# VIETNAM

National Centre for Hydro-Meteorological Forecasting (NCHMF) Vietnam
Meteorological Hydrological Administration (VMHA)

Contact: Mr. Tien Du Duc

Deputy chief, Numerical weather prediction and remote sensing division

Focal point of the Severe Weather Forecasting Demonstration Project (SWFDP) for Southeast Asian

Email: duductien@gmail.com ddtien@monre.gov.vn

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 (updates on status and plan of satellite data access, processing, application and training)

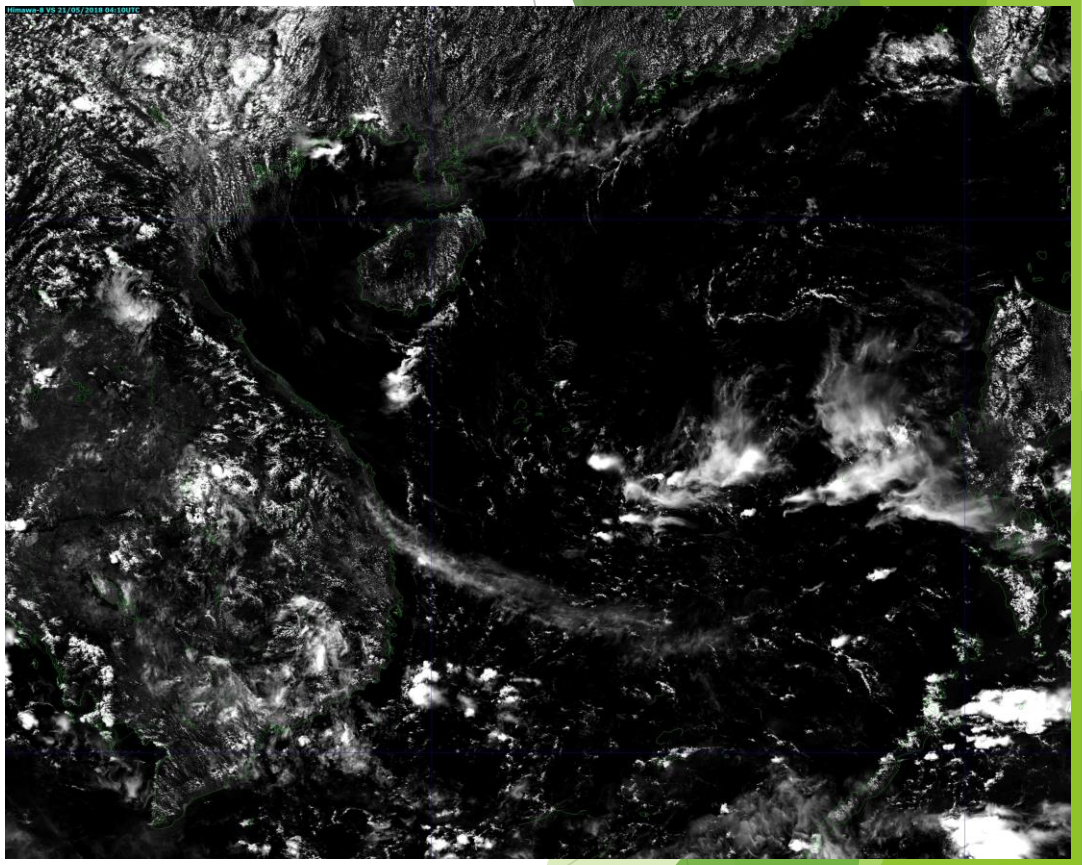

▶In National Centre for Hydro-Meteorological Forecasting (NCHMF) which is a governmental organization belonging Vietnam Meteorological Hydrological Administration (VMHA ), the main satellite data is the geostationary data from JMA–Himawari8/9 satellite and it is gathered from two data sources: (a) directly from satellite receiving station (HimawariCast Rx system which established in 2015 and relocated to new VMMA building in 2017) and (b) via internet (HimawariCloud, Wis–JMA portal and CEReS Chiba University-Japan).

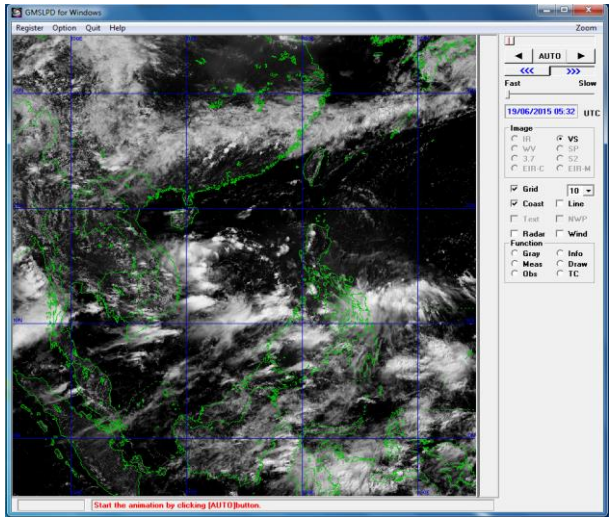
▶The satellite data is received in two main formats: (a) binary z-file type of SATAID-JMA softwares and (b) the Himawari Standard Data (HSD) format.

▶The main software for exploring satellite data is SATAID software from JMA. The raw data of Himawari is also converted to other format (netcdf, binary) for futher applications.

▶Other satellite data types are from NOAA system including (a) sea surface wind - ASCAT from NOAA (via internet) and (b) radiances from NOAA sounders (ATOVS) in prebufr format (via internet)


FANSIPAN LEGEND

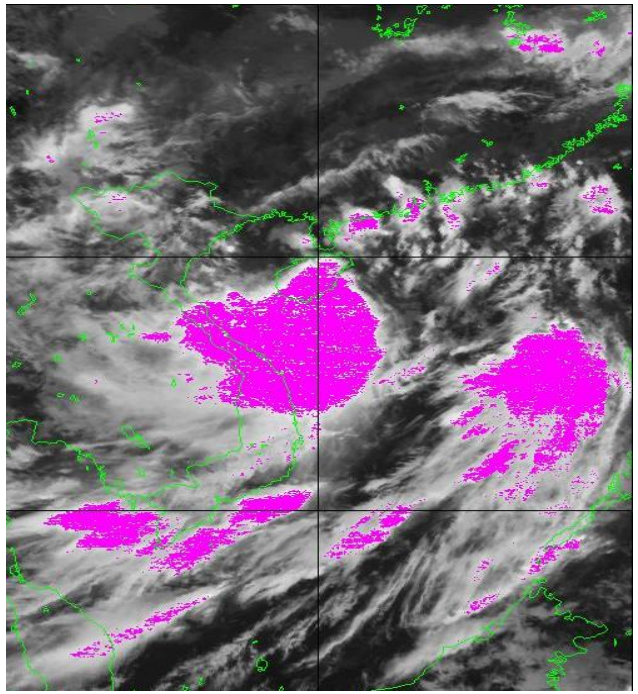



GMSLPD for Windows
Register
Option
Quit
Help
Zoom
AUTO
Fast
Slow
19/06/2015 05:32
UTC
Image
VS
Grid
Coast
Line
Radar
Wind
Function
Gray
Info
Meas
Draw
Obs
TC
Start the animation by clicking [AUTO]button.

