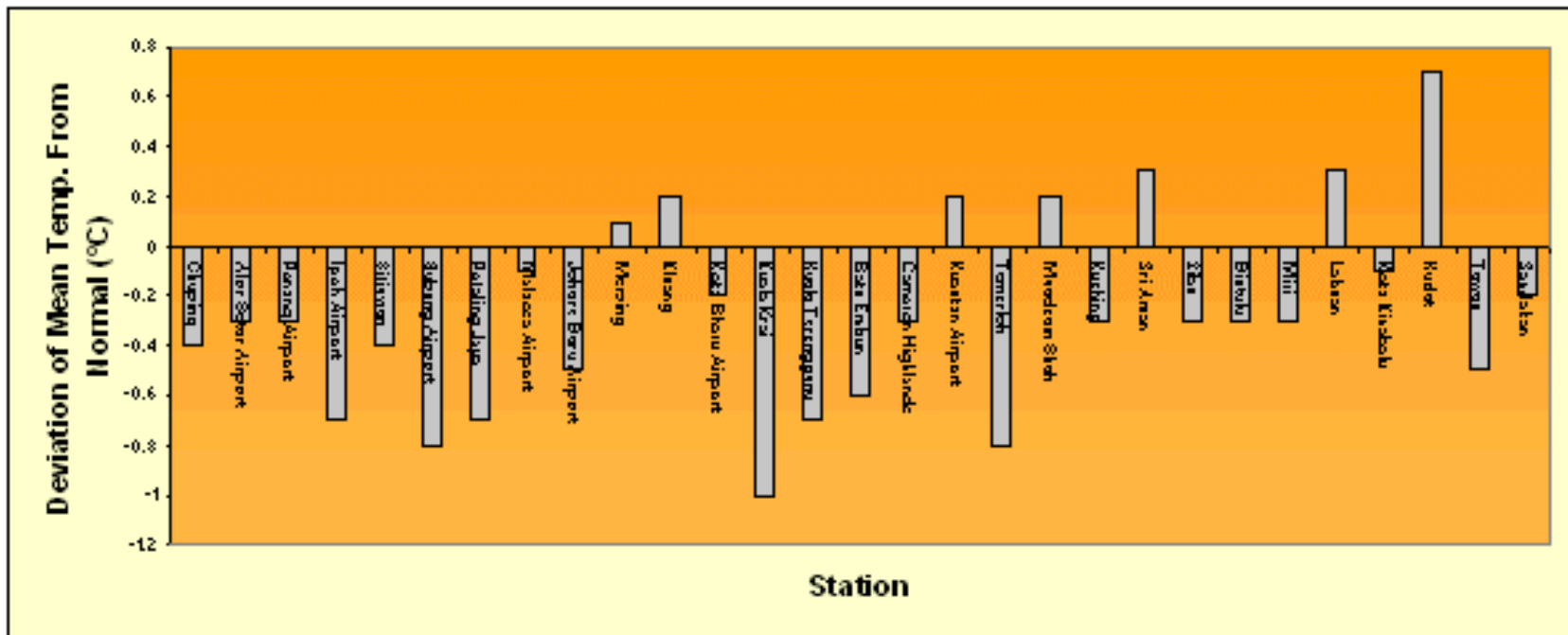
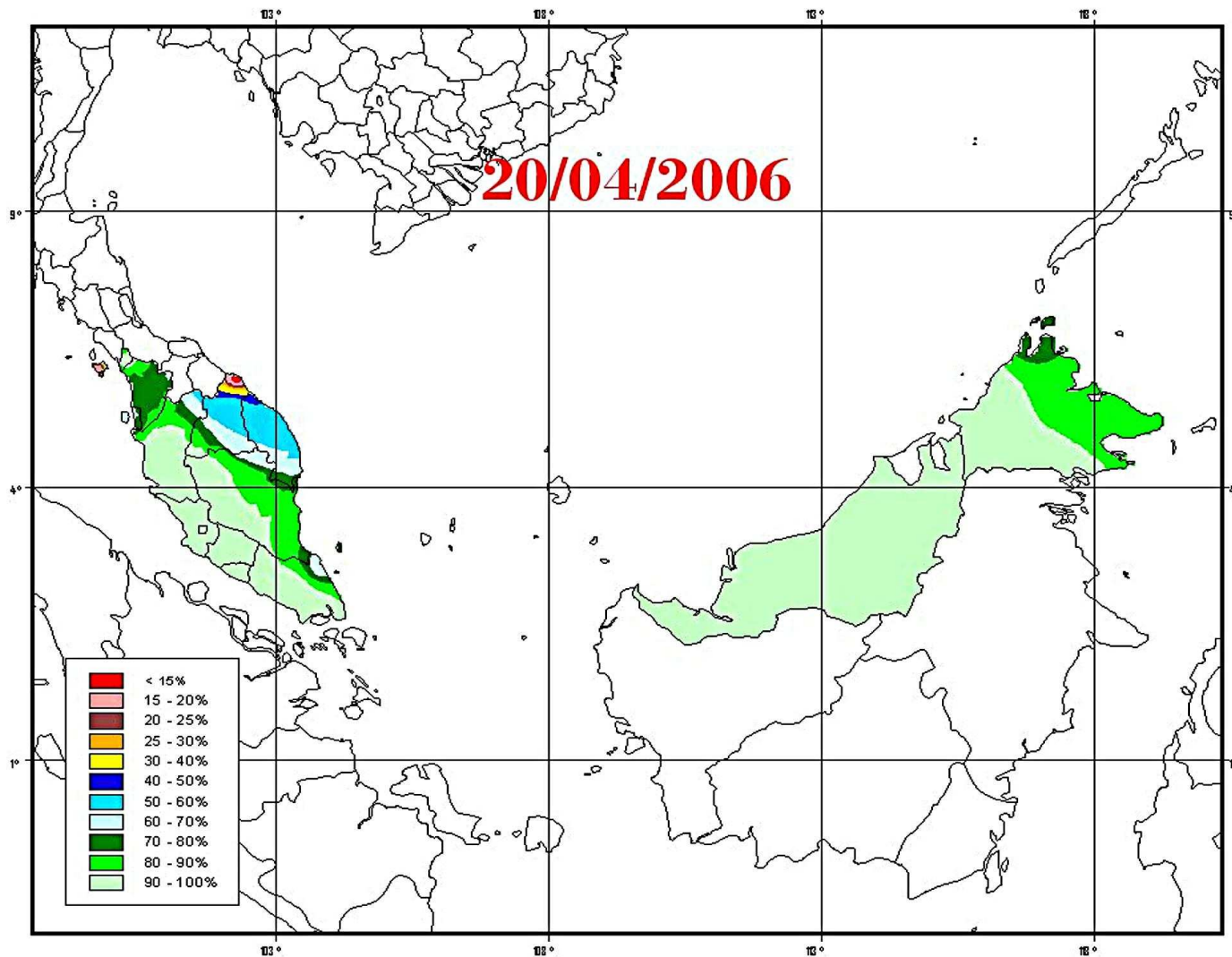


Figure 7 : Soil Moisture Distribution



The soil moisture shown in the map is indicative values of the amounts of water in the top 1m depth of a horizontal soil. They are estimated daily by the water budgeting/balance method. Daily rainfall amounts are used as inputs to the soil water content. The daily evapotranspiration rates are estimated by using the modified Penman-Monteith formula which needs as inputs daily mean values of temperature, humidity, solar radiation and wind speed. These meteorological variables together with rainfall are those measured at principal meteorological stations of the Malaysian Meteorological Service (MMS) located throughout the country. A few stations that are manned by non-MMS staff are also included to improve the spatial coverage. At the non-MMS staffed stations, solar radiation is usually not measured and sunshine duration is used to estimate the value of solar radiation by applying the Angstrom Equation. The ArcView software is employed to perform spatial analysis.

