

Malaysia Country Report

MALAYSIA METEOROLOGICAL DEPARTMENT

asmadi@met.gov.my

Joint Meeting of RA II WIGOS Project and RA V TT-SU
Jakarta, Indonesia / 11 October 2018
BMKG Headquarter

Outline

- I. Abstract (updates on status and plan of satellite data access, processing, application and training)
- II. Satellite data and product requirements, training needs and infrastructure

Appendix

- a. Background
- b. Short description of NMHS activities
- c. Current observational system overview
- d. Access, processing and application of satellite data and products
- e. Satellite data to address regional challenges

Abstract

MMD is currently operating various types of ground satellite receiving and processing system in managing, visualizing and processing of satellite data from Polar-Orbiting/LEO Satellites and Geostationary Satellites. Data and information received from these weather satellites either through ground receiving antenna (e.g. Himawari Cast, CMACast, FY2 Direct Broadcast for FY2G, SATRAX for *NOAA Series*, *TERRA*, *AQUA*, *NPP*, *METOP A&B*, *FY-3*, *VXEOS* for NOAA series) or internet services (e.g. Himawari Cloud) act as supporting recipes for weather forecasters in providing better advanced warnings of weather related phenomena. MMD are using SATAID, SWAP, METEOR, MICAPS, MESSIR COROBOR as a processing and display software.

Well trained personnel to manage and interpret satellite products, maintaining ground receiving system especially for polar orbiting satellites, up-to-date data processing package software due to increasing number of satellite data, and customize satellite-based products for specific users is a challenges for an effective satellite applications for National Meteorological and Hydrological Services (NMHSs).

With the latest technologies development of new generation weather satellites and the growing of demand for weather information and warnings from various stakeholders in Malaysia, MMD must confront the challenges by continuously improving the capabilities on various areas from time to time.

Satellite data and product requirements, training needs and infrastructure

- ▶ Satellite data and product requirements
 - Level 2 geostationary satellites data e.g forest fire, atmospheric aerosol and for aviation services
 - Near real time polar orbiting satellites data (Level 0 or Level 1b) through internet service to NMHSs
- ▶ Training needs
 - Interpreting RGBs products and high level satellite products
- ▶ Technical infrastructure issues to access and process/visualize satellite data
 - Up-to-date data processing package software that can automatically generate satellite Level 1b and RGB products for NMHSs services

Appendix

Country Overview



- Located between latitude 2° North to 7° North of the equator and longitude 99.5° East to 120° East in Southeast Asia
- A total of land area about 329,847 square kilometers; and separated by the South China Sea in two regions, Peninsular and Malaysian Borneo, with a population of over 30 million.
- Malaysia's climate is a tropical climate with generally uniform temperature that ranging from a maximum of 33°C to a minimum of 23°C and high humidity around 70%-90%.
- The average annual rainfall is 2,400 mm for Peninsular Malaysia, 3,800 mm for Sarawak and 2,600 mm for Sabah.
- Divided into two (2) seasons which are Southwest Monsoon (May-Sep), Northeast Monsoon (Nov-Mar) and two (2) shorter periods of Inter-monsoon (Apr and Oct).

Major Historical Hydrometeorological Disaster

WEATHER RELATED DISASTER



Monsoon Flood



Flash Flood



Drought



Forest Fire



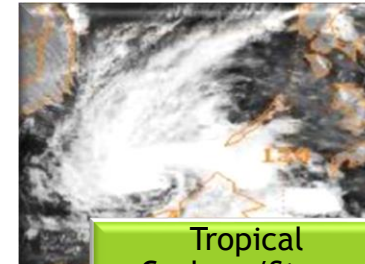
Haze



Thunderstorm



Waterspout/Landspout

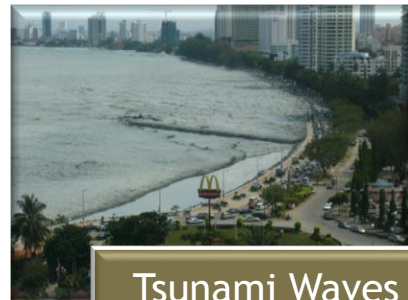


Tropical Cyclone/Storm

EARTHQUAKE & TSUNAMI DISASTER



Cracked Roads



Tsunami Waves



Landslide



Structural Damage

Monsoon and Weather Phenomena



Monsoon Flood

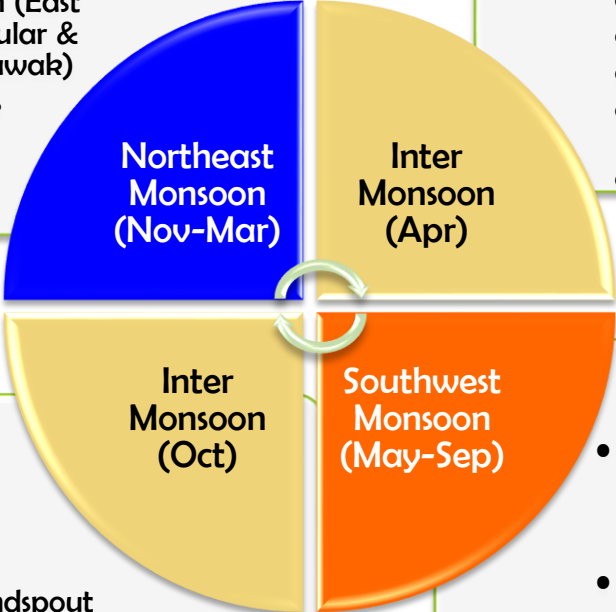


Strong Winds



Rough Seas

- Monsoon rain (East Coast Peninsular & Western Sarawak)
- Strong Winds
- Rough Seas



- Thunderstorm
- Heavy Rain
- Wind Gust
- Waterspout/Landspout
- Hail

- Thunderstorm
- Heavy Rain
- Wind Gust
- Waterspout/Landspout
- Hail

- Less rain in Peninsular & Sarawak (stable atmosphere)
- Squall line (at early morning in western Peninsular)



Flash Flood



Fallen Trees



Damaged Roof



Drought



Forest Fire



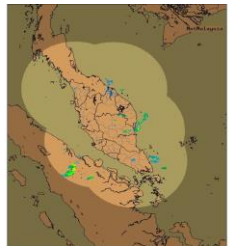
Haze



Lightning



Landslide



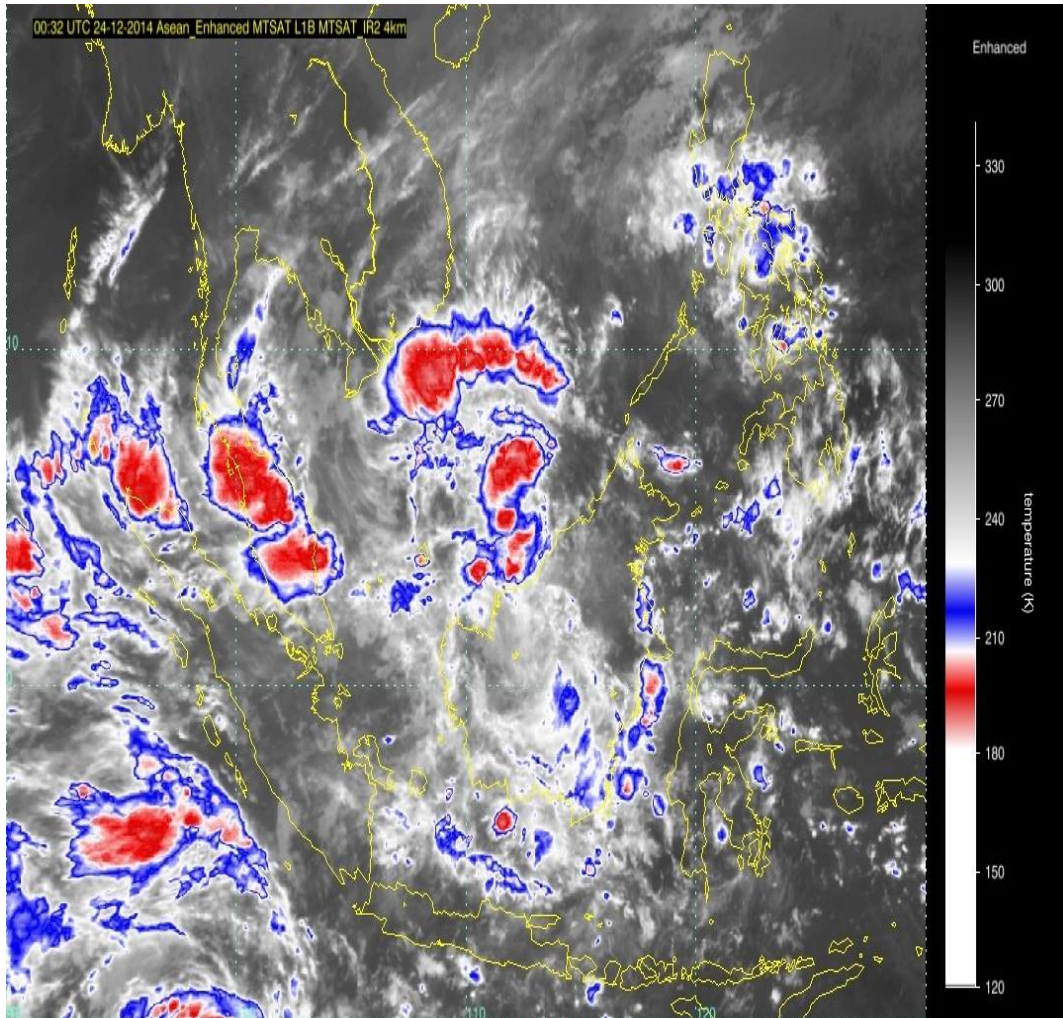
01:20:01
17 JAN 2018 BRT



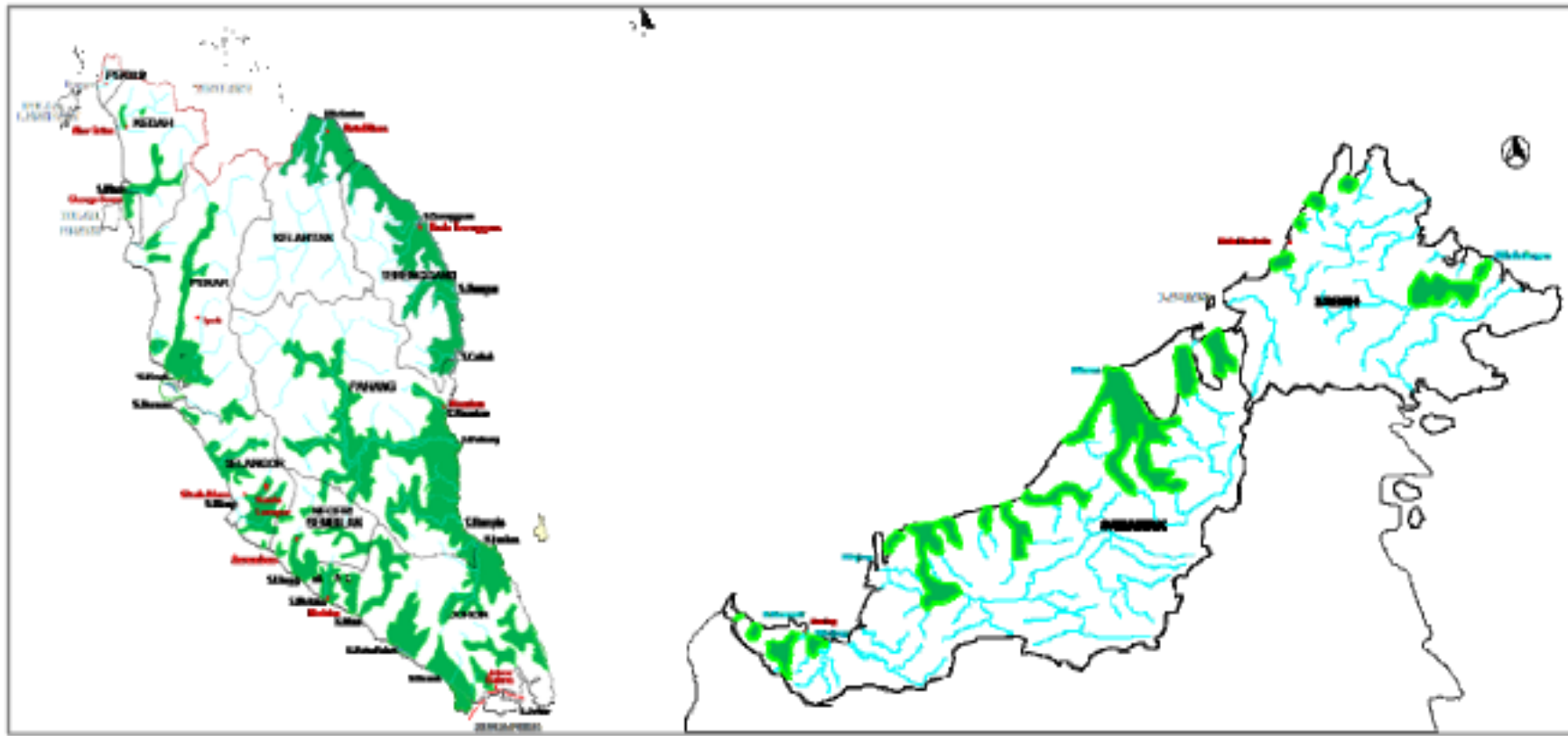
Squall Line

Monsoon Flood

- During Northeast Monsoon (Nov – Mar).
- Due to monsoonal rain (Continuous heavy rainfall up to several days)