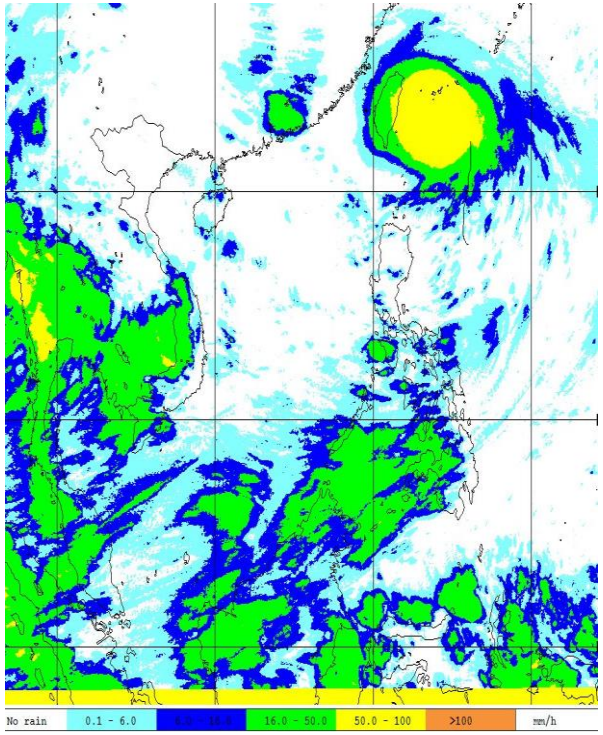
# Abstract (updates on status and plan of satellite data access, processing, application and training)

- Applications:
  - Operational weather analysis
    - Cloud classifications
    - Tropical cyclone intensity estimation with Dvorak method
    - In combination with other remote data for weather analysis
  - Nowcasting
    - Monitoring convective systems
    - Very-short range extrapolation of cloud moving systems
    - Detecting of the development thunderstorm
  - Rainfall estimation