The holding capacity of the soil is assumed to be 30 cm out of the 1 m depth of soil. The field capacity and wilting point are assumed to have the values 0.3 and 0.1 respectively. For interpreting these maps, please refer to the following table:

**Soil Moisture Content
Condition**

> 30% - Very Wet

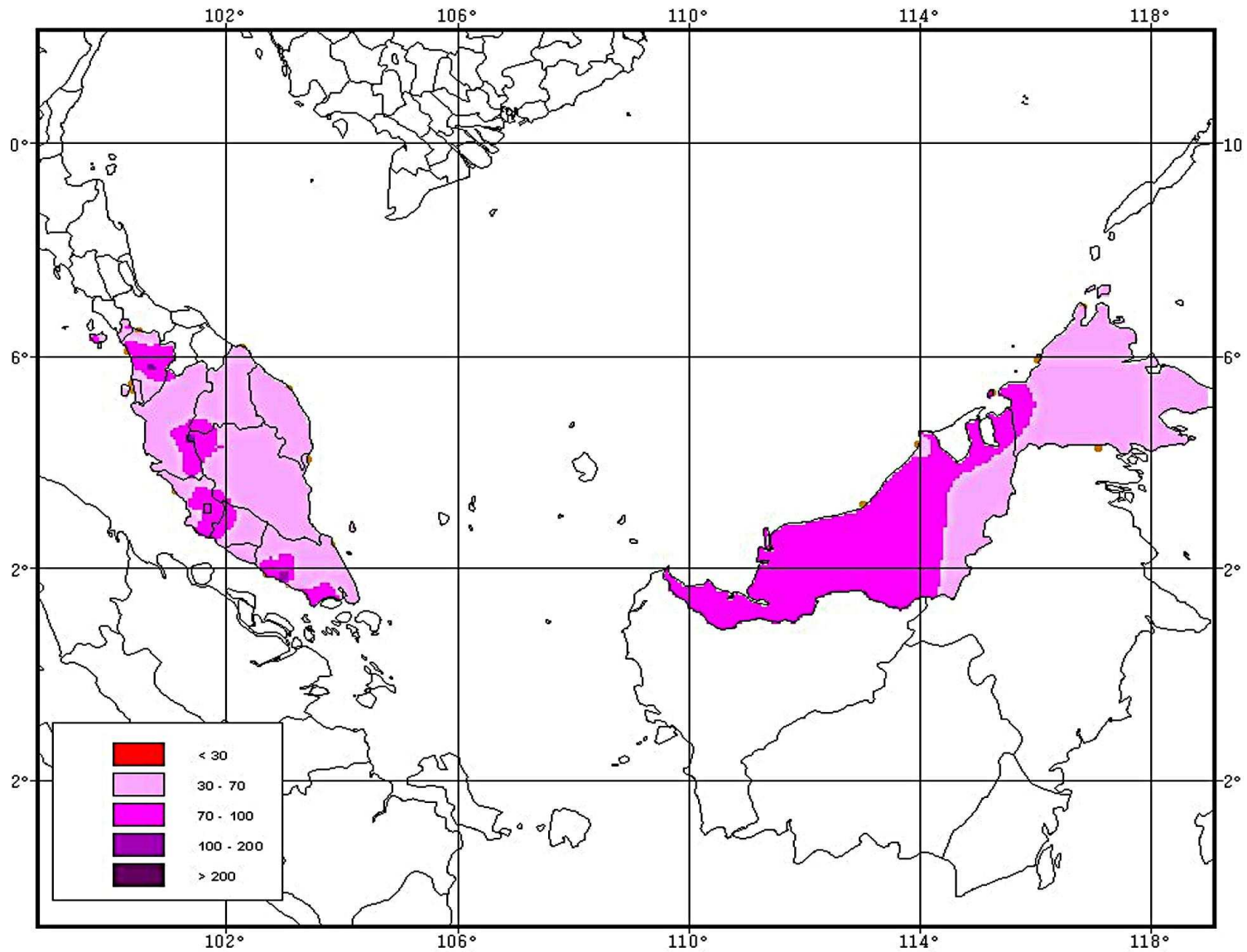
25 - 30% - Wet

20 - 25% - Moderate

15 - 20% - Dry

<15% - Very Dry

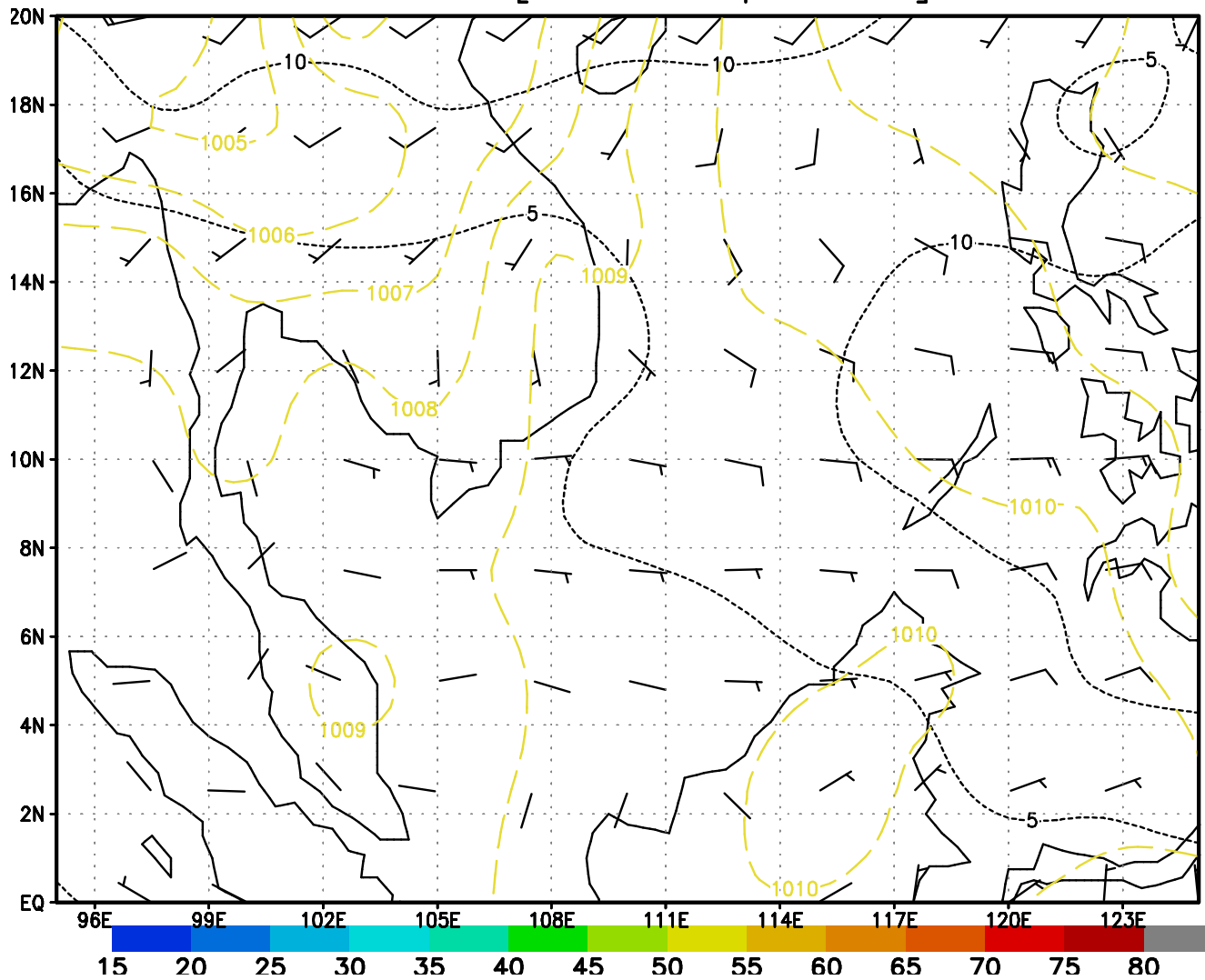
Figure 8 : Rainfall (mm) for the 10 days Period