Monsoon Flood

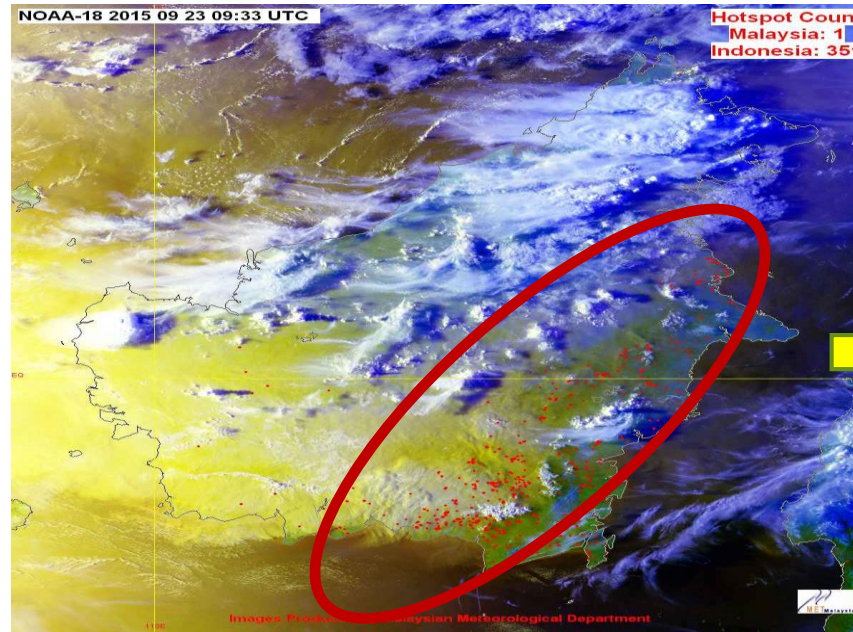


Flood-prone Areas
in Malaysia
Source: Drainage
and Irrigation
Department
Malaysia [Online]
(2012)

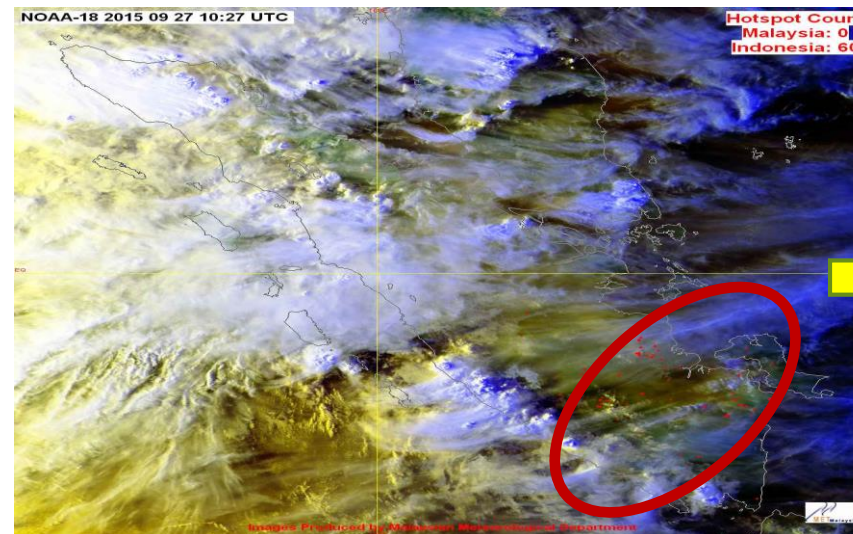
- The estimated area vulnerable to flood disaster is approximately 29,800 km² or 9% of the total Malaysia area, and is affecting almost 4.82 million people which is around 22% of the total population of the country (DID, 2009)
- The damage caused by the monsoon flood in parts of north and eastern Malaysia in 2014 is likely to exceed RM1 billion or almost USD\$300 million (Berita Harian, 2014).

Drought and Haze

- During Southwest Monsoon (May-Sep)



- Dry weather and less rain



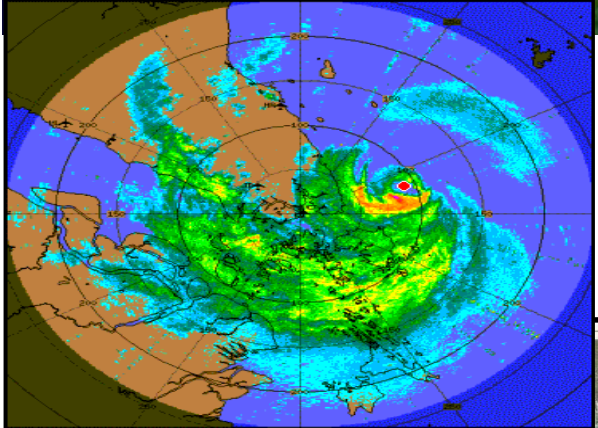
Typhoon Vamei and tropical Storm Greg

Ty
Vamei

Hit east Johore on 27 Dec 2001

Strong winds (140 km/h) and heavy rain:
 - Mud floods & flash floods.
 - Damaged crops and several houses.

5 people killed



Five swept away by mudslide
 By ZUHRIN AZAM AHMAD and LAM LI
 PEKAN NANAS: Five people, including a mother and her three children, were swept away into a river during a mudslide at the foot of Gunung Pulai, late Thursday night.
 Rescuers have so far recovered only one victim, Salina Abas, 34, some 500m away from her demolished house.
 Johor Deputy CPO Senior Asst Comm I Abu Bakar Said said the woman's body was found at about 7.30am yesterday among piles of tree trunks and debris carried by the mudslide.
 The search and rescue operation for the remaining missing victims continued up to late yesterday.
 The missing are three of Salina's

TS
Greg

Crossed northern Sabah 26 Dec 1996

Strong winds (83 km/h) and heavy rain:
 - Mud flood and torrential flooding.
 - More than 4,000 houses damaged.

238 people killed



TOUGH TASK ... search and rescue team members going through logs and other debris washed down by a mudslide that occurred at the foot of Gunung Pulai near Pekan Nanas late on Thursday. — IBRAHIM MOHTAR

Tropical Storm Sonamu

6 **NATION** The Star, TUESDAY 8 JANUARY 2013 Sumber: The Star

Stories by FARIK ZOLKEPLI, SYED AZHAR, ONG HAN SEAN, C.A. ZULKIFLI and P. ARUNA. Photos by ZABIDI TUSIN and NIK NAIZI HUSIN

Terengganu prepares for worst-case scenario

Sonamu: Usah terlalu cemas

Oleh SITI AIRUNNISA ALAUI
pengarang@utusan.com.my Sumber: Utusan Malaysia



Red alert for Sonamu

Public urged to stay clear of beaches and fishermen asked to stay home

By Johnson K Saal and Peter Sibon

Sonamu has weakened, says dept

By Eve Sonary Heng
reporters@theborneopost.com

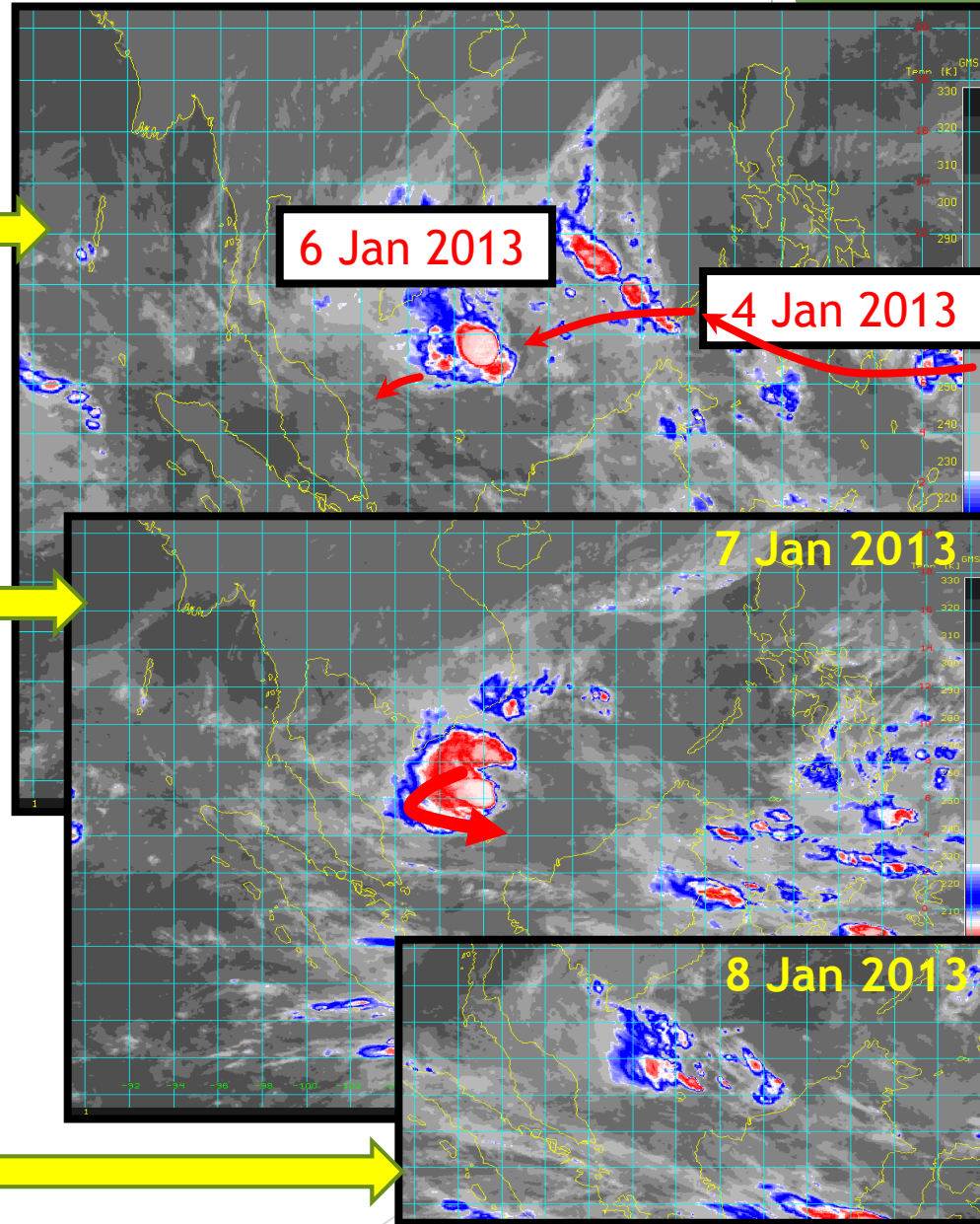
activities including fishing and ferry services.

"At the moment, the storm is getting weaker and is heading towards Australia. It is now called 'Narelle Wind'. However, we still advise people to be prepared for any eventuality and stay away from the beach and sea because of the strong waves," he said.

According to him, the tropical storm had stopped and did not reach Mukah or Kuching.

He explained that the thunderstorm and strong wind on Wednesday in Mukah was just the 'whiptail' of Sonamu.

"The real Sonamu is greater and stronger," he pointed out.



Major National Economic Sectors Relying on NMHSs

Public



Aviation



Disaster Management Agencies



Plantations



Fisheries



Shipping



Oil and Gas Exploration



Sports & Recreational



Special events



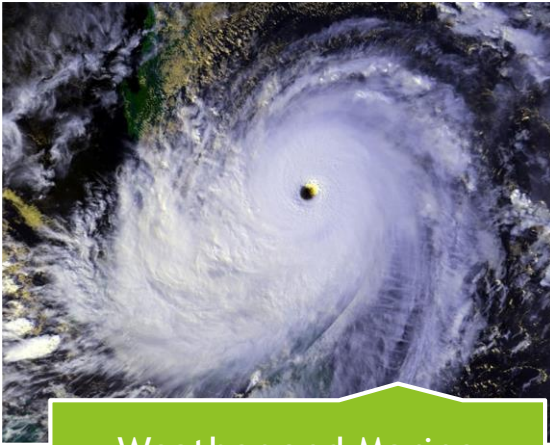
Mission & Objectives of MMD

MISSION

To fulfill Malaysia's needs on meteorological, climatological and geophysical services for national security, societal well-being and sustainable socio-economic development.