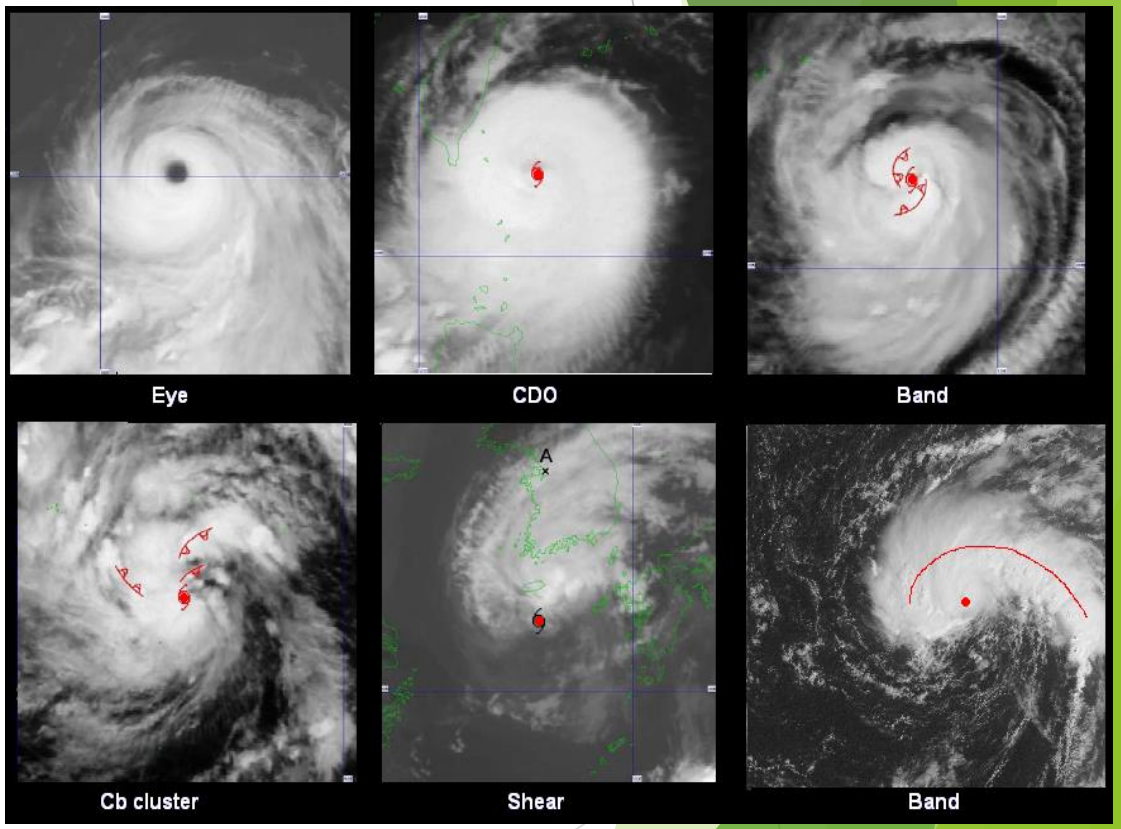
## Convective systems



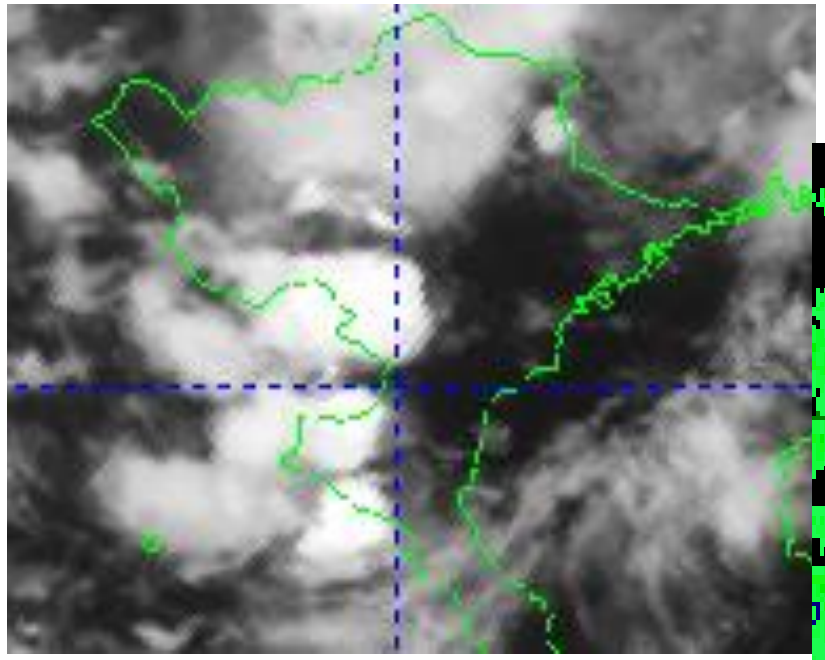
## Rainfall estimation



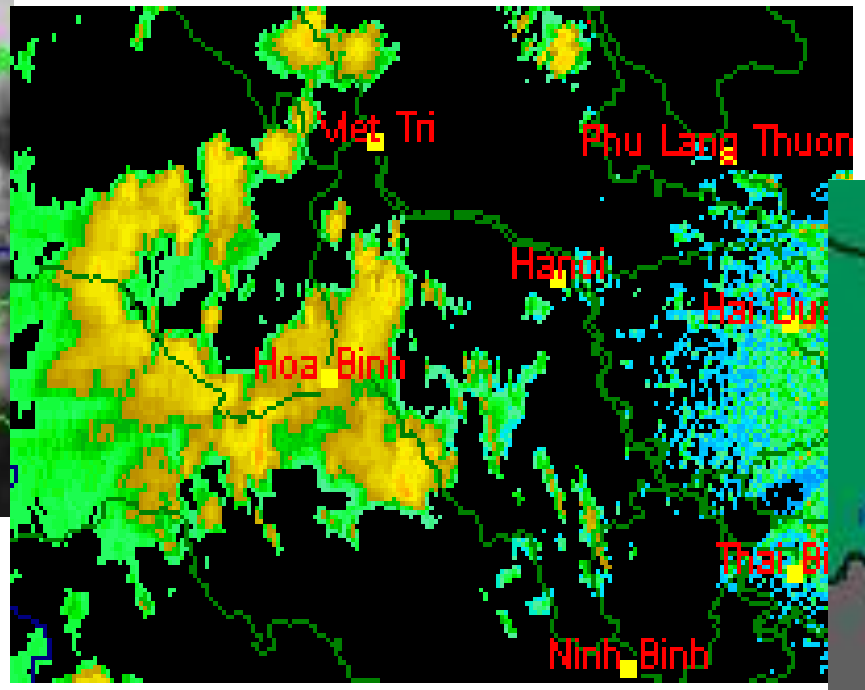

## Tropical cyclone analysis



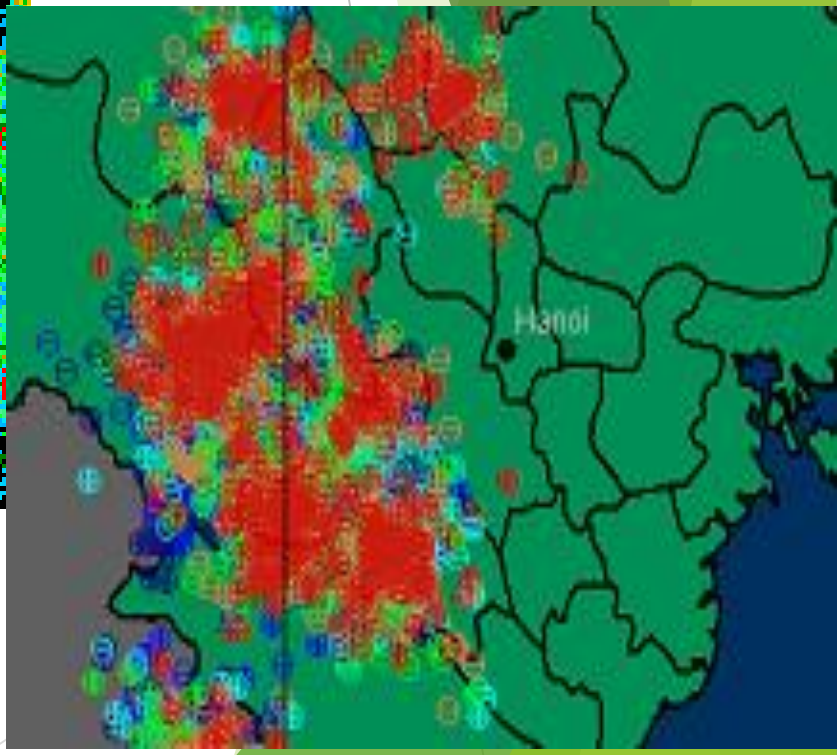
# Detect the development thunderstorm



Himawari data




Local radar




Lightning data

# Satellite data and product requirements, training needs and infrastructure

- Satellite data and product requirements
  - Rainfall estimations
  - Tropical cyclone zooming data
- Training needs
  - on interpreting RGBs,
  - on meso-scale system analysis and On detecting thunderstorm developments
  - on rainfall estimation
  - Tropical cyclone analysis
- Technical infrastructure issues
  - Direct reception for polar orbit products (NOAA)
  - Higher speed for internet service with HimawariCloud
  - Integrating local data to SATAID (lightning, local Vietnam observation, radar…)