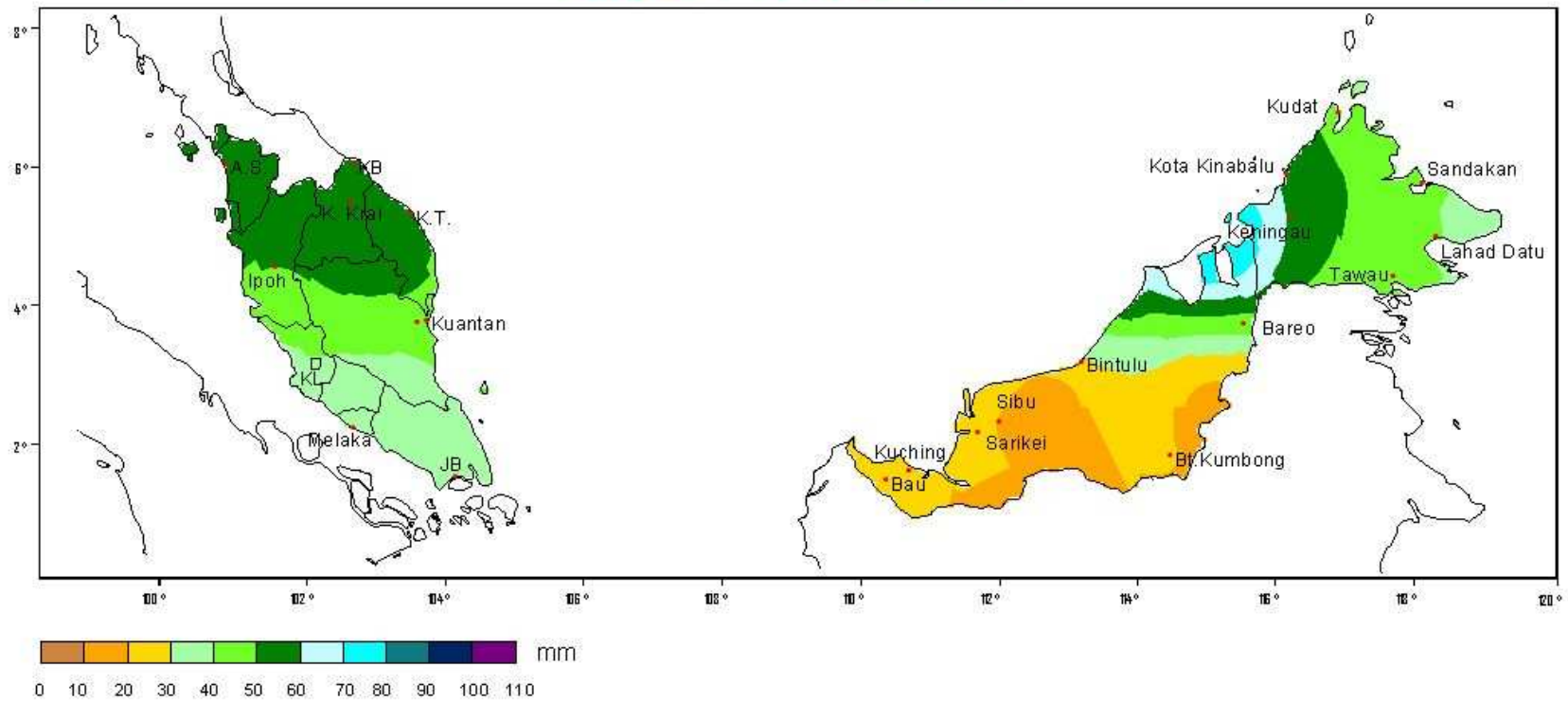
Monthly Agroclimatic & Monsoon Outlook

- **Monthly Agroclimatic Analysis & Outlook (soft)**
(MARDI, FELDA, MPOB, Estates, Farmers (Pomeloes))
 - **Weekly Maps for 5000ft Wind, Mean Sea Level Pressure and Accumulated Rainfall (mm)**
 - **Weather outlook for the Monsoon Season**
 - (i) **Characteristics of the monsoon**
 - (ii) **ENSO and general weather outlook for the month**
- **Seasonal Monsoon Outlook (web & hard copy)**
to disaster management agencies and on web page
 - **Characteristics of the Monsoon**
 - **Rainfall statistics for the last few months**
 - **ENSO, General weather outlook including Rainfall range for each state**

5000 ft Wind and Mean Sea Level Pressure Outlook 1st week [01 - 07 April 2006]



Weekly Accumulated Rainfall (mm) for 01 April - 07 April 2006



Monthly Weather Bulletin

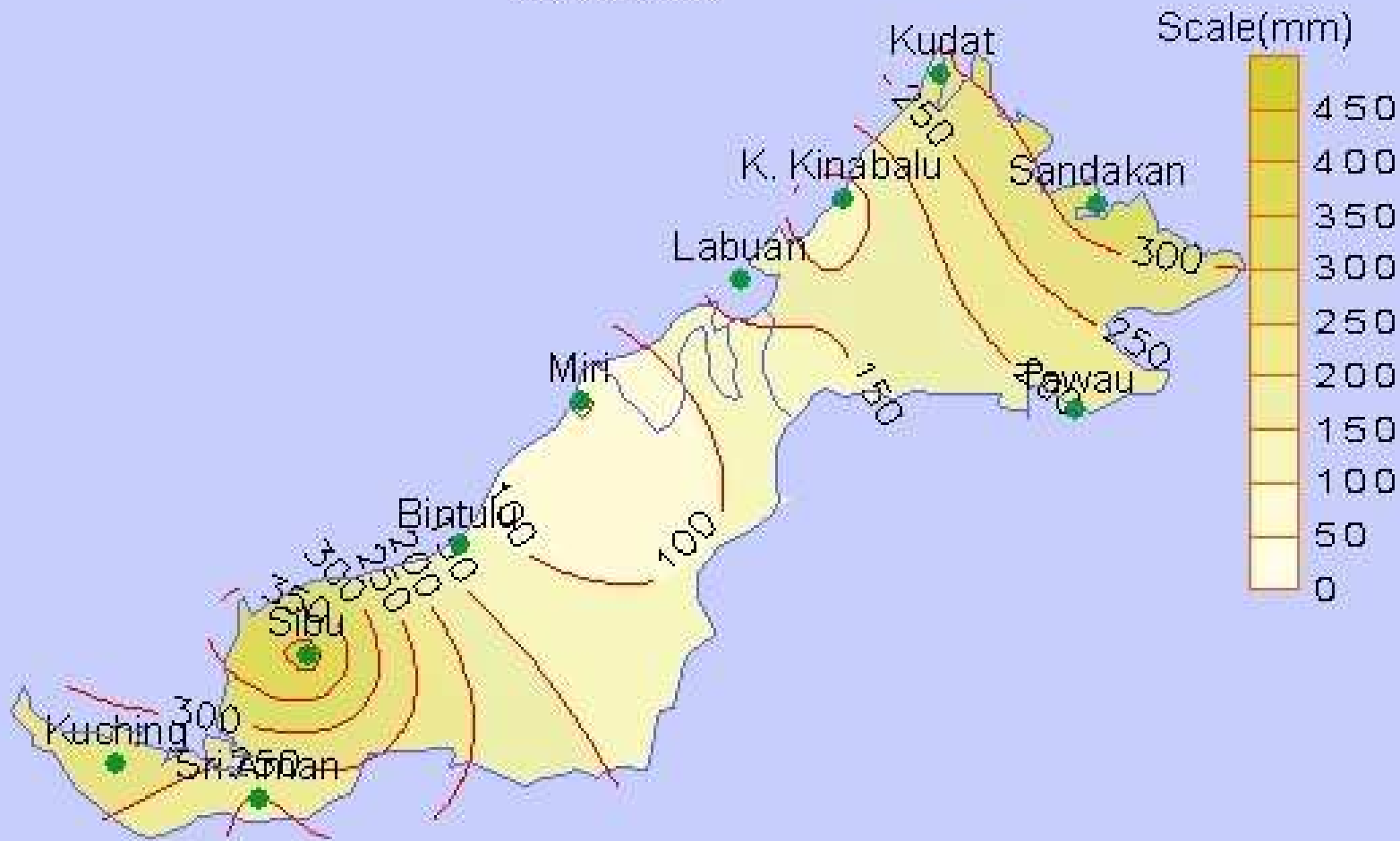
(Web)

- 1. SUMMARY**
- 2. RAINFALL – General descriptions & map**
- 3. TEMPERATURE – General descriptions**
- 4. SOLAR RADIATION – General descriptions**
- 5. EVAPORATION – General descriptions**