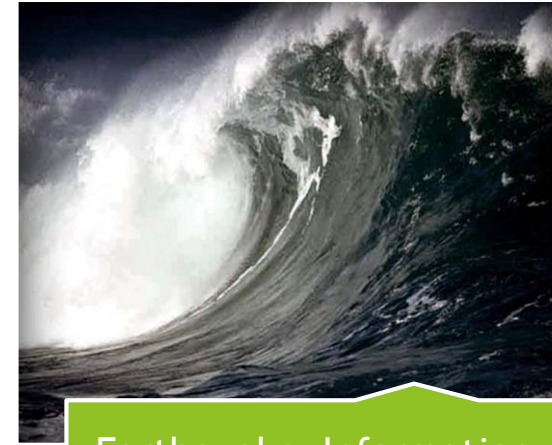
Services



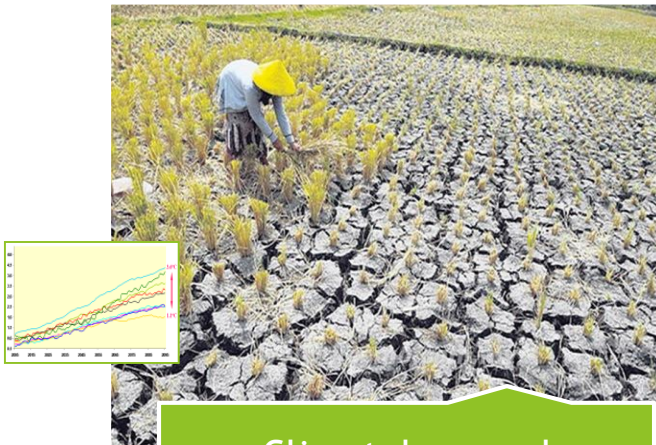
Weather and Marine
Forecasts & Warnings



Aviation Meteorology



Earthquake Information
and Tsunami Warnings



Climatology and
Agrometeorology Services



Atmospheric Science and
Cloud Seeding

Current Observational System



Principal Meteorological Stations

42



Auxiliary Weather Stations

380

196 Automatic Weather Stations-AWS



Upper Air Stations

8



Weather Radar Stations

12

Peninsular - 7
Sarawak - 3
Sabah - 2



Satellite Ground Receivers

5

Polar Orbiting Satellite - 2
Geostationary Satellite - 3

Principal Meteorological Station



Observe & record **surface** weather parameters



Principal Meteorological Stations

42



Cameron Highlands Meteorological Station



Met Farm



Auxiliary Weather Station



Auxiliary Weather Stations

380



LABAN RATA, SABAH



SIK, KEDAH

Automatic Weather Station (AWS)

DATA PANEL Test Station Lat 3.1° Long 101.65° Elevation 60.8m

Home View Actions Settings

Main Wind Chart Temperature Pressure Rainfall Humidity

SURFACE WIND

	DIRECTION (degrees)	SPEED (m/s)	MAX GUST (m/s)	start	RANGE end
1-m in	070	1.9	2.0	050	110
2-m in	070	1.9	2.0	050	110
10-m in	090	1.9	2.5	050	140

Fri 25 Apr 00:04:02

PRESSURE

STATION LEVEL (hPa)	MSL (hPa)	QNH / QFE (hPa)	Hg (in.)
1004.8	1011.4	1013.4	29.87

TEMPERATURE

DRY BULB (°C)	WET BULB (°C)	DEW POINT (°C)	REL HUMIDITY (%)
24.0	23.8	23.7	98

RAINFALL

CURRENT HOUR (mm)	LAST HOUR (mm)	CURRENT HOUR (MJ)	LAST HOUR (MJ)
0.0	0.0	0.0000	0.0000

RADIATION

CURRENT HOUR (MJ)	LAST HOUR (MJ)
0.0000	0.0000

MESSAGES / ALERTS

AWS Data Display

Upper Air Station

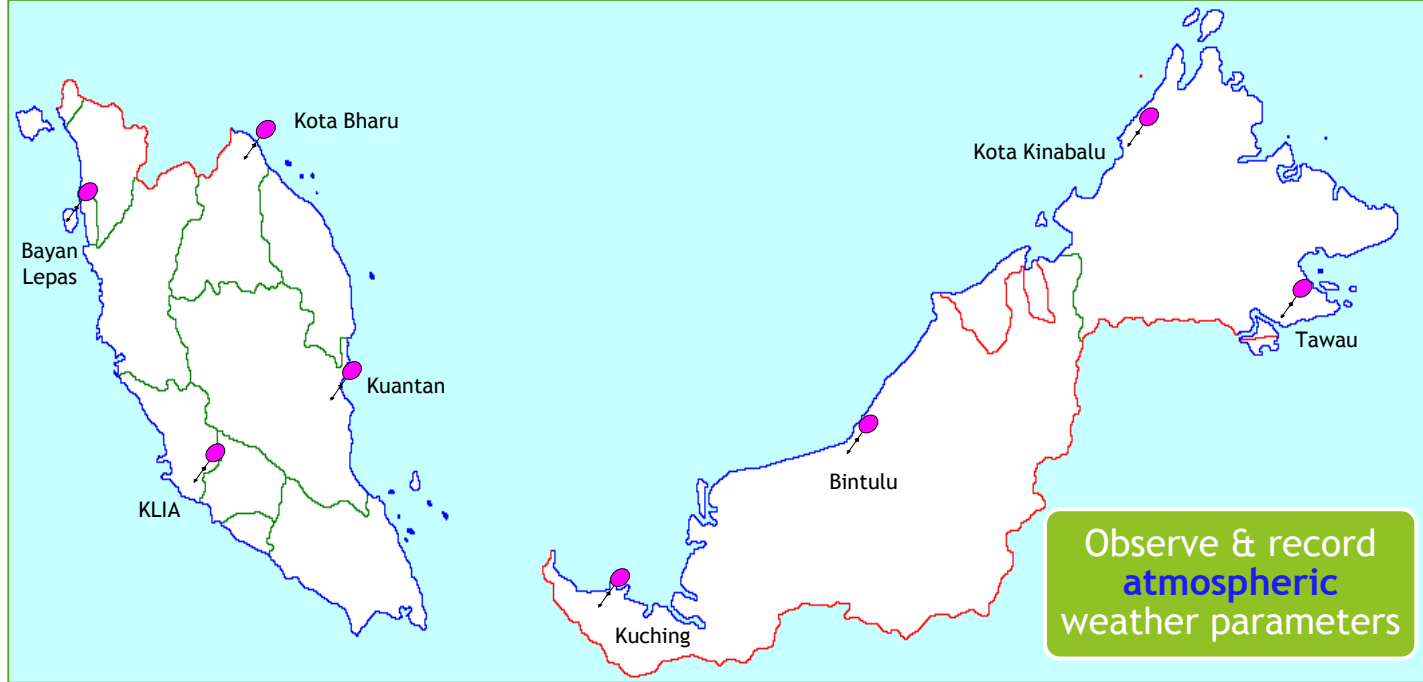


Upper Air Stations

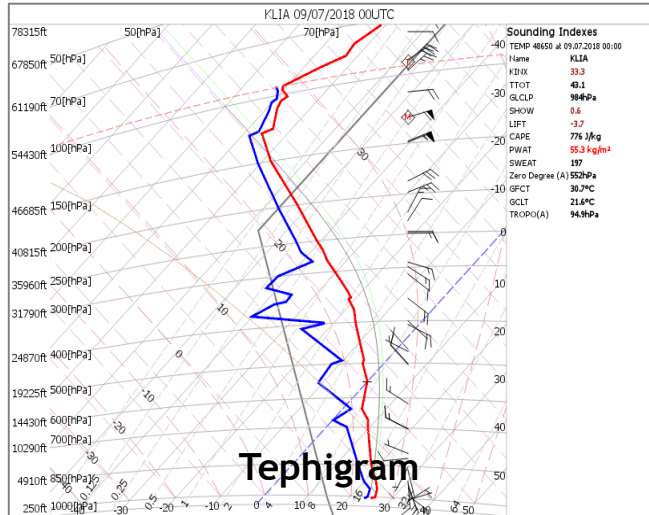
8



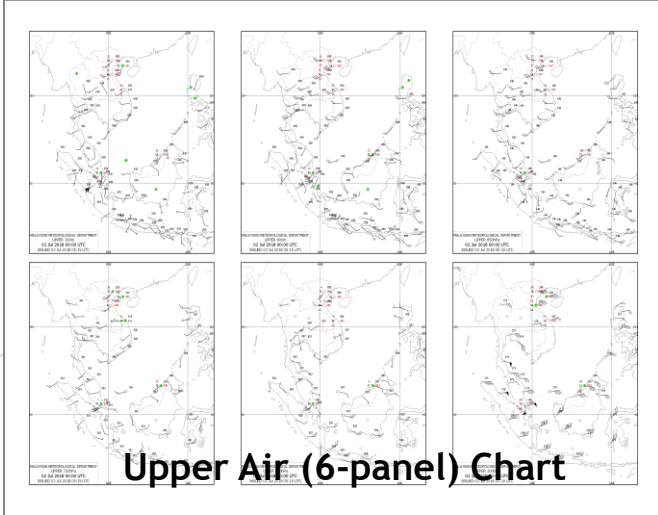
Radiosonde



Observe & record atmospheric weather parameters



Tephigram



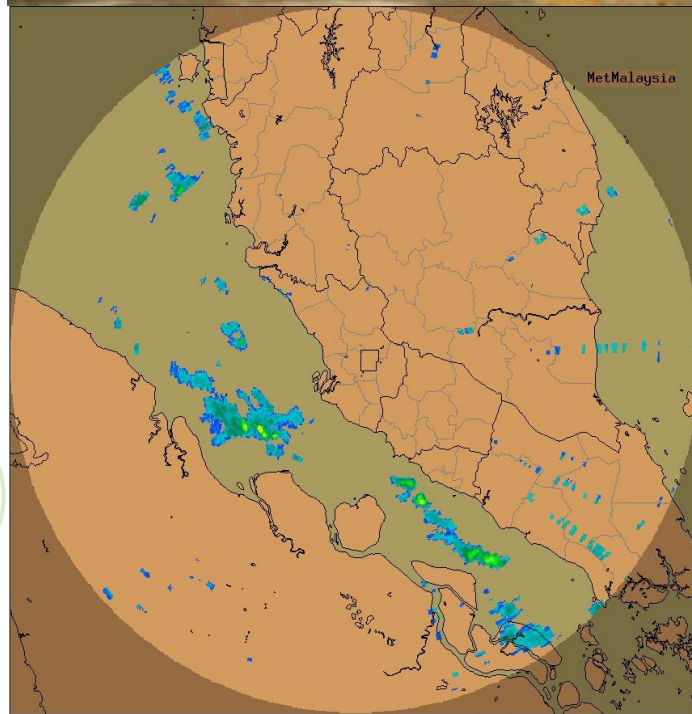
Upper Air (6-panel) Chart

Weather Radar Station

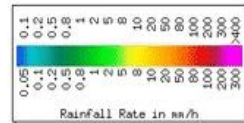
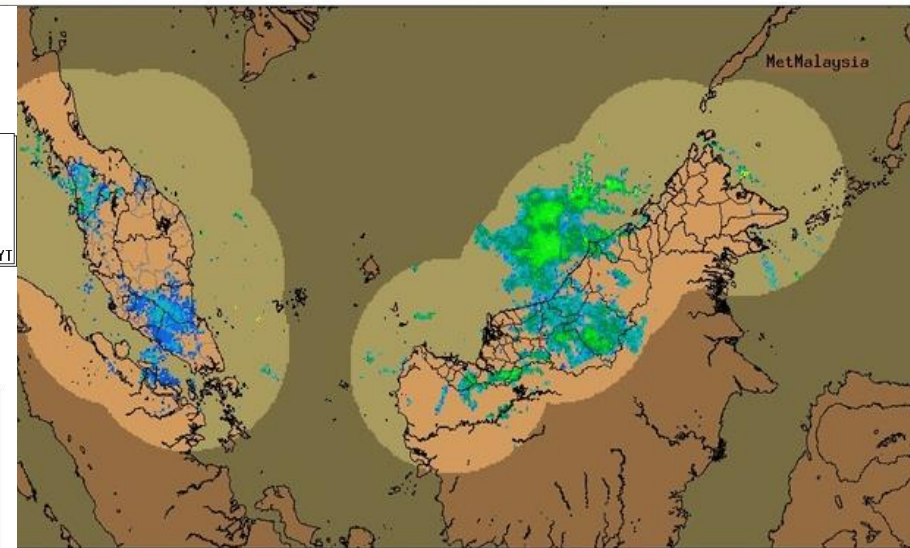
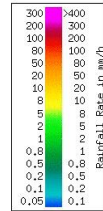


Weather Radar Stations

12



Subang
CAPP1
R_300_2
Task: LRANGE_VOL
PRF: 250Hz
Height:12,0 km
Max Range:300 km
09:00:14
27 OCT 2016 MYT



Malaysia
CAPP1
R_300_2_MY
Task: LRANGE_VOL
PRF: 250Hz
Height:12,0 km
Max Range:1422 km
03:00:01
17 APR 2017 MYT