# Appendix

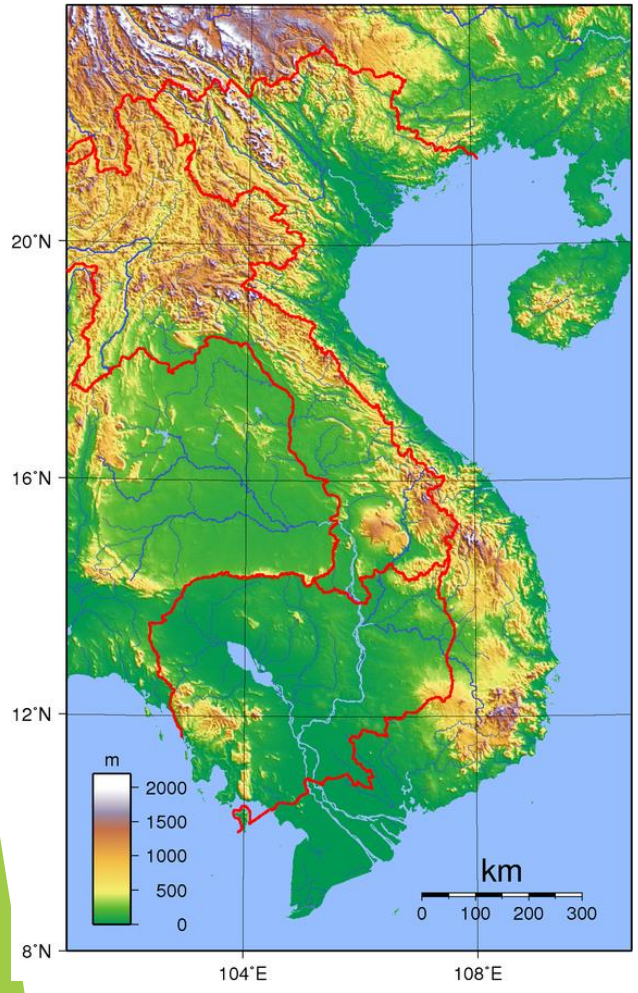
# Background

I. Country overview
    I. Geography
    II. Population
    III. Climate information
II. Major historical hydrometeorological disasters
    I. Disaster type and distribution

# Background:

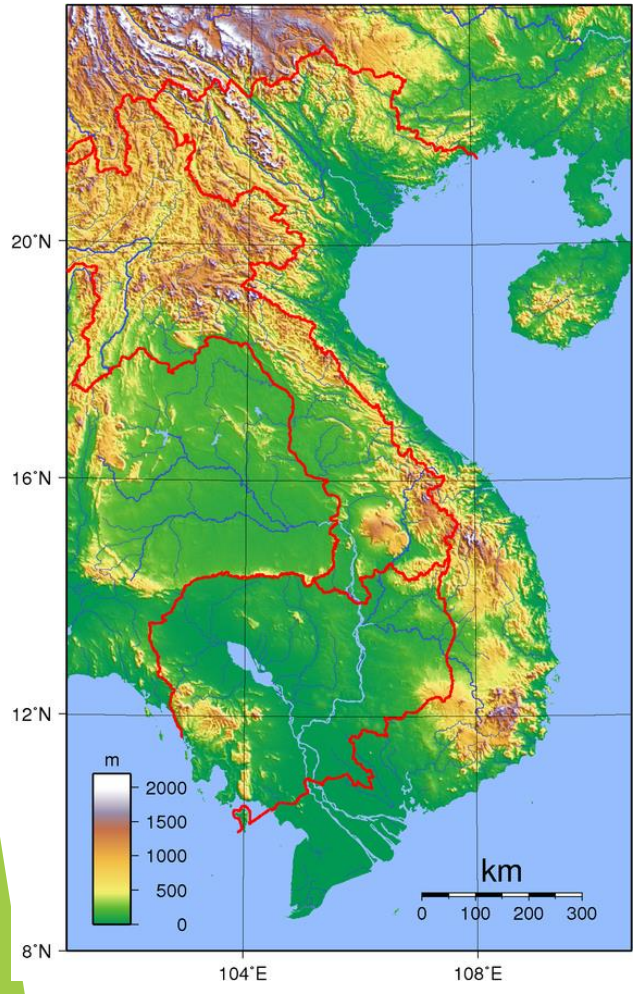

**General Information**
Official name: The Socialist Republic of Vietnam
Capital: Hanoi
Population: 93 million people
Total Area: 331.212 square kilometers

# Topo and Weather




| Months | Important local information/factors | Additional Comments |
|---|---|---|
| January | Strong northeast monsoon | Low temperature in the north |
| February | Strong northeast monsoon | Low temperature with drizzle and high relative humidity in the north while scattered rain occurs occasionally in the south |
| March | Weakening northeast monsoon | The main weather drives are mostly located in the north |
| April | Weakening northeast monsoon | Heavy rain in the south |
| May | The onset of southwest monsoon | |

# Topo and Weather (cont.)




| Months | Important local information/factors | Additional Comments |
|---|---|---|
| July | Stormy season in the north while southwest monsoon prevails in the south | The northern Vietnam suffers from tropical disturbance that occasionally causes heavy rain, whereas Central Vietnam experiences the dry and hot west wind as a result of eastward-developing heat low pressure in the west. The rainy season begins in southern Vietnam and Central Highland. |
| August | Stormy season in the north while southwest monsoon prevails in the south | This is the time for stable summer monsoon. Tropical depression and storm are the main factors for abundant rain in the north. |
| September | Stormy season in the north and mostly in central Vietnam while southwest monsoon prevails in the south | The west and south systems are weakening to pave the way for the north system.<br><br>In addition, September has the highest number of tropical cyclone per year. |
| October | Stormy season in the north and central Vietnam while southwest monsoon prevails in the south. The northeast monsoon begins in the north. | This is a transition month from summer to winter. The north system including cold front, squall lines affect the north region, while tropical storm and ITCZ tend to be active in the Central and the south part. Moreover, the central part of Vietnam occasionally experiences heavy rain due to the interaction between these two weather systems. |
| November | Stormy season in the central Vietnam and northeast monsoon | The north Vietnam officially steps into winter. In this month, it is dry in the north and the south, while there are several active cold front in the central Vietnam which causes high relative humidity and rain in this region. |
| December | Stormy season in the central and southern Vietnam and strong northeast monsoon | The winter monsoon reaches its peak during December and January |

# Major hydro-meteorological disasters

- tropical cyclones and tropical depression
- heavy rainfall;
- cold surge and associated weather such as: very cold wather, frozen, frost;
- heat wave and very hot weather;
- thunderstorms, gusty winds, tornadoes, lightening, hail and local heavy rainfall;
- flood and inundation; flash flood, landslide caused by heavy rain or runoff; drought;
- saltwater encroachment;
- high wave and storm surge caused by tropical cyclone and strong monsoon, tide, coastal fog