Fig.1: Rainfall Amount (mm)
March 2006



Fig.2: Rainfall Amount (mm)
March 2006

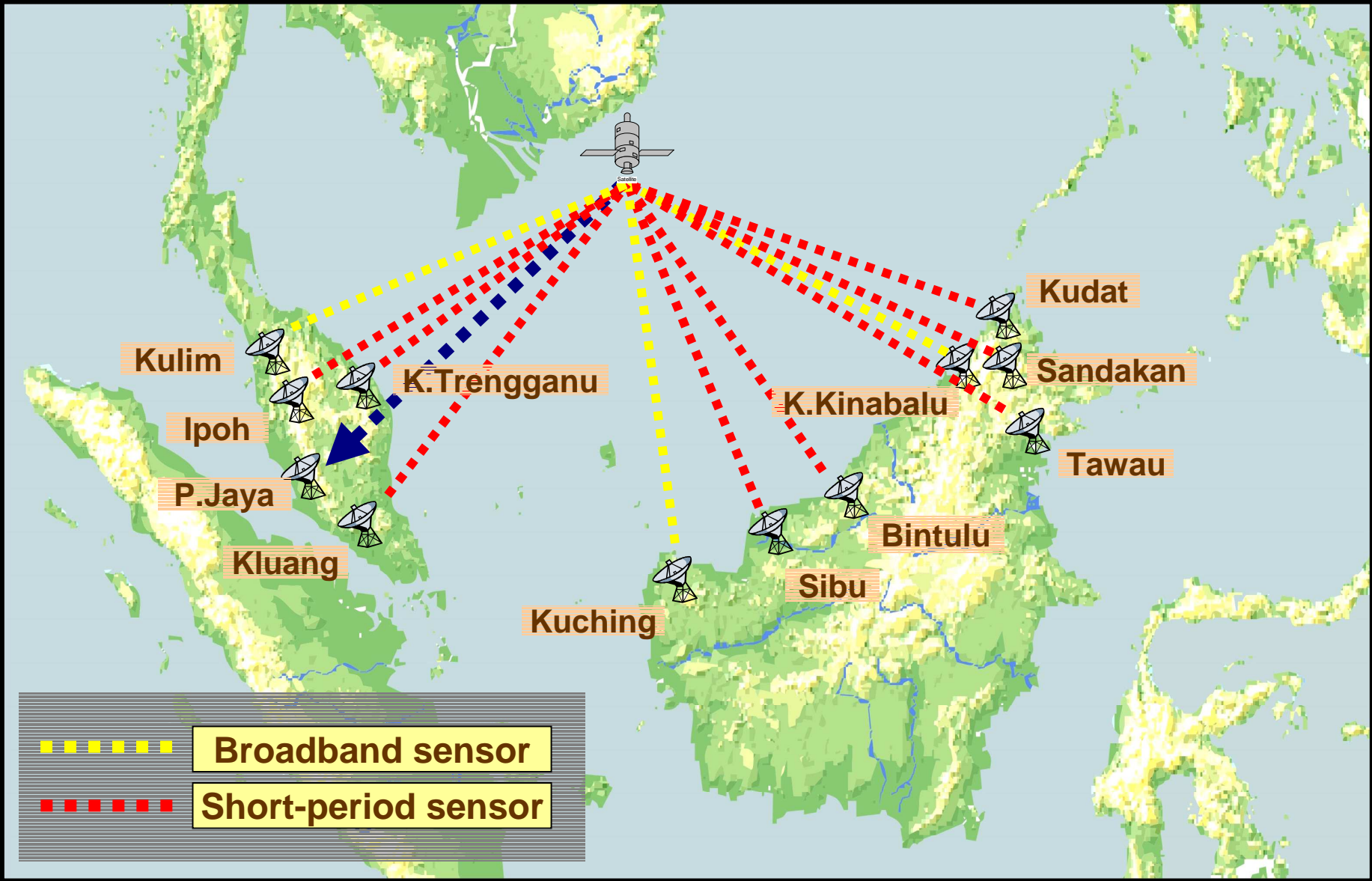


ANNUAL CLIMATE SUMMARY

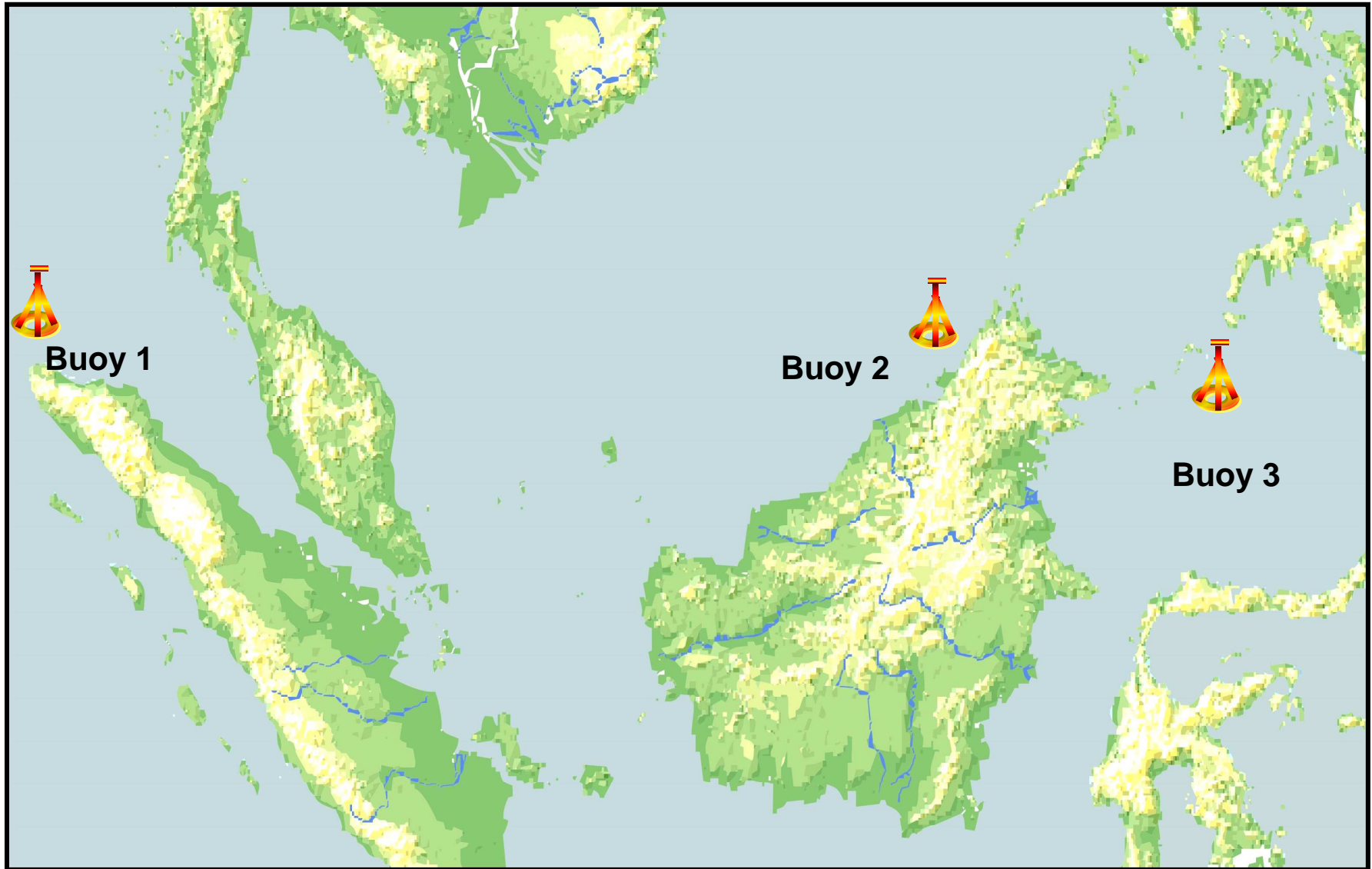
(soft & hard copy)

- 1. BRIEF SUMMARY OF GLOBAL CLIMATE**
- 2. RAINFALL – General descriptions & maps**
(monthly and annual with time series of anomaly)
- 3. TEMPERATURE – General descriptions & maps**
(annual 24 hr mean, mean max. and min. deviations, time series of annual mean, mean max. and min. temperature, monthly mean max. and min. deviations)
- 4. SOLAR RADIATION – General descriptions & bar charts of monthly mean daily**
- 5. EVAPORATION – General descriptions & bar charts of monthly mean daily**
- 6. Significant Weather Events**