Satellite Ground Receivers



Satellite Ground Receivers

5

Satellite Ground Receivers

Polar Orbiting Satellite

Hotspot and Haze Monitoring

NOAA

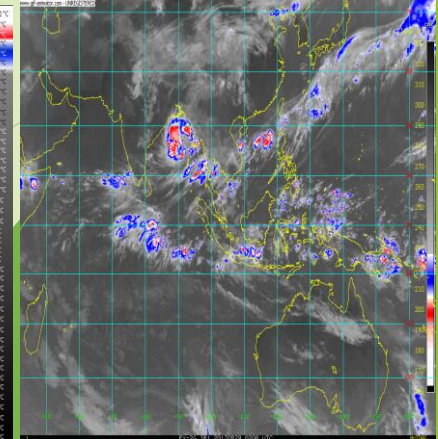
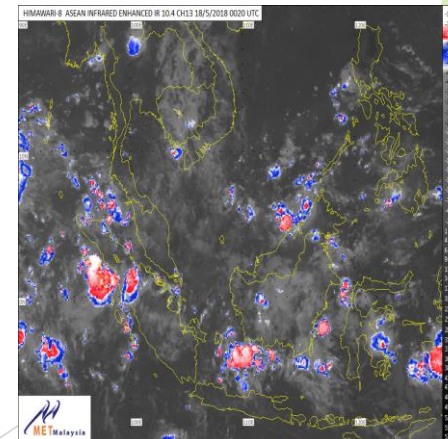
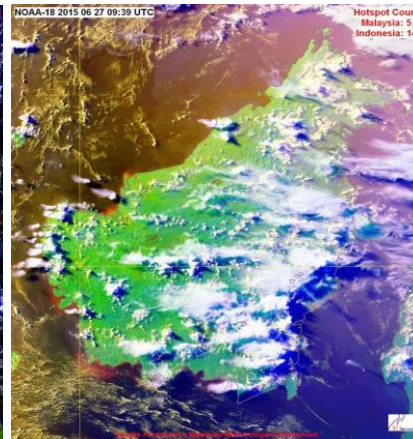
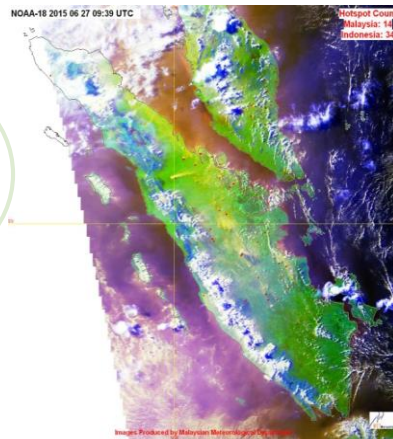


Geo-stationary Satellite

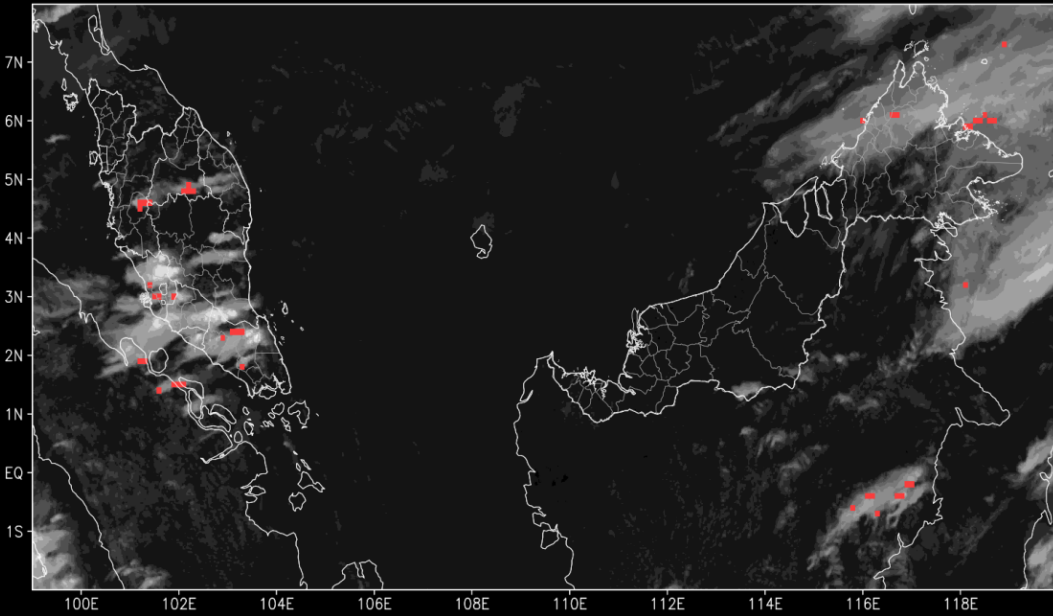
Weather Monitoring

HIMAWARI

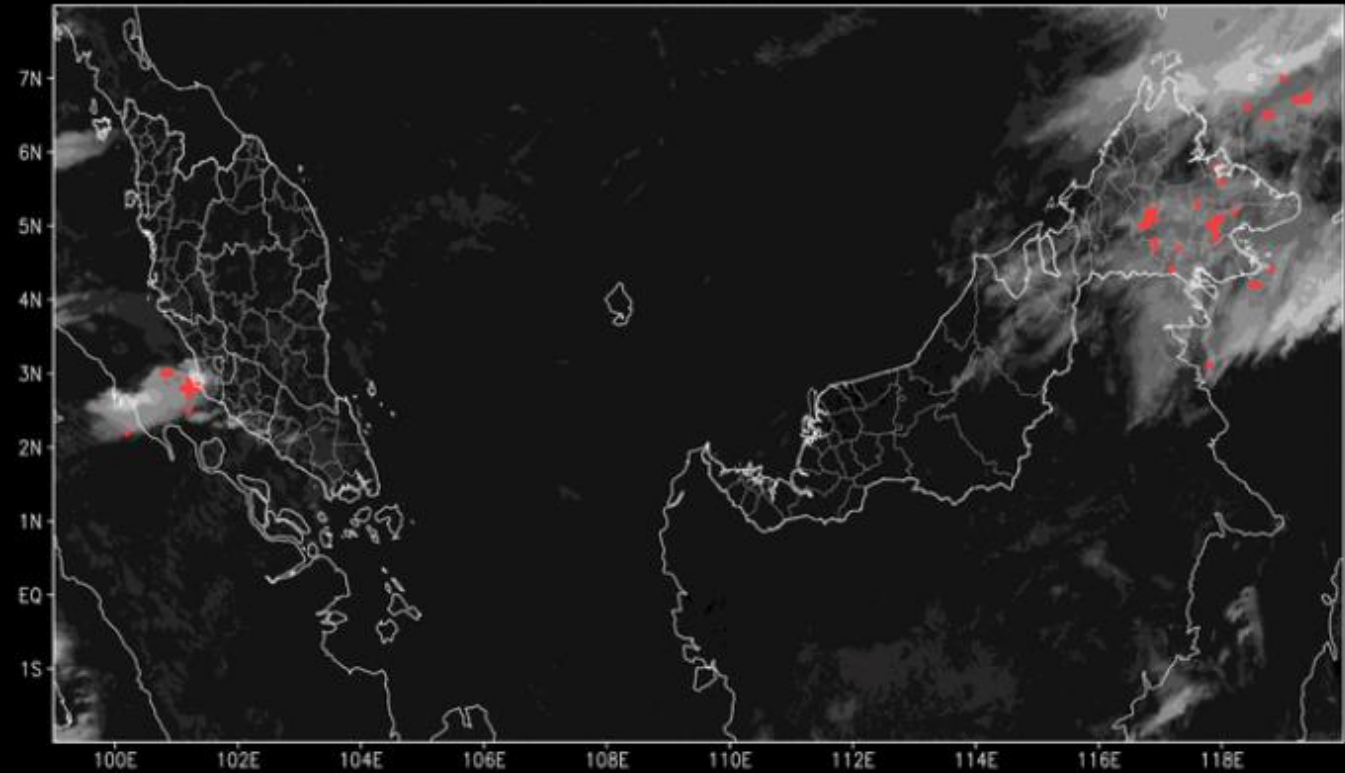
FY2G



Rapid Developing Cumulus Area (RDCA) – 20180723:0650UTC



Rapid Developing Cumulus Area (RDCA) – 20180723:0330UTC



RDCA PRODUCT PRODUCED by MMD every 10 minutes data from 7 Channels (Band 03, 08, 10, 11,13,15 &16) High spatial resolution (0.5-2km) data downloaded from HimawariCloud Services

13-24 Mac 2017- Visiting Scientist Program at MSC/JMA

22-25 Oct 2018 - Technical Meeting on Himawari 8/9 RDCA Products

Validate RDCA data

input: the detection of RDCA

output: the accuracy of RDCA

Satellite Data Access

Geostationary Satellites

HIMAWARI-CAST



HIMAWARI CLOUD



INTERNET
CLOUD
SERVICE

CMA-CAST



FENG YUN
(Direct Broadcast)

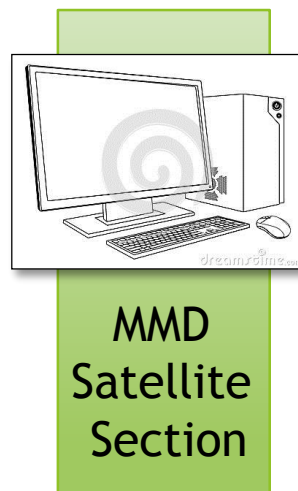


Polar-Orbiting Satellites

SATRAX



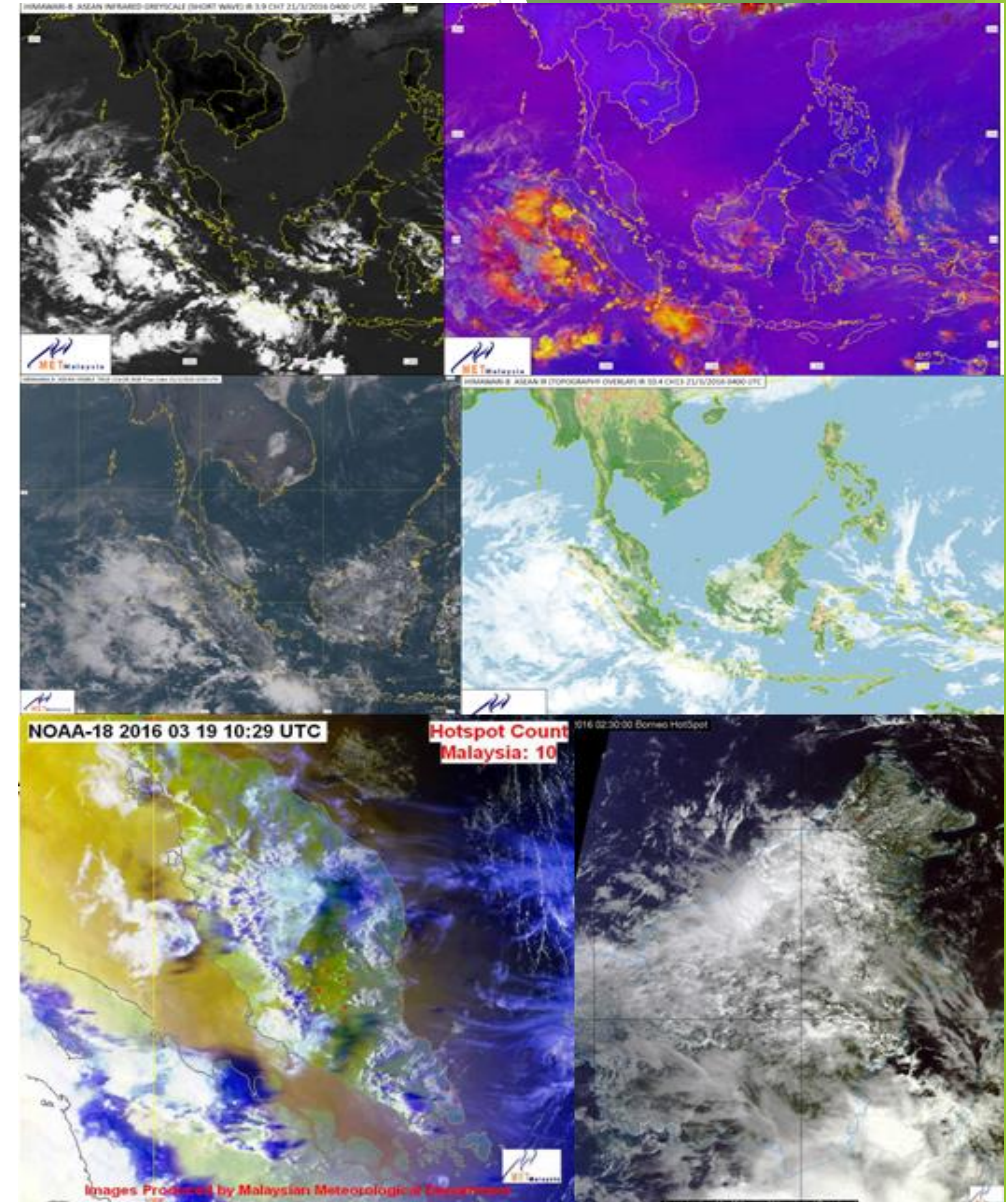
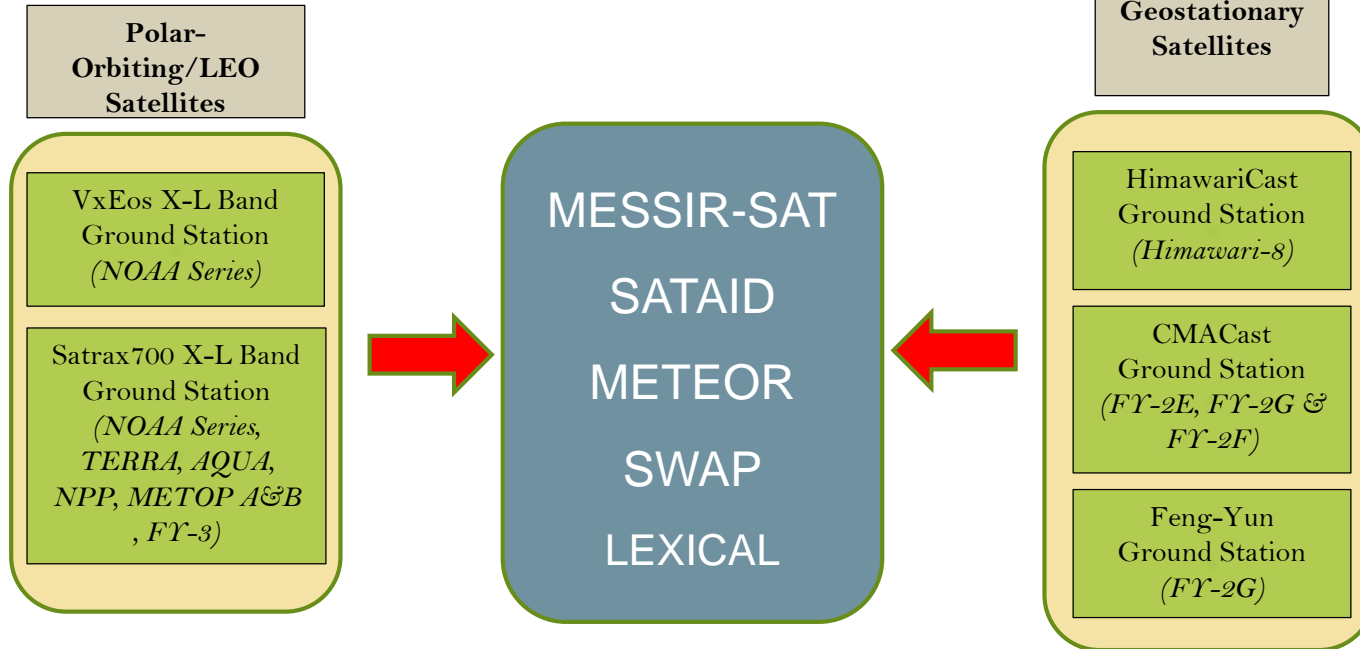
VXEOS