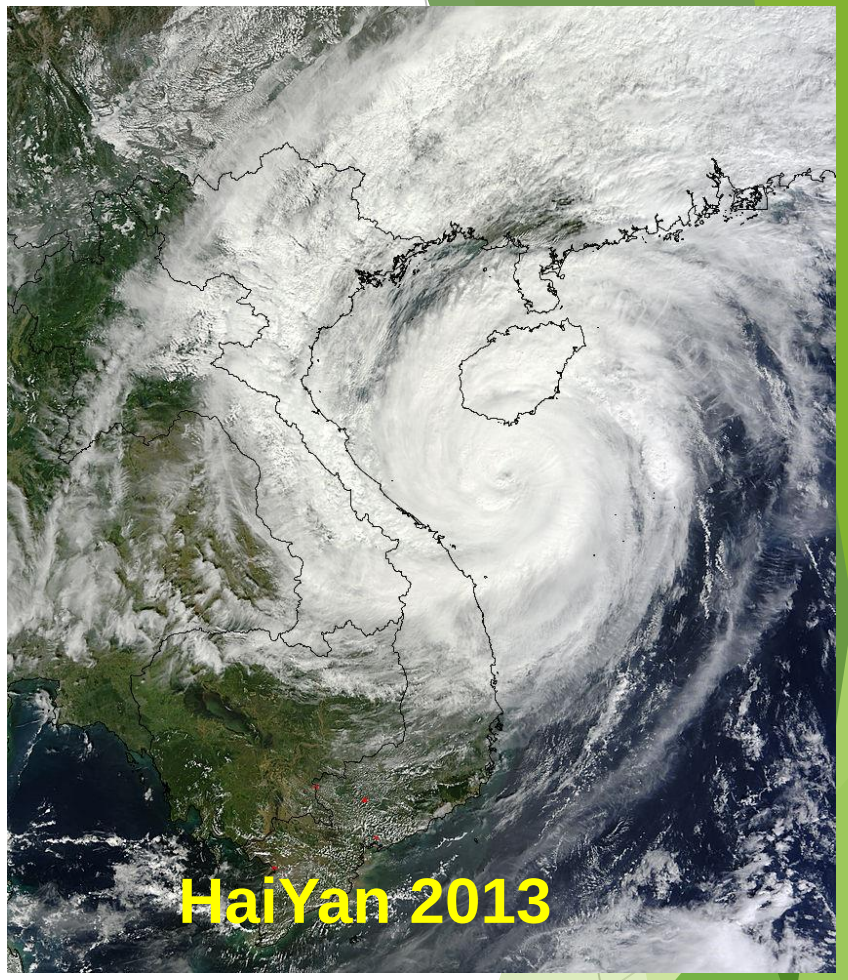
# Tropical cyclone affects

**Anually:**

10 - 12 Tropical cyclones activate over the East Sea (40% from ES, 60% from WNP)

5-6 Tropical cyclones make landfall or indirectly affect to Vietnam

**Storm Season**: 5-12 (6-11)




Tropical cyclones Frequency from 1985 - 2010:

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.05 | 0.00 | 0.10 | 0.15 | 0.35 | 1.10 | 1.60 | 1.25 | 1.60 | 1.90 | 1.15 | 0.45 |

# Short Description of Vietnam Meteorological Hydrological Administration

Water resources

**Meteorology and Hydrology**

Land resources

Geology and Mineral resources

Seas and islands

Environment

Survey and mapping

Dept. of Hydro-Meteorology and Climate change

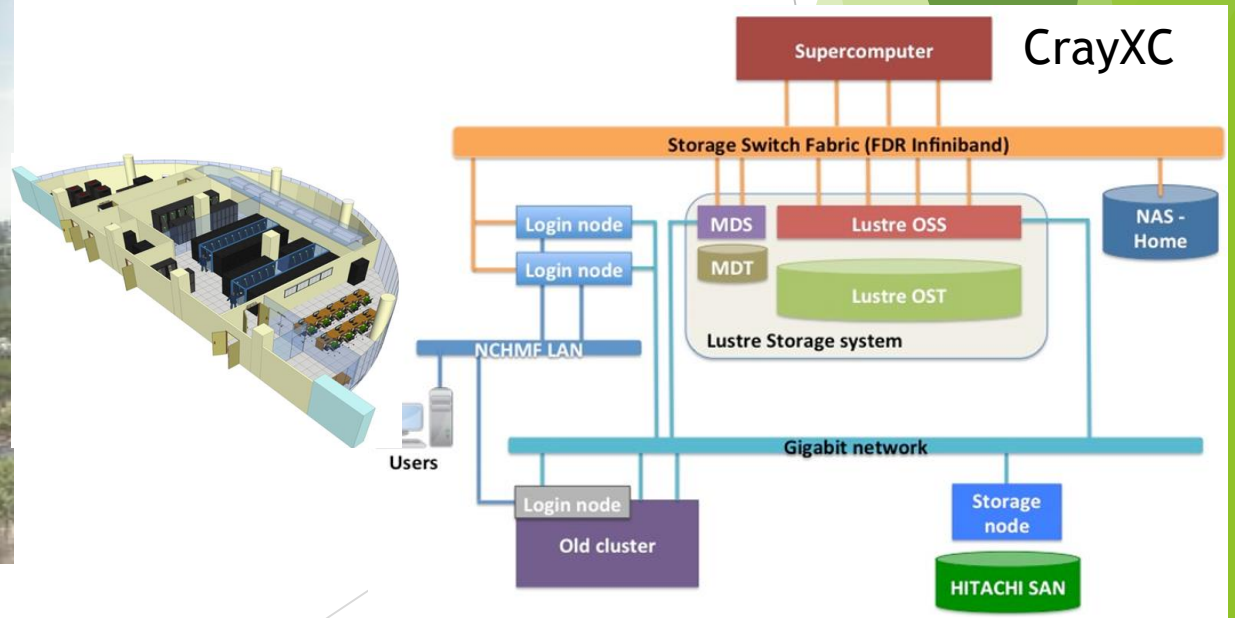
Institute of Meteorology, Hydrology and Climate change