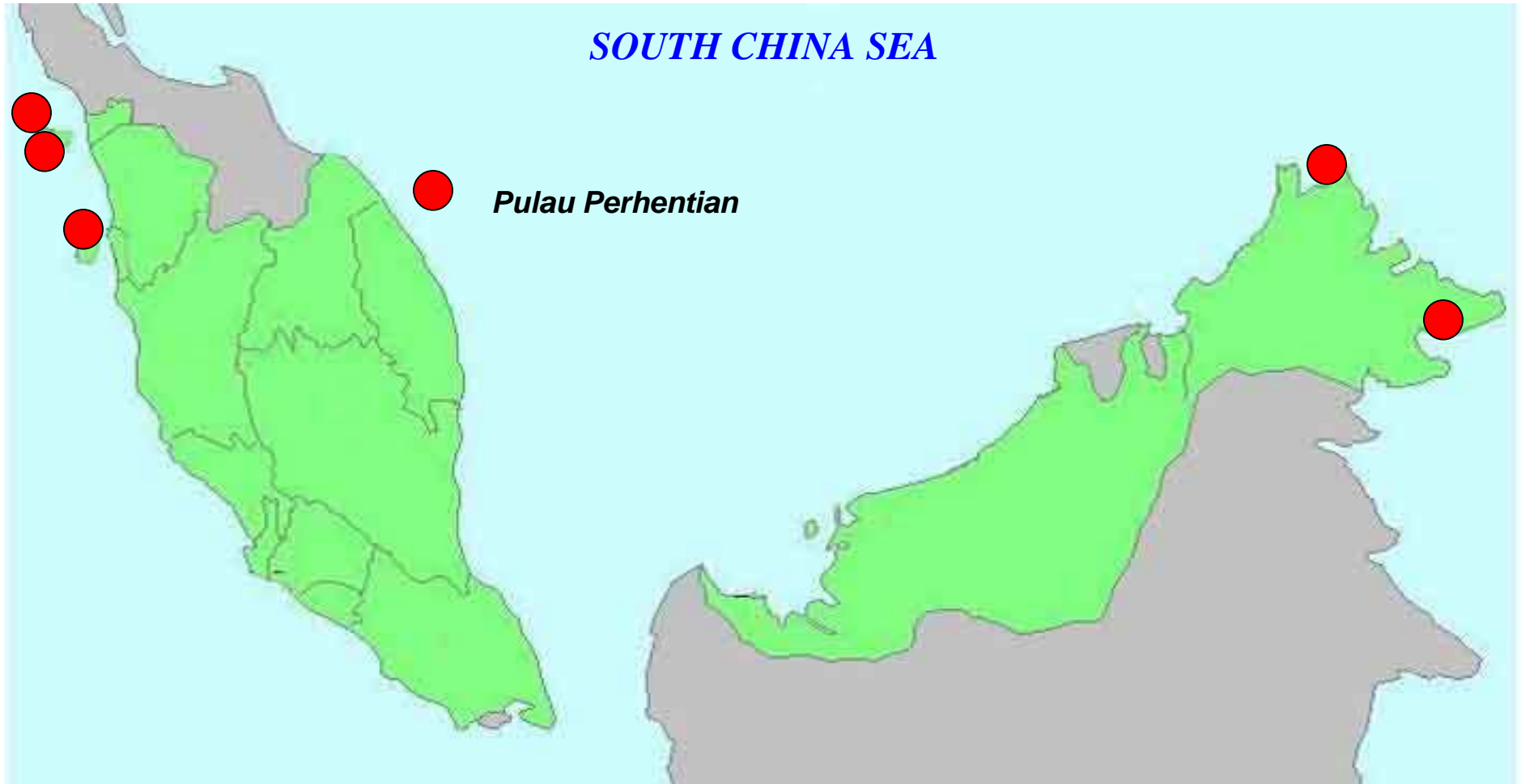
NATIONAL SEISMIC NETWORK



PROPOSED OCEAN BUOY LOCATIONS



PROPOSED NEW TIDAL GAUGES



Dissemination Component

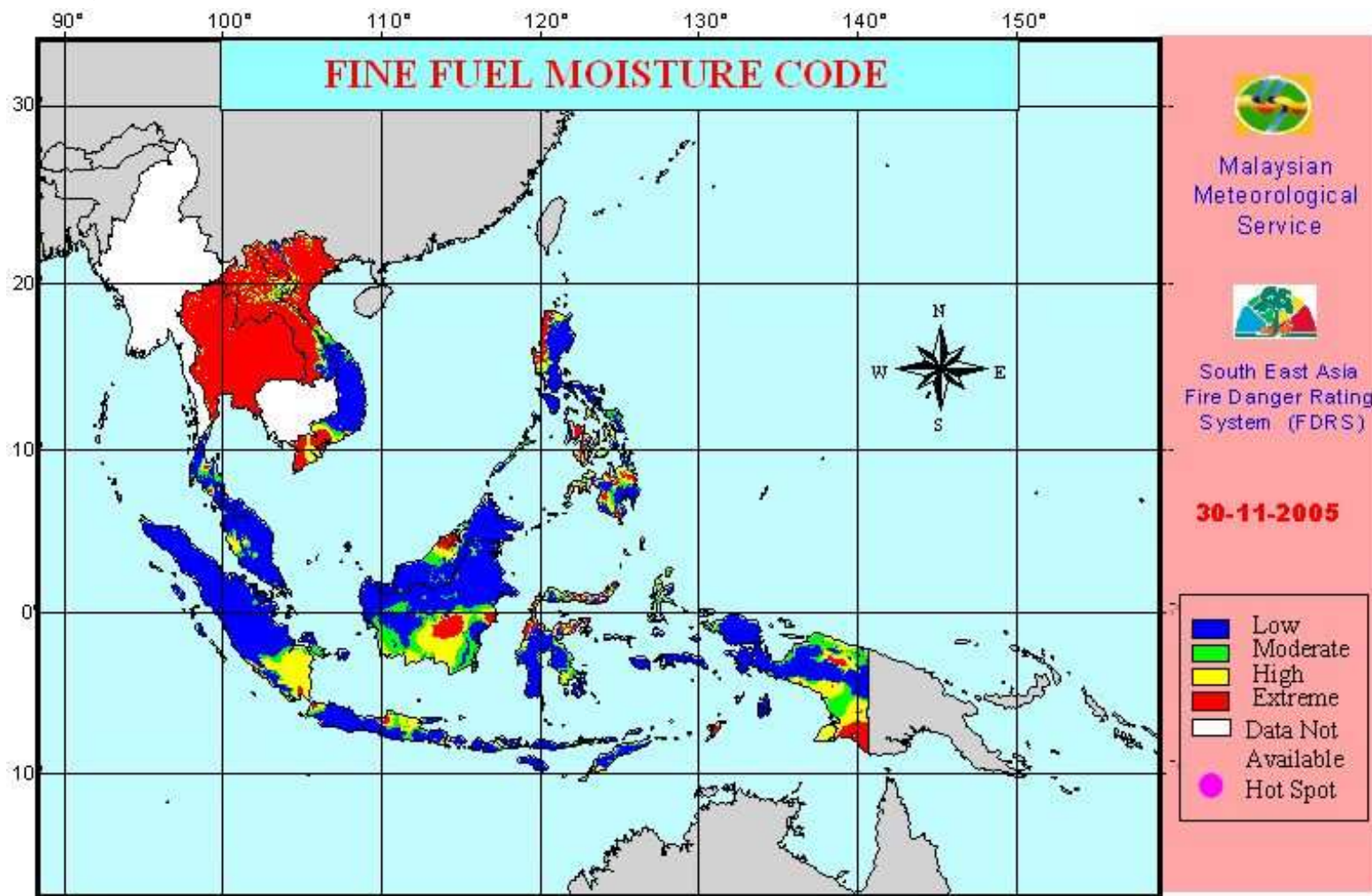
- SMS to selected users
- Public Alert (cell broadcast & fixed line phone)
- Telefax
- Media Broadcasting
- Public Announcement (Siren & Mosque Facilities)
- Web-page

FDRS

- A system that monitors forest/vegetation fires risk and supplies information that assists in fire management
- Can be used to predict fire behaviour
- Can also be used as a guide to policy-makers in developing actions to protect life, property and the environment
- Meteorological parameters used include temperature, RH, rainfall & wind speed
- Spatial analysis carried out using ArcView software