MMD
Satellite
Section



Processing and Archiving of Satellite Data and Products



Satellite Processing and Display System

Polar-Orbiting/LEO Satellites

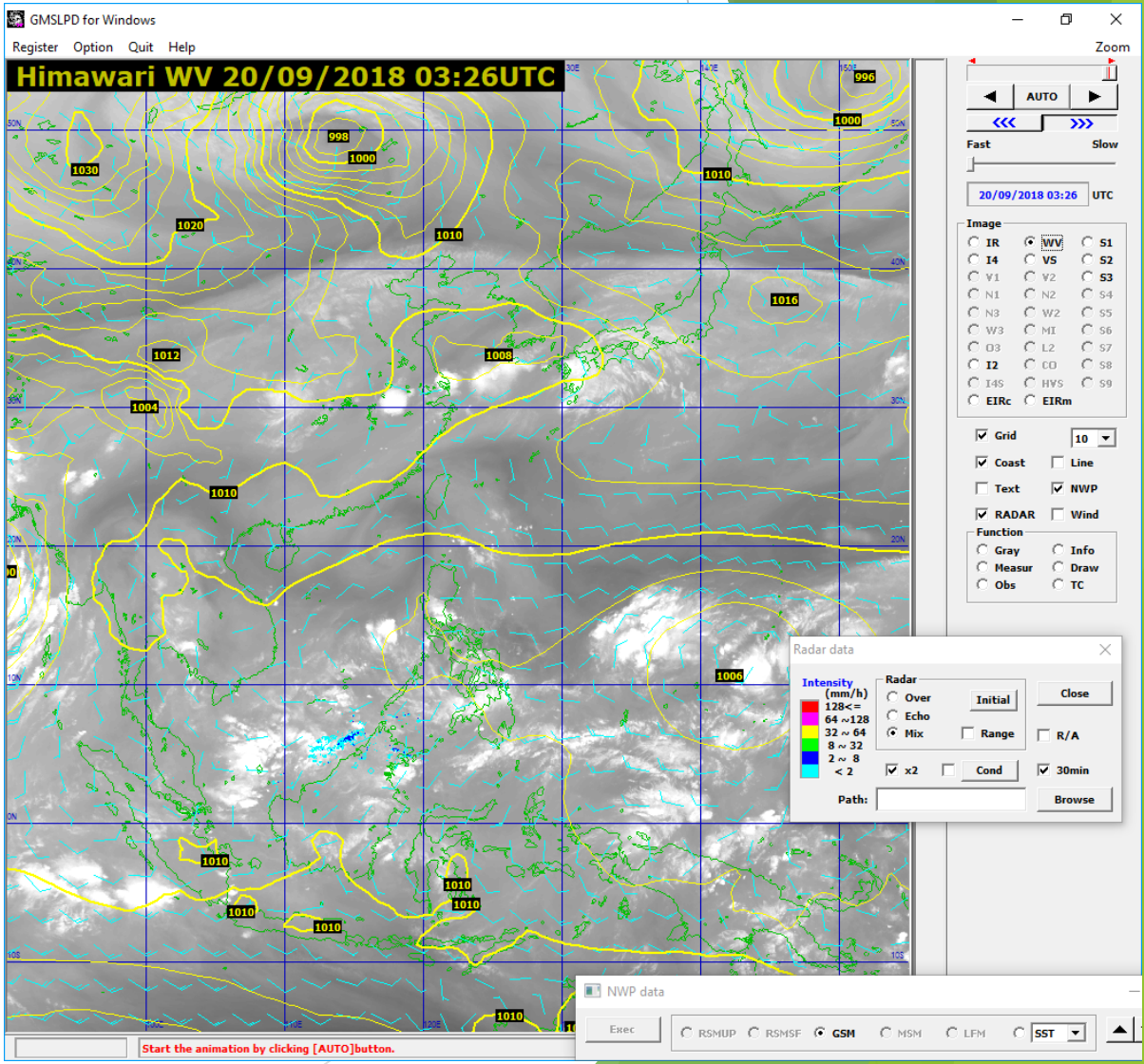
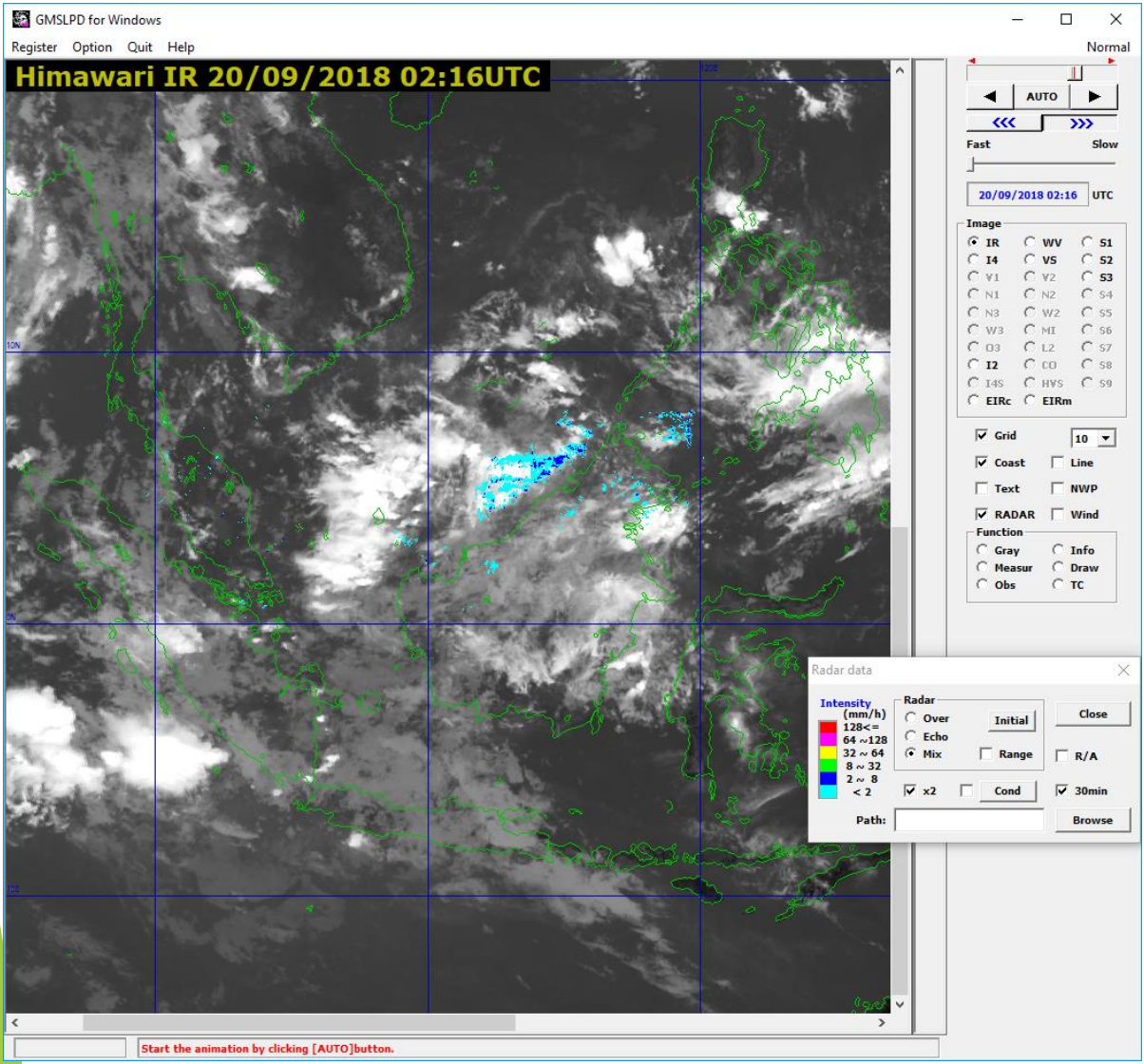
- VxEos X & L Band Acquisition and Processing System (Since 2009)
- Satrax700 X-L Band System (POESAT500 / METEOR) (since 2005)
- Lexical Processing and Display System (since 2005)

Geostationary Satellites

- HimawariCast System (*MESSIR-SAT, Corobor*) & *SATAID & METEOR*) since 2015
- Feng-Yun 2G System (*ES&S FY-2 System –Mcidas*)-(Since 2004)
- CMACast System (GMSOFT, MICAPS & SWAP)- (since 2010)

Note: need assistance on hardware and update of software application

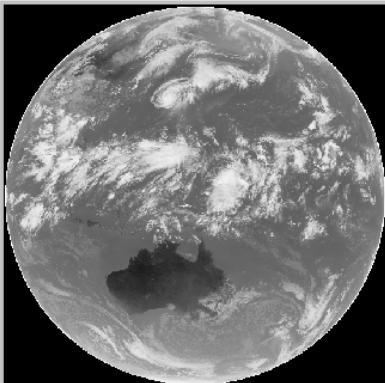
HIMAWARICAST DATA - SATAID



MTSAT/ HIMAWARICAST DATA -METEOR

METEOR 3.32-4 [forecaster]

File Window



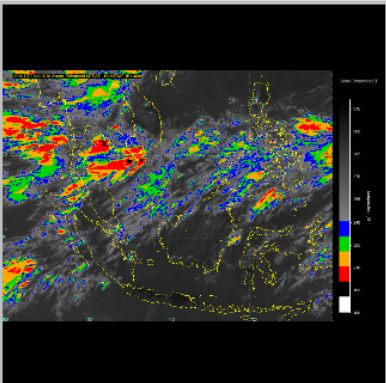
Setup

- Asean
- Asean_Composite
- Asean_Enhanced
- Asean_Enhanced_Test
- Asean_Visible
- Asia
- Asia_Enhanced
- Asia_Visible
- Australia
- Borneo_CP
- Disk
- DiskFY2
- EastAsia
- FullDisk
- FullDiskIR
- FullDiskVIS
- Globe
- Globe_Enhanced
- Malaysia
- NEDisk
- NorthHalfDiskVis

Passes

06:30	03 Sep 2018	MTS
06:20	03 Sep 2018	MTS
06:10	03 Sep 2018	MTS
06:00	03 Sep 2018	MTS
05:50	03 Sep 2018	MTS
05:40	03 Sep 2018	MTS
05:30	03 Sep 2018	MTS
05:20	03 Sep 2018	MTS
05:10	03 Sep 2018	MTS
05:00	03 Sep 2018	MTS
04:50	03 Sep 2018	MTS
04:40	03 Sep 2018	MTS
04:30	03 Sep 2018	MTS
04:20	03 Sep 2018	MTS
04:10	03 Sep 2018	MTS
04:00	03 Sep 2018	MTS
03:50	03 Sep 2018	MTS
03:40	03 Sep 2018	MTS
03:30	03 Sep 2018	MTS
03:20	03 Sep 2018	MTS
03:10	03 Sep 2018	MTS
03:00	03 Sep 2018	MTS
02:50	03 Sep 2018	MTS
02:30	03 Sep 2018	MTS
02:20	03 Sep 2018	MTS
02:10	03 Sep 2018	MTS
02:00	03 Sep 2018	MTS
01:50	03 Sep 2018	MTS
01:40	03 Sep 2018	MTS
01:30	03 Sep 2018	MTS