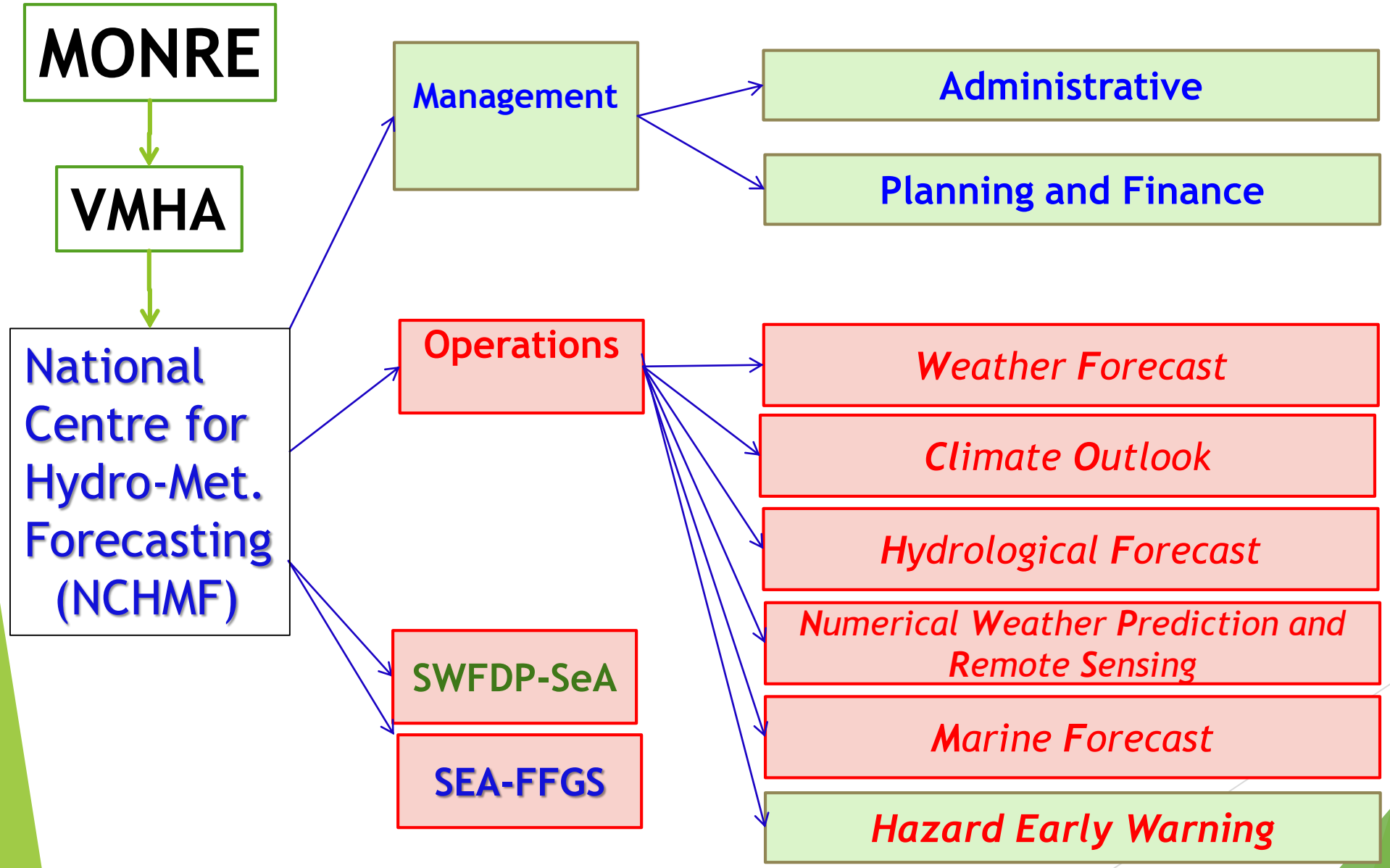
Vietnam Meteorological Hydrological Administration (VMHA)

Vietnam Meteorological Hydrological Administration (VMHA) is a state operational institution under MONRE, has the functions to assist the Minister in managing, exploiting the national hydro-meteorological station networks (including meteorological and hydrological basic investigations, forecasts, documentation), carrying out observations on air and water environment to serve disaster prevention and preparedness, socio-economic development, to ensure security and defense in over the country.

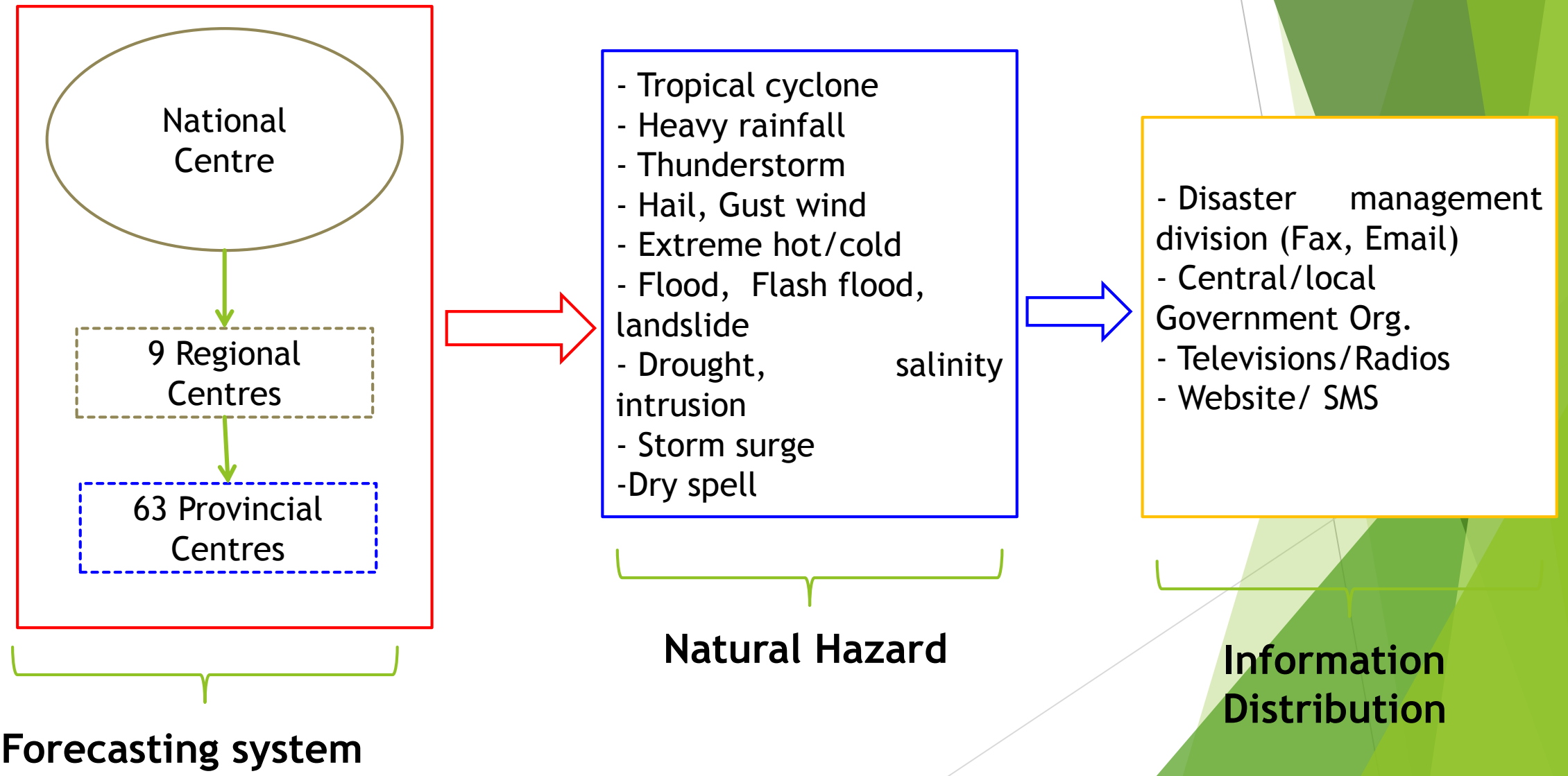
# Short Description of National Centre for Hydro-Meteorological Forecasting (NCHMF)

National Centre for Hydro-Meteorological Forecasting (NCHMF) is a governmental organization belonging Vietnam Meteorological Hydrological Administration (VMHA) with authority to issue forecasting/warning information for weather, climate, hydrology, water resource, marine weather (i.e. hydro-meterology) and provide hydro-meterology services.