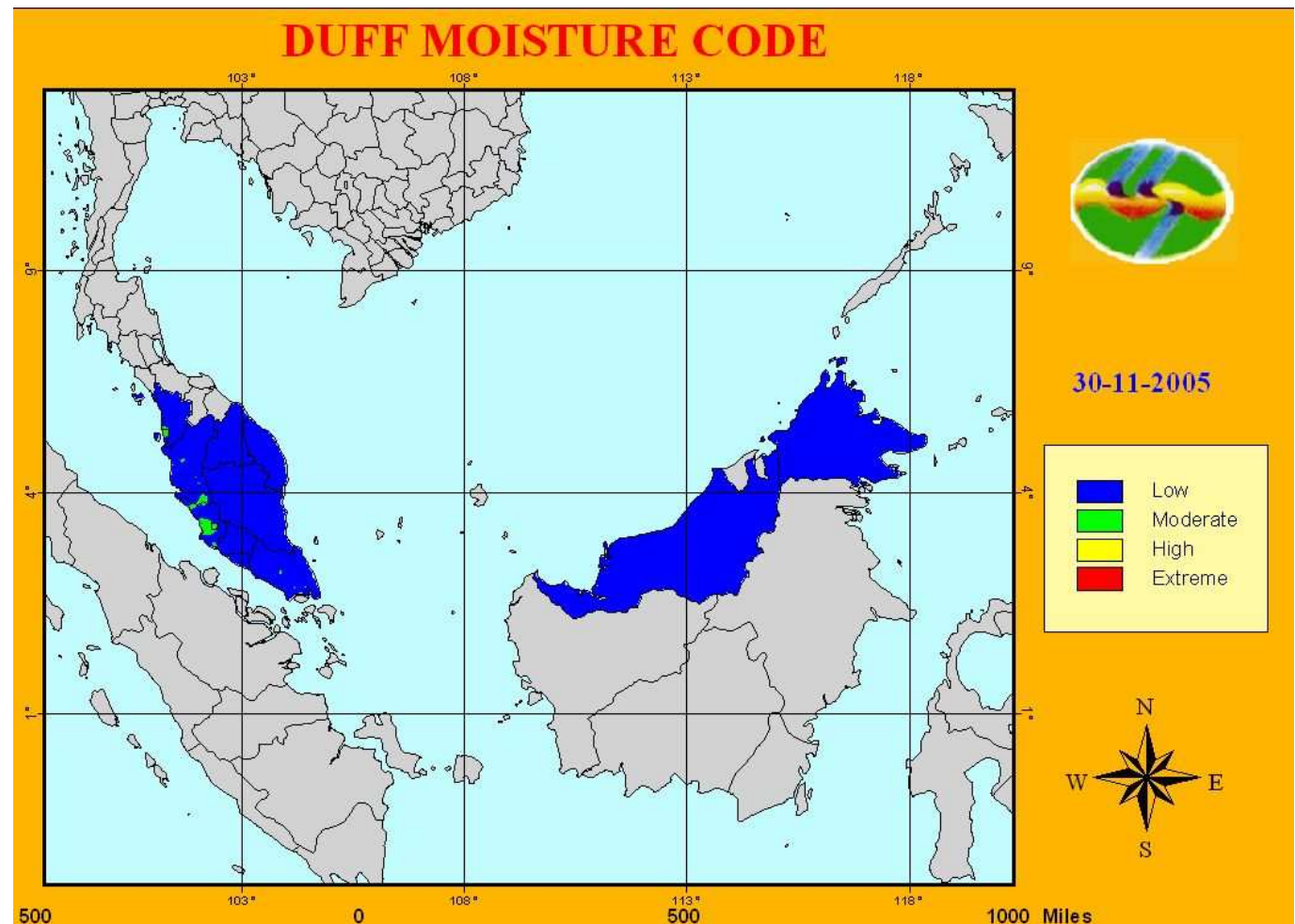
Fine Fuel Moisture Code

Numerical ratings of moisture content of litter & other cured fine fuels. Used as indicator of ignition potential & spread of fire.



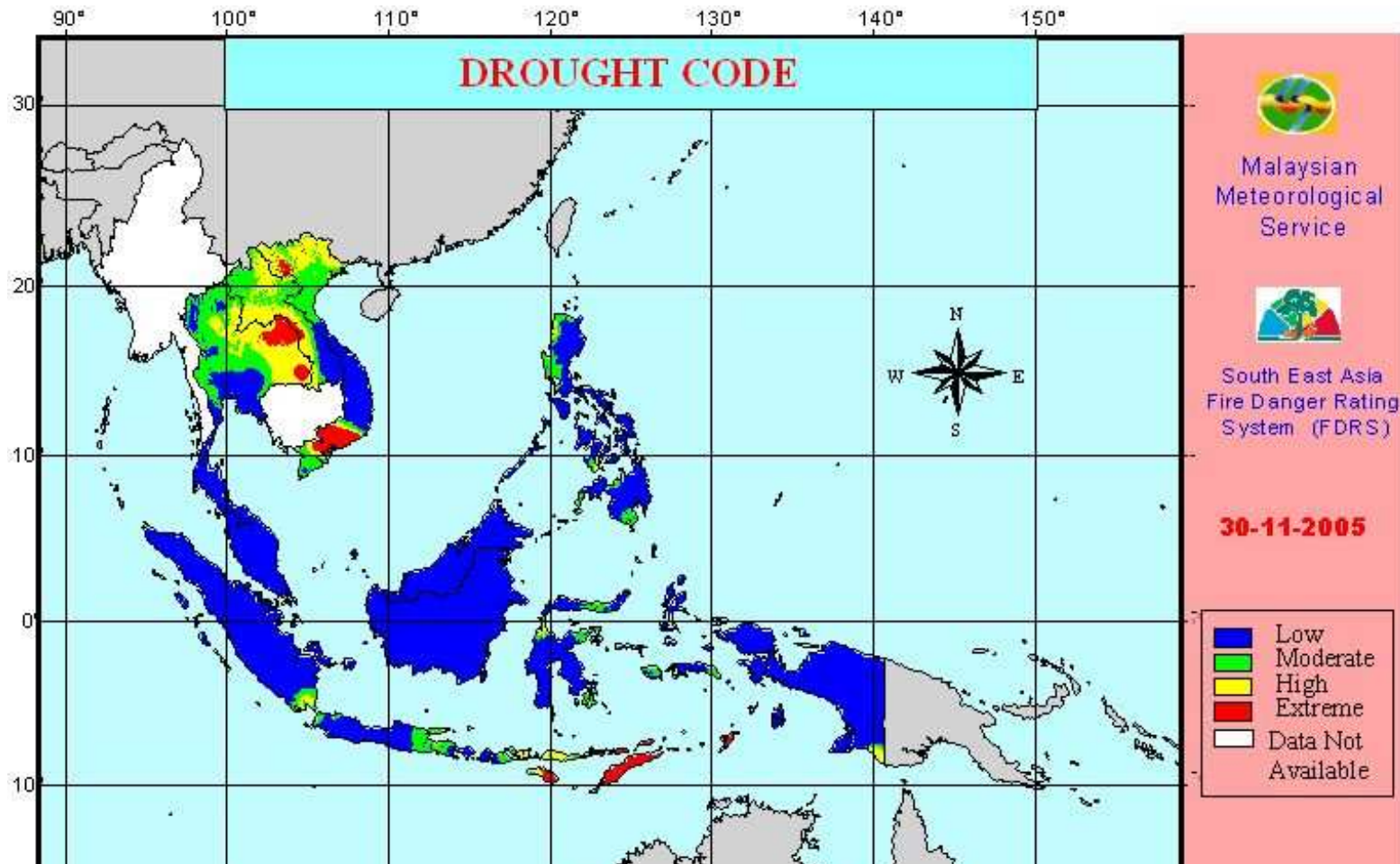
Duff Moisture Code

Numerical ratings of the average moisture content of a loosely compacted surface organic layers (duff). Indicates fuel consumption of surface organic layer with low bulk density and medium-sized woody material