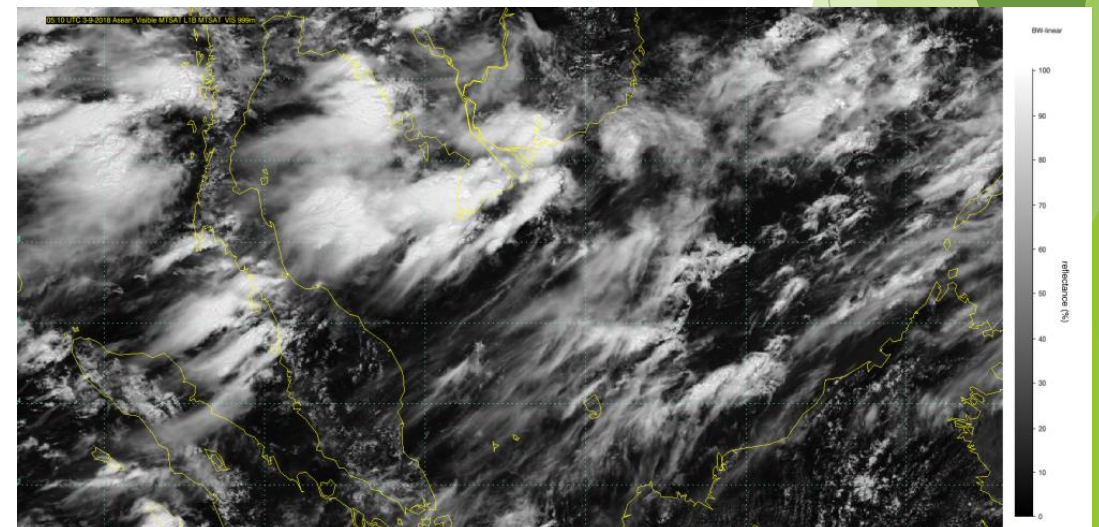
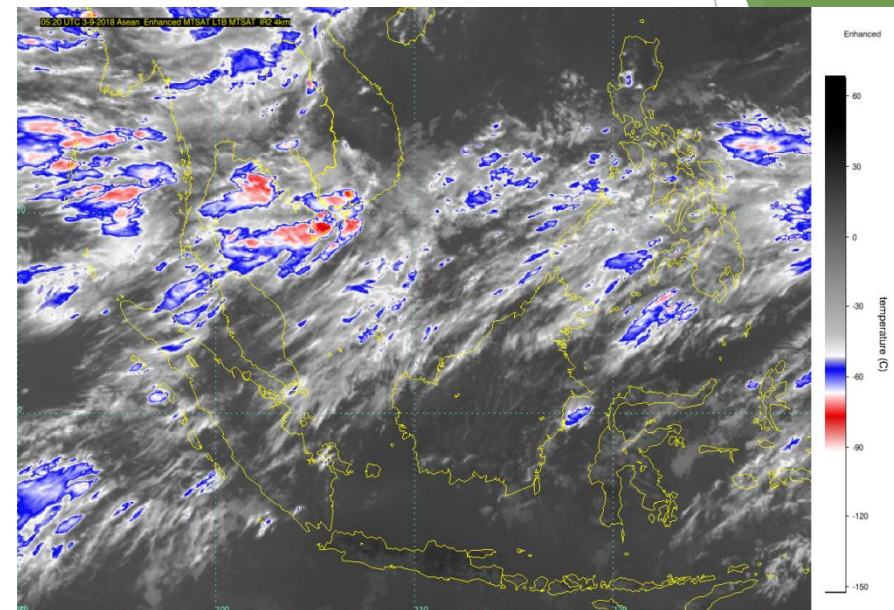
Delete Pass



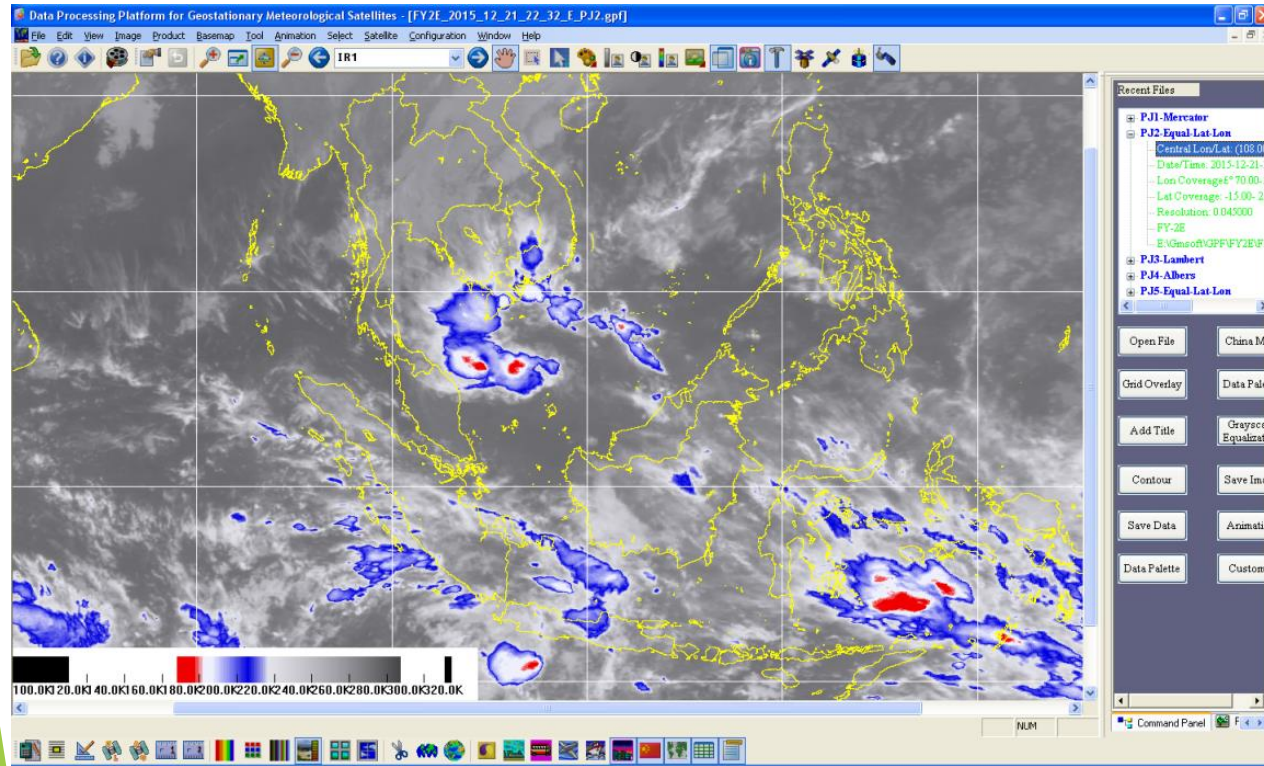
Products

06:30	03 Sep 2018	MTS	Asean_Visible	L1B
06:30	03 Sep 2018	MTS	Asean_Enhanced	L1B
06:20	03 Sep 2018	MTS	Asean_Visible	L1B
06:20	03 Sep 2018	MTS	Asean_Enhanced	L1B
06:10	03 Sep 2018	MTS	Asean_Visible	L1B
06:10	03 Sep 2018	MTS	Asean_Enhanced	L1B
06:00	03 Sep 2018	MTS	Asean_Visible	L1B
06:00	03 Sep 2018	MTS	Asean_Enhanced	L1B
05:50	03 Sep 2018	MTS	Asean_Visible	L1B
05:50	03 Sep 2018	MTS	Asean_Enhanced	L1B
05:40	03 Sep 2018	MTS	Asean_Visible	L1B
05:40	03 Sep 2018	MTS	Asean_Enhanced	L1B
05:30	03 Sep 2018	MTS	Asean_Visible	L1B
05:30	03 Sep 2018	MTS	Asean_Enhanced	L1B
05:20	03 Sep 2018	MTS	Asean_Visible	L1B
05:20	03 Sep 2018	MTS	Asean_Enhanced	L1B
05:10	03 Sep 2018	MTS	Asean_Visible	L1B
05:10	03 Sep 2018	MTS	Asean_Enhanced	L1B
05:00	03 Sep 2018	MTS	Asean_Visible	L1B
05:00	03 Sep 2018	MTS	Asean_Enhanced	L1B
04:50	03 Sep 2018	MTS	Asean_Visible	L1B
04:50	03 Sep 2018	MTS	Asean_Enhanced	L1B
04:40	03 Sep 2018	MTS	Asean_Visible	L1B
04:40	03 Sep 2018	MTS	Asean_Enhanced	L1B
04:30	03 Sep 2018	MTS	Asean_Visible	L1B
04:30	03 Sep 2018	MTS	Asean_Enhanced	L1B
04:20	03 Sep 2018	MTS	Asean_Visible	L1B
04:20	03 Sep 2018	MTS	Asean_Enhanced	L1B
04:10	03 Sep 2018	MTS	Asean_Visible	L1B
04:10	03 Sep 2018	MTS	Asean_Enhanced	L1B