MONRE
VMHA
National Centre for Hydro-Met. Forecasting (NCHMF)
Management
Administrative
Planning and Finance
Operations
Weather Forecast
Climate Outlook
Hydrological Forecast
Numerical Weather Prediction and Remote Sensing
Marine Forecast
Hazard Early Warning
SWFDP-SeA
SEA-FFGS

# What does NCHMF do?



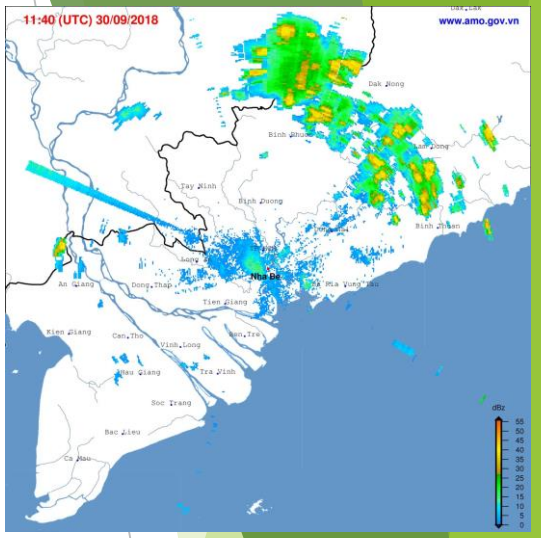
# Current Observational System Overview

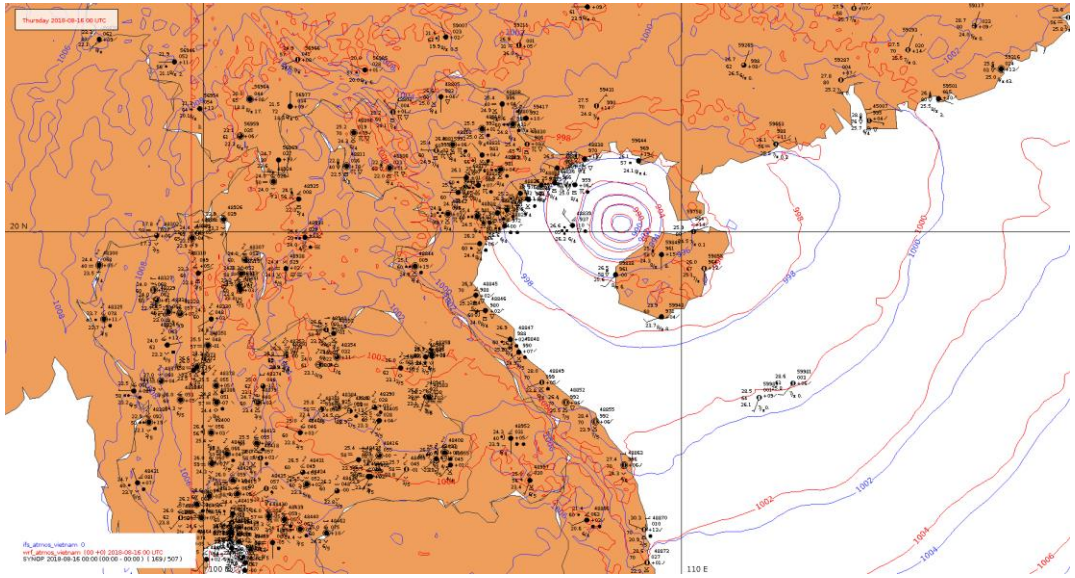
I. Surface observations
II. Upper-air observations
III. Marine observations
IV. Aircraft-based observations
V. Satellite observation[4]
VI. Weather Radar Observations
VII. Other observation platforms

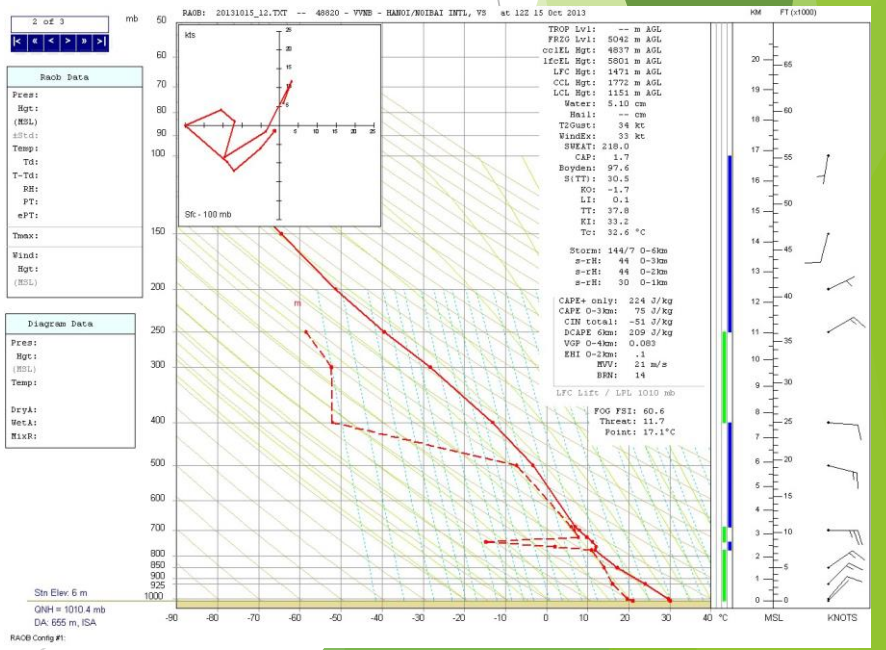
More information is available via the following link:
http://www.wmo.int/pages/prog/www/OSY/Gos-components.html

[4] This item means satellite observation project by your country. It does not include satellite data reception systems.