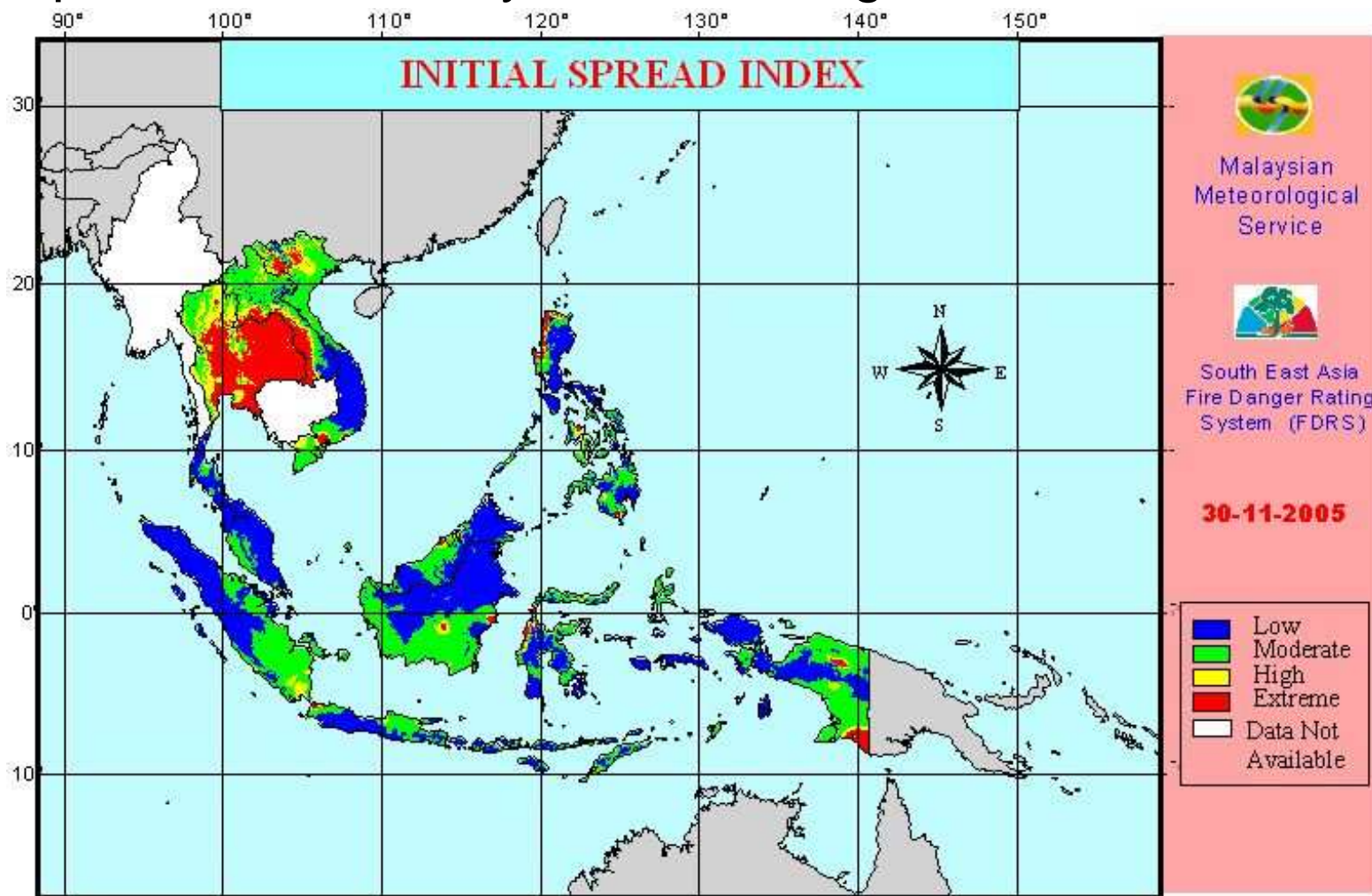
Drought Code

Indicative values of the moisture content of a deep layer of compact organic matter. Used to indicate the potential for fire to smoulder in peat.



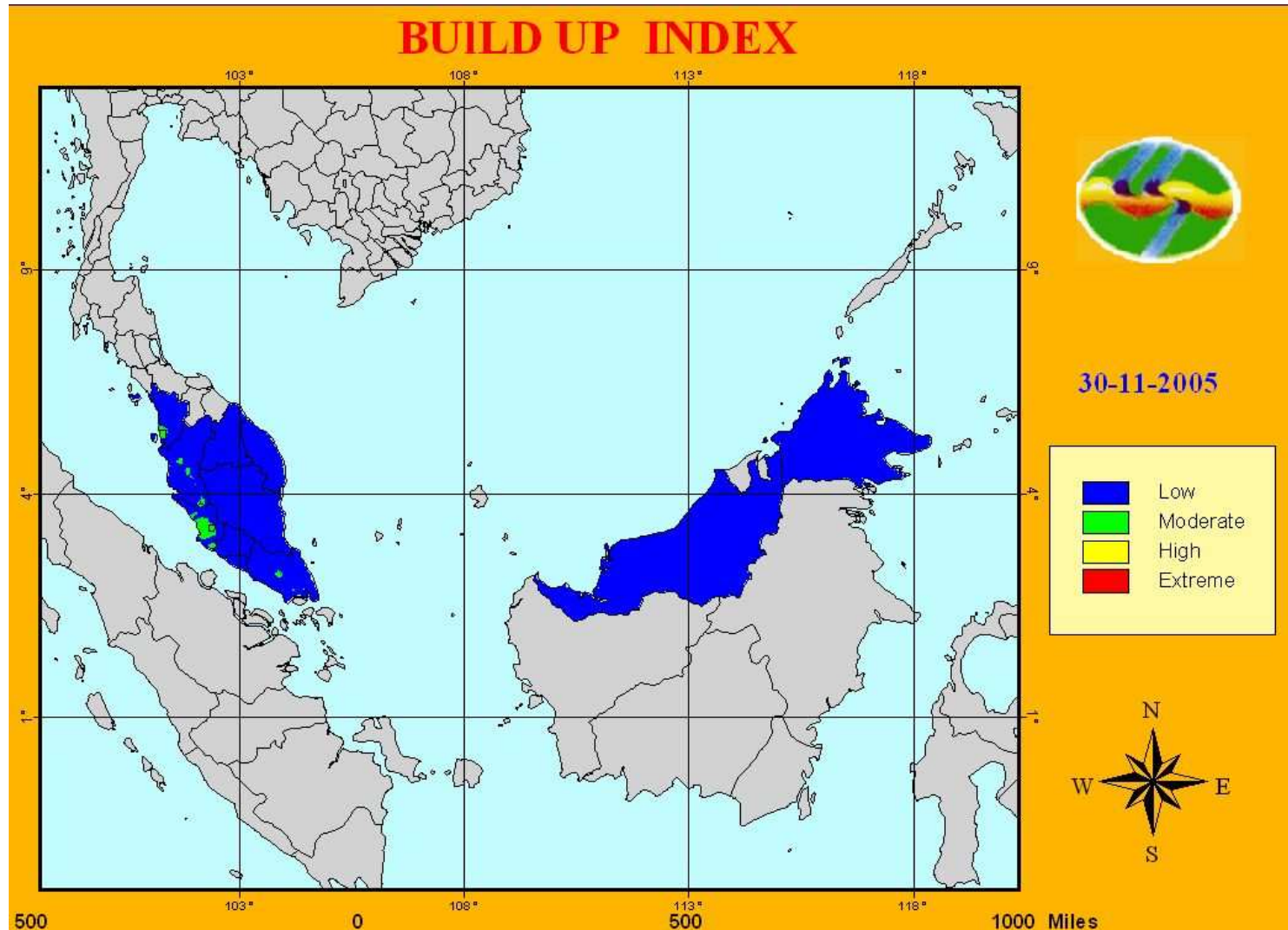
Initial Spread Index

An indicator of the head fire intensity, rate of fire spread and difficulty of control in grasslands