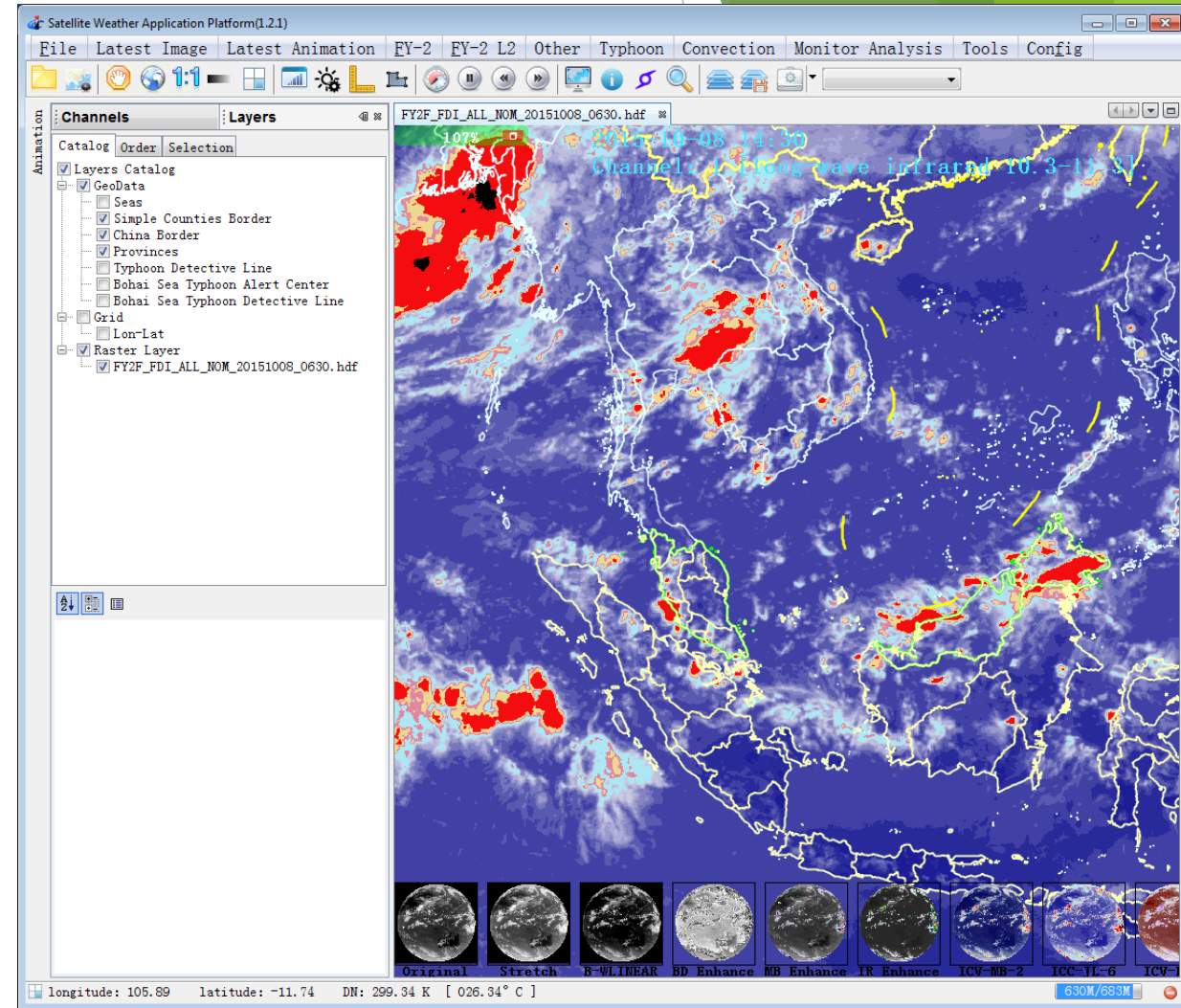
Load Product Delete Product



CMACAST DATA



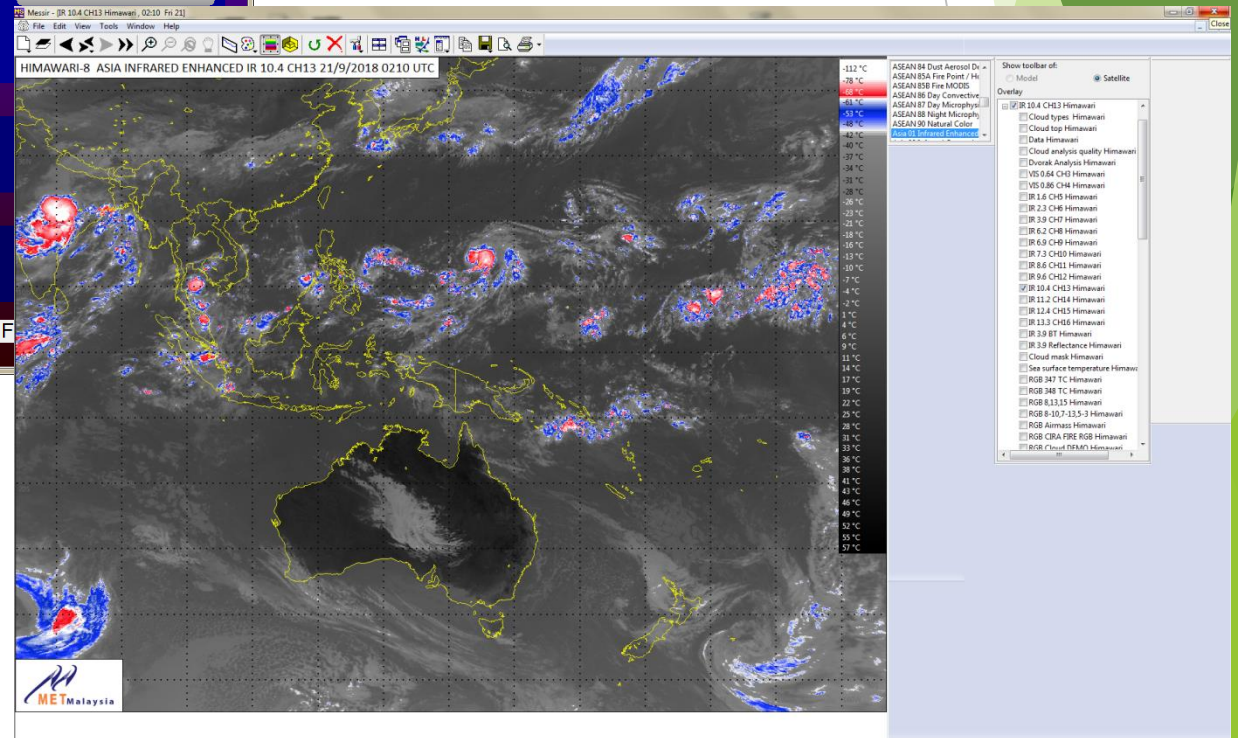
GMSOFT



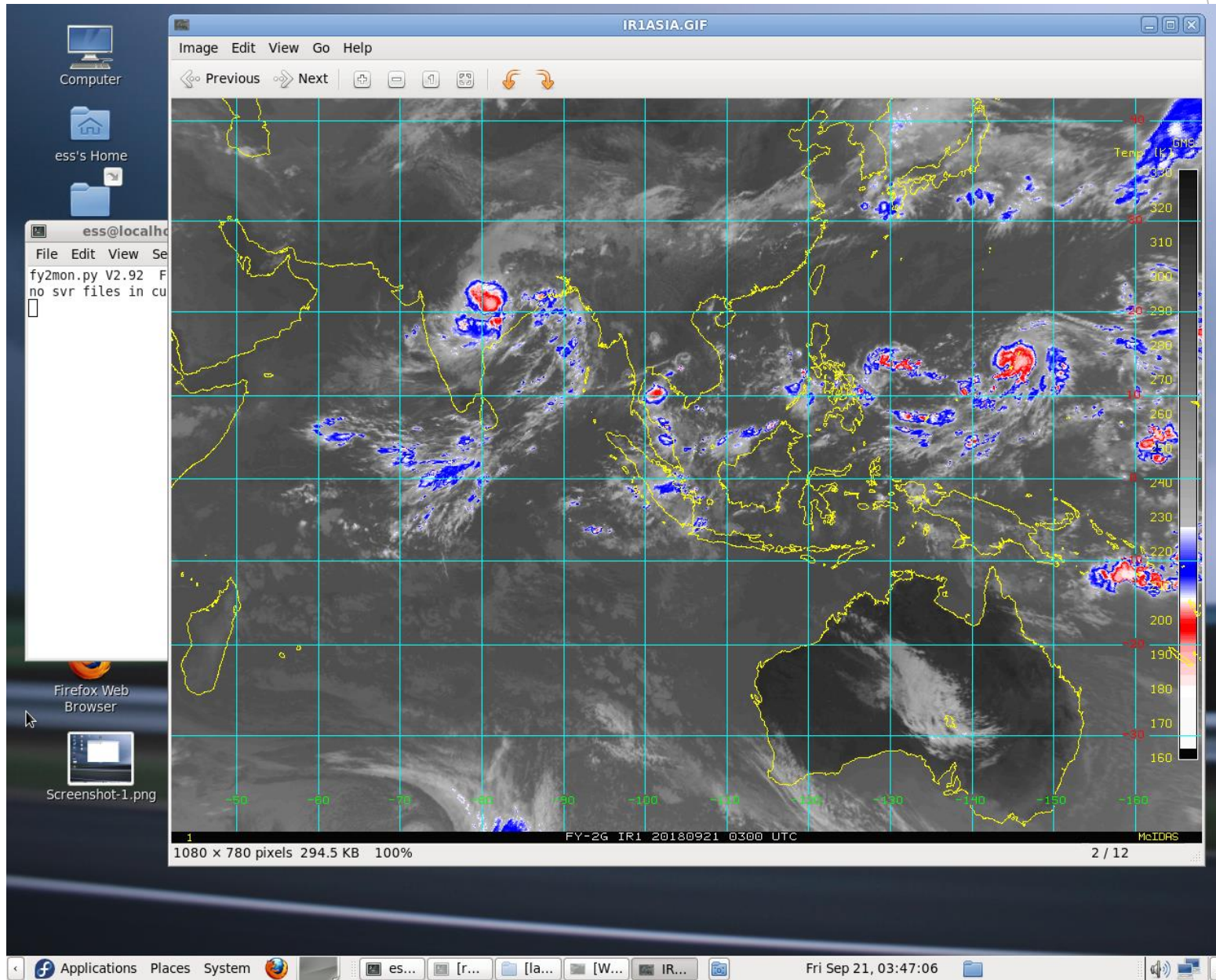
SWAP

HIMAWARICAST DATA/ HSD/ HCAI /AMV PRODUCT MESSIR-SAT COROBOR

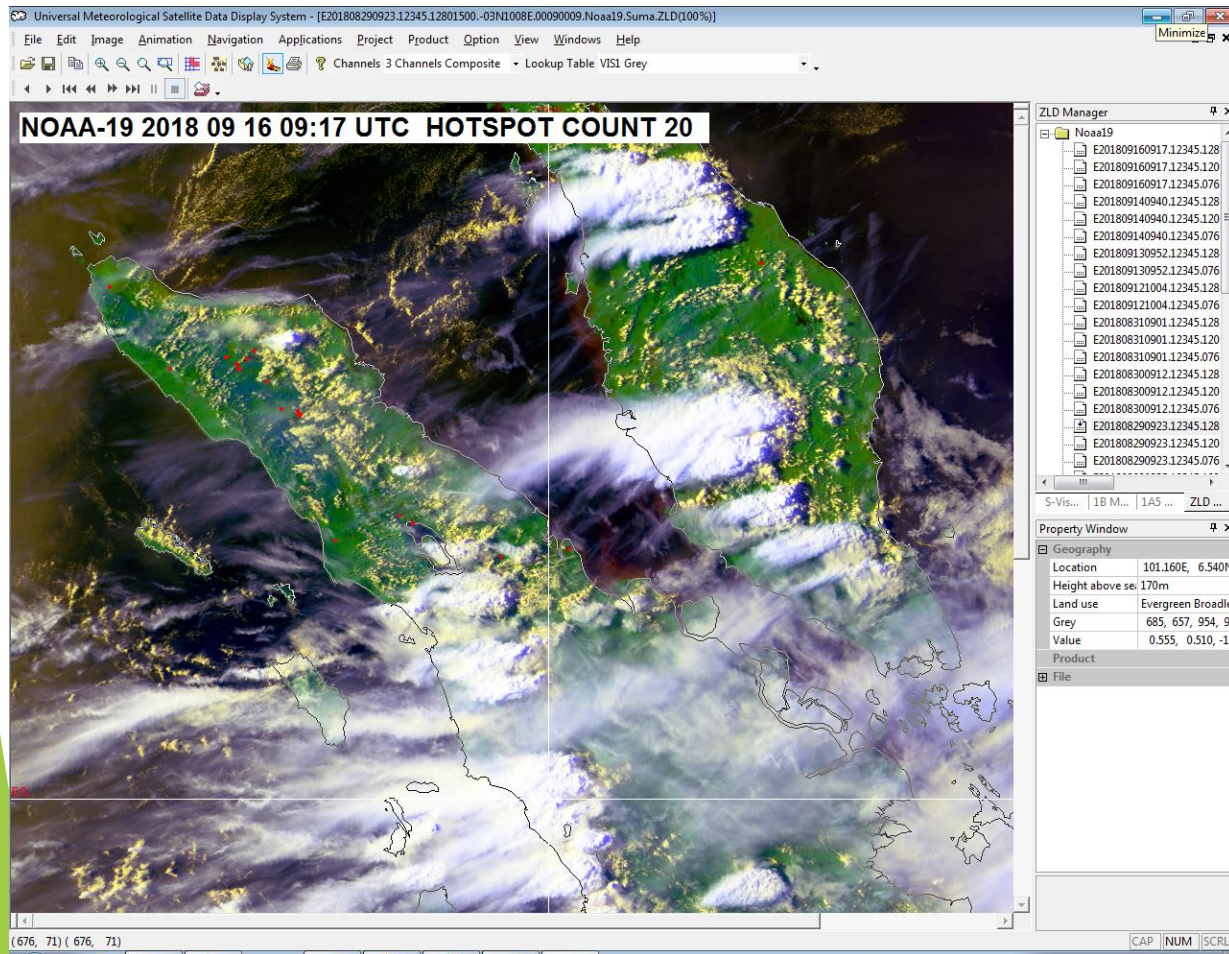
The screenshot shows the MESSIR-SAT Himawari software interface. At the top, there is a menu bar with 'File', 'Edit', 'View', 'Tools', 'Window', and 'Help'. Below the menu bar, there is a row of buttons for 'L2 Basic' products: 'Visible', 'Infrared', 'RGB True Color', 'Topography', and 'Rain Intensity'. The main area features the text 'MESSIR - SAT Himawari' in large yellow letters, with 'COROBOR systems' and 'MET Malaysia' logos to the right. Below this, there are several rows of buttons for 'L2 Adv', 'Text', and 'Admin' products. The 'L2 Adv' row includes 'Clouds', 'SST / LST', 'Dvorak', 'Volcanic Ash', and 'Instability'. The 'Text' row includes 'Bulletin', 'Reports', 'PNG/T4 Charts', and 'Model'. The 'Admin' row includes 'ImageMaker', 'Circuit monitoring', 'Warnings', and 'Setup'.