- 181 surface synoptic stations (33 stations are reported to GTS)
- 354 hydrological stations
- 6 TEMP (6 stations are reported to GTS)
- 6 pilot stations: (4 stations are reported to GTS)
- 500-800 automatic rain gauge
- 8 weather radars
- Ground receiving satellite stations: HimawariCast, CMAcast
- 26 marine stations (wave and water level)
- Marine radar (wave, surface current)





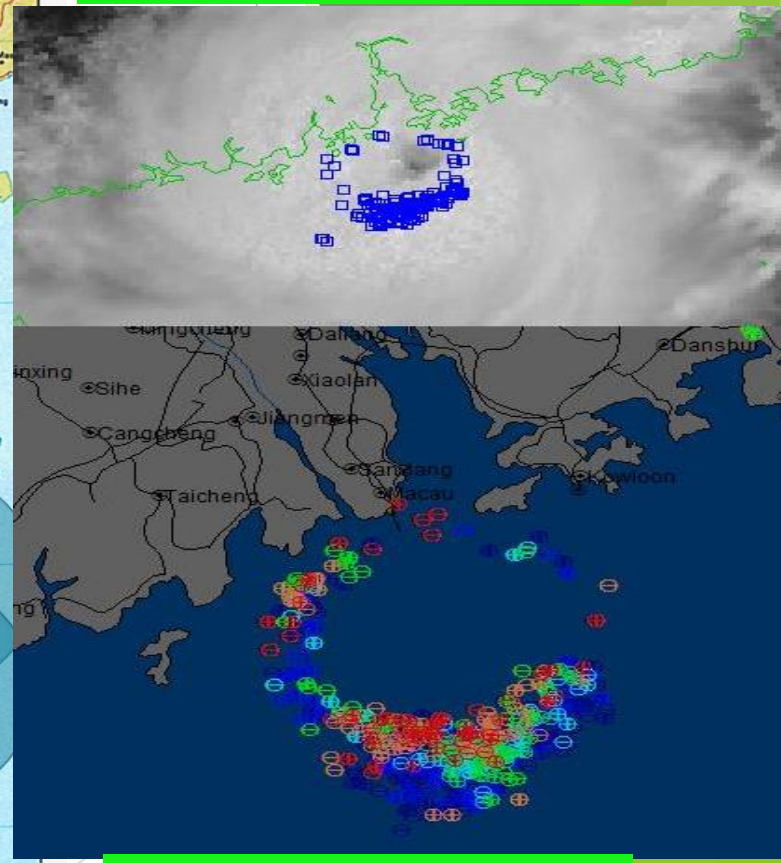
# Remote sensing information

New systems

| Band | | | Wavelength [μm] | Spatial Resolution |
|---|---|---|---|---|
| | V1 | VIS | 0.46 | 1Km |
| | V2 | | 0.51 | 1Km |
| | VS | | 0.64 | 0.5Km |
| | N1 | Near IR | 0.86 | 1Km |
| | N2 | | 1.6 | 2Km |
| | N3 | | 2.3 | 2Km |
| | I4 | IR | 3.9 | 2Km |
| | WV | | 6.2 | 2Km |
| | W2 | | 7.0 | 2Km |
| | W3 | | 7.3 | 2Km |
| | MI | | 8.6 | 2Km |
| | O3 | | 9.6 | 2Km |
| | IR | | 10.4 | 2Km |
| | L2 | | 11.2 | 2Km |
| | I2 | | 12.3 | 2Km |
| | CO | | 13.3 | 2Km |

Radar obs. system


Himawari 8/9 from JMA



Lighting obs. From FMI

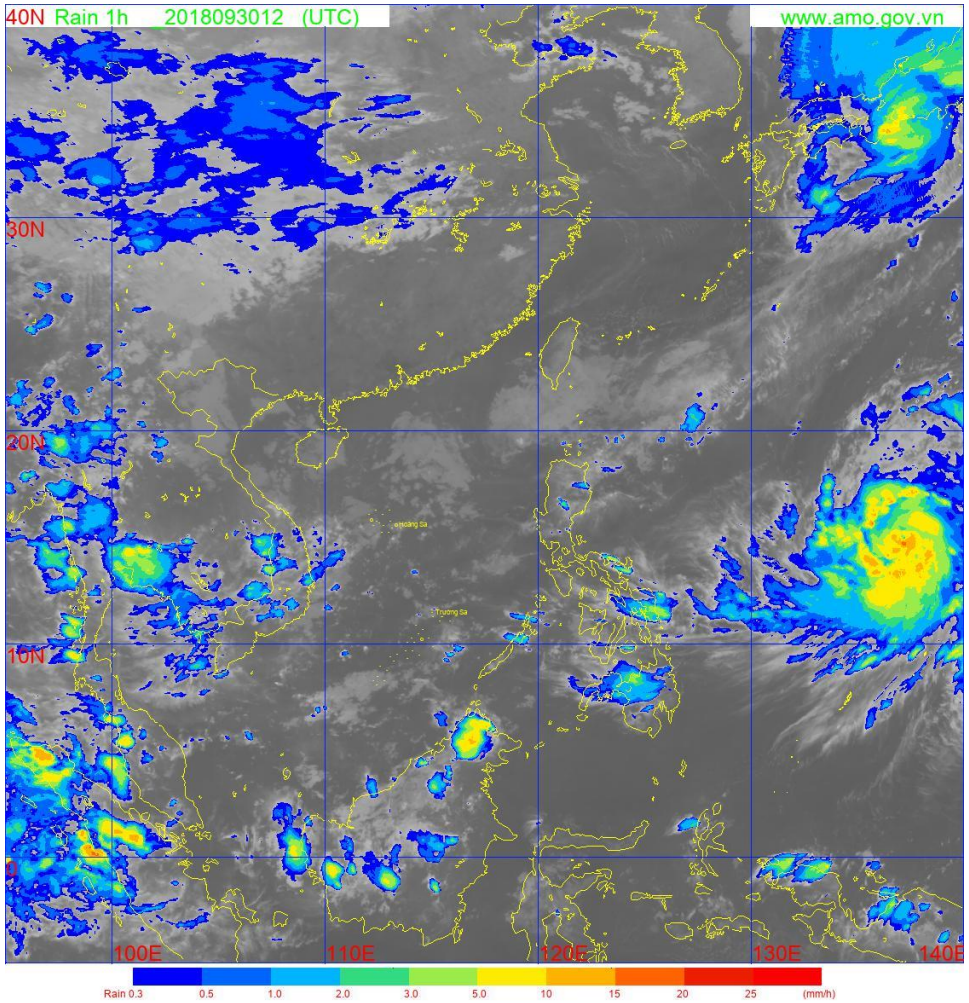
# Access, Processing and Application of Satellite Data and Products