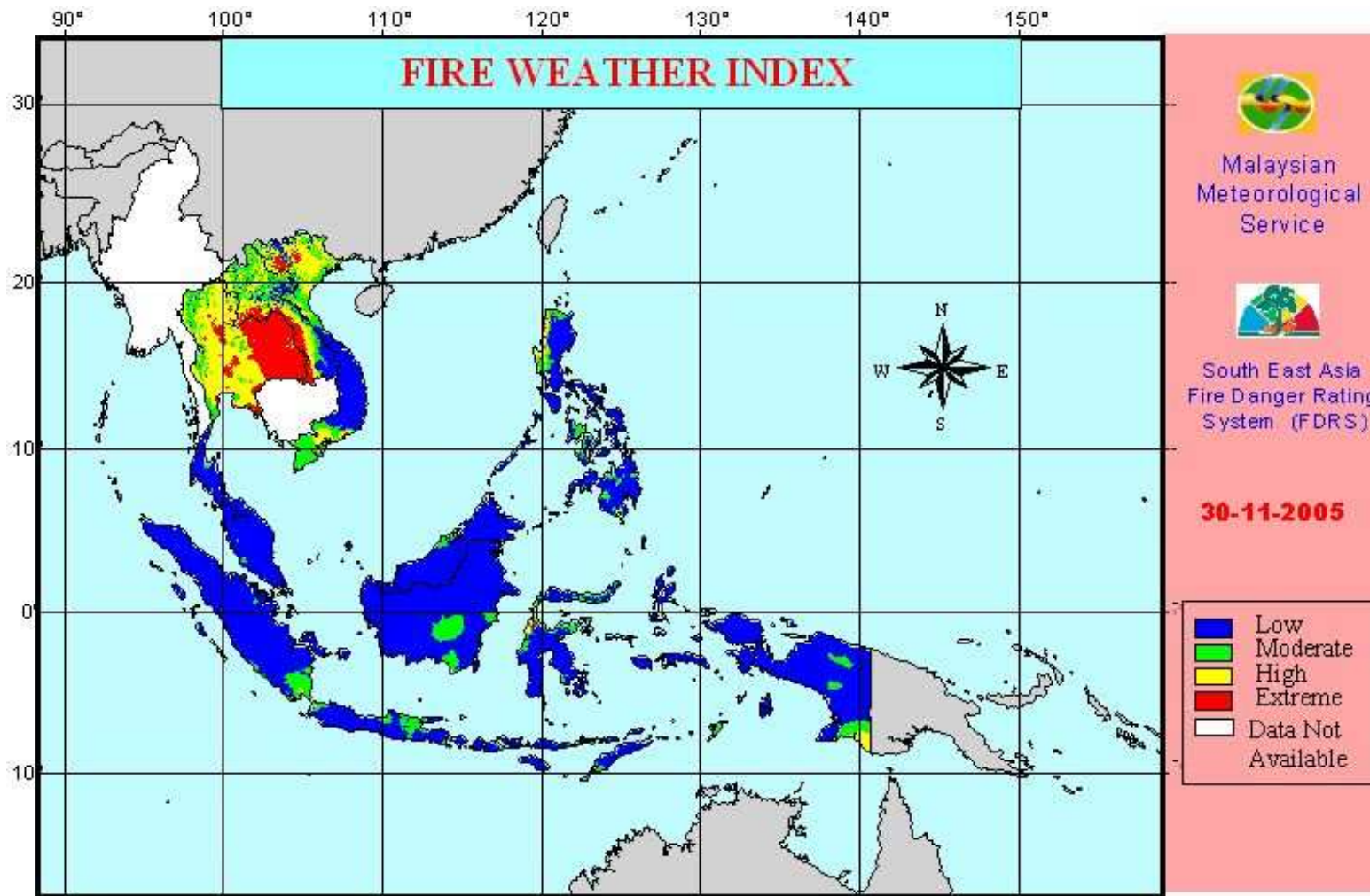
Build Up Index

Indicative values of the amount of fuel available for combustion.

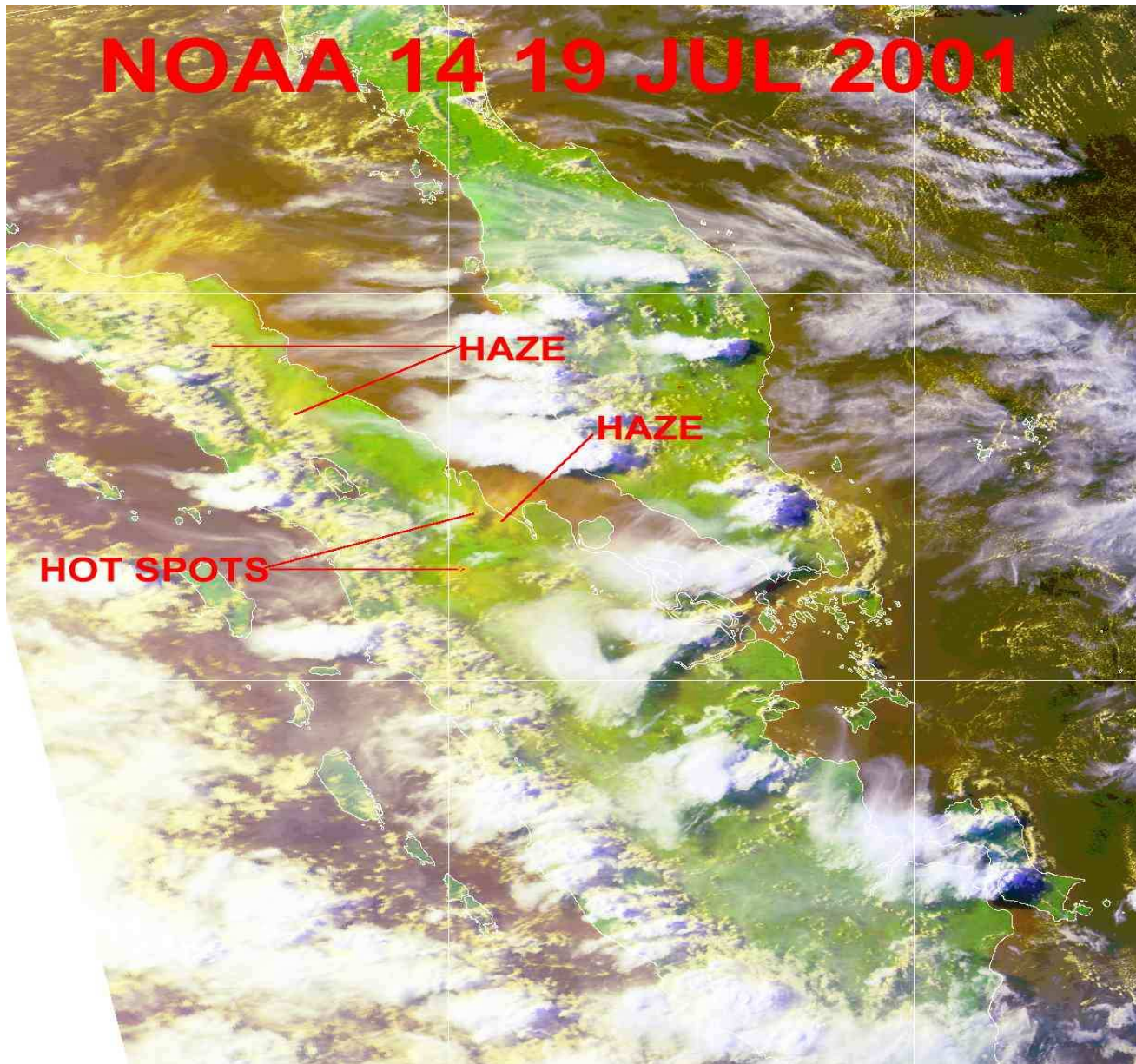


Fire Weather Index

Numerical ratings of fire intensity and general fire danger. Indicate the difficulty of fire control based on the head fire intensity and fire fighting capability.



Hot Spots



Development: Weather monitoring systems, NWP products, relevant web sites and software

Communication: Direct and Indirect Contact through meeting, telephone, SMS, fax, letter and monthly meet clients session

Level of Input from users: Generally not much except for special requests - Drainage and Irrigation Department needs quantitative rain forecast for specific location for flood forecastings – provide (+ National Security Division) direct access to operational intranet web.

Fulfillment of requirements: Yes, if possible.

Information required: On site data (real time for oil and gas exploration), vulnerable flood and landslides maps

Conclusion

Proactive role to constantly review and reassess processes

Good lead time in Weather warnings issued

Warnings should be concise, clear using simple words

Delivery of warnings – multi-method and effective

Thank You