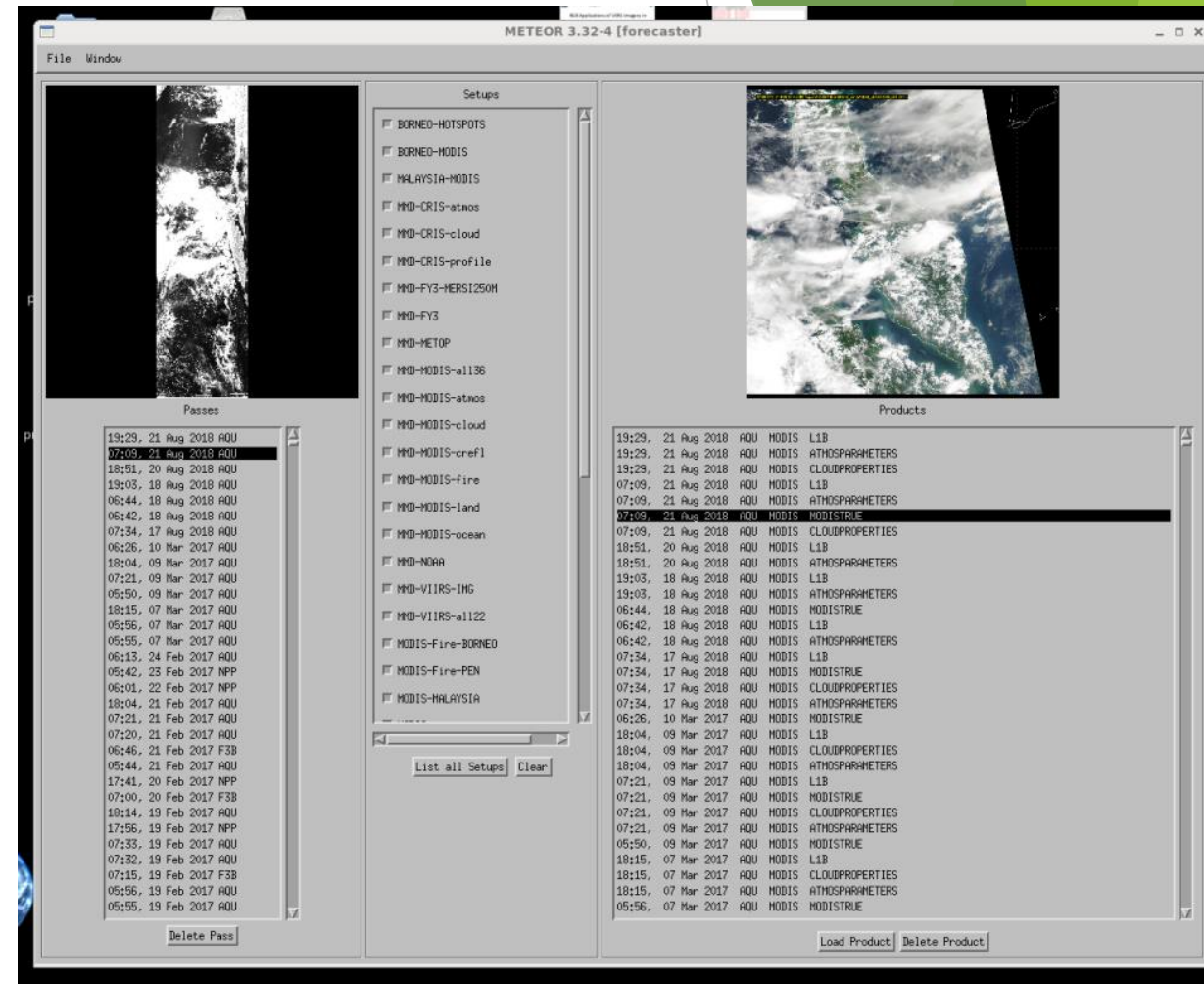
FY2G DATA (direct broadcast)-Mcidas



Polar Orbiting System



Lexical



Meteor

Operational SIGMET Coordination Support Website

WS WC WV

Your ID: WMKK / Your FIR: Kuala Lumpur / Time: Automatic updating

TS Info. Satellite Analysis: CBA MLUA RDCA CB TOP
TB Info. TB Index IC Info. IC Index

ATC File
DRAWLINE File

SIGMET Message Editor Chat Links

SIGMET Message

WMFC SIGMET 1 VALID 210437/210837 WMKK-
WMFC KUALA LUMPUR FIR EMBD TS OBS =

Copy to Clipboard
 WMO Header

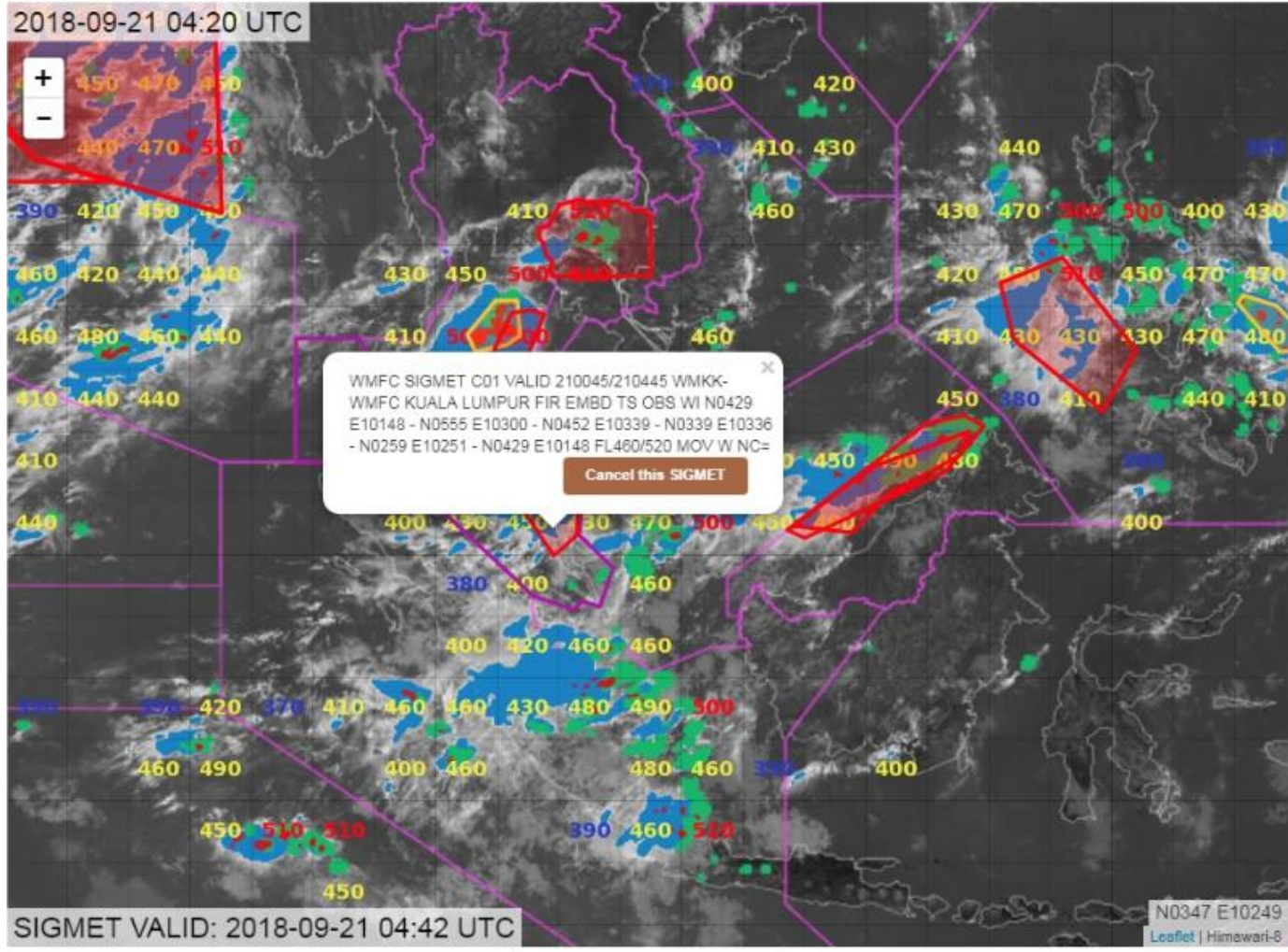
Daily sequence number
1

Validity period
The beginning: 21 04 37 Now
The end: 21 08 37 +4HR

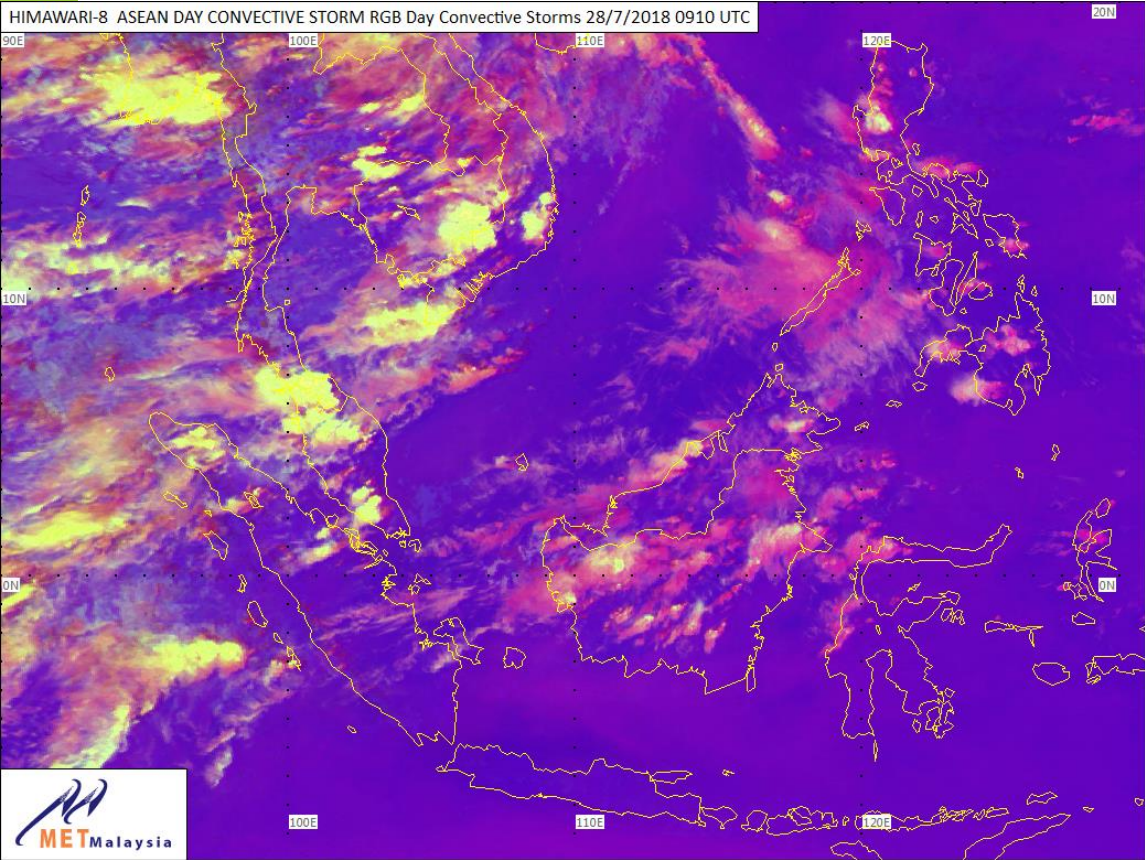
Description of the phenomenon
EMBD TS

Observed or forecast phenomenon
 OBS
 OBS AT 00 00 Z
 FCST
 FCST AT 00 00 Z

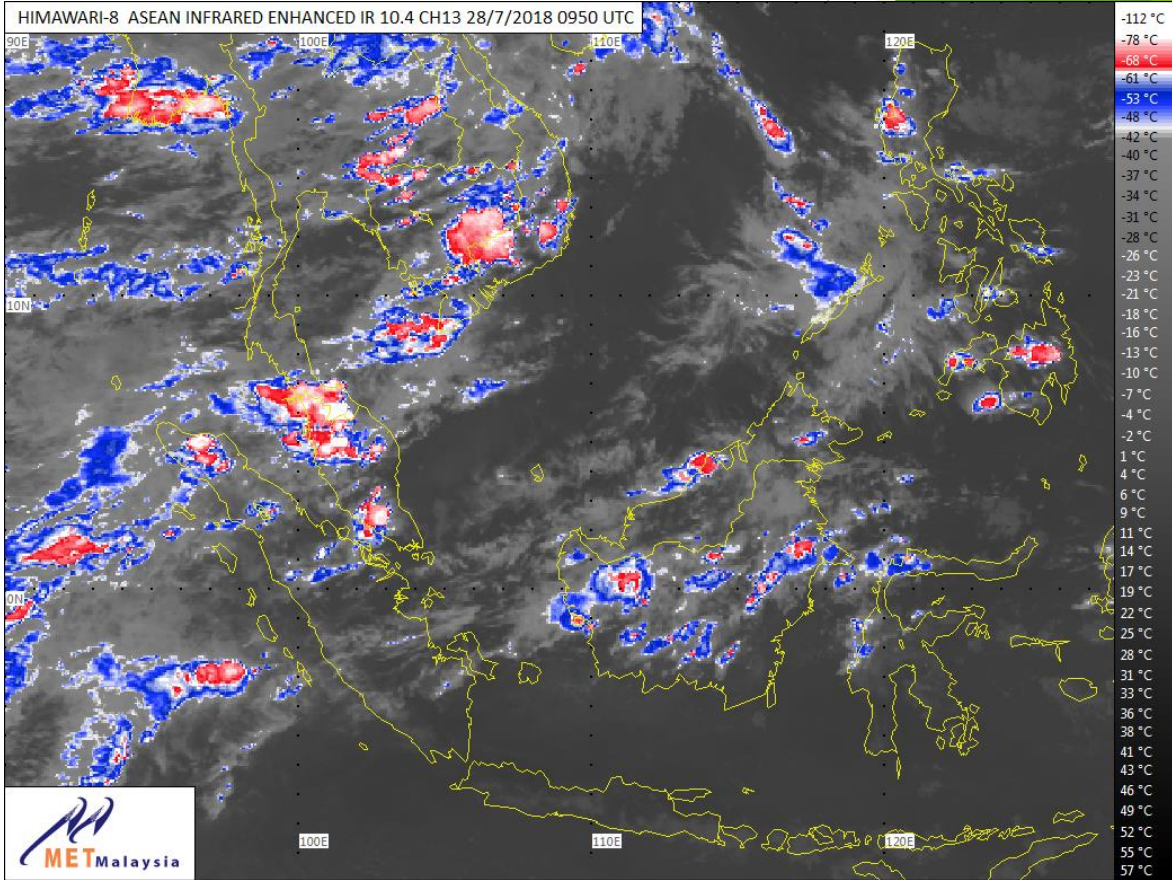
Location
 None
 Polygon
 dir OF latitude
 dir OF longitude
 dir OF lat AND dir OF lon
 dir OF latitude AND
 dir OF longitude AND
 dir OF LINE lat lon



Satellite Data to address Regional Challenges



Deep convective cloud detection



THANK YOU

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the frame, creating a modern, layered effect against the white background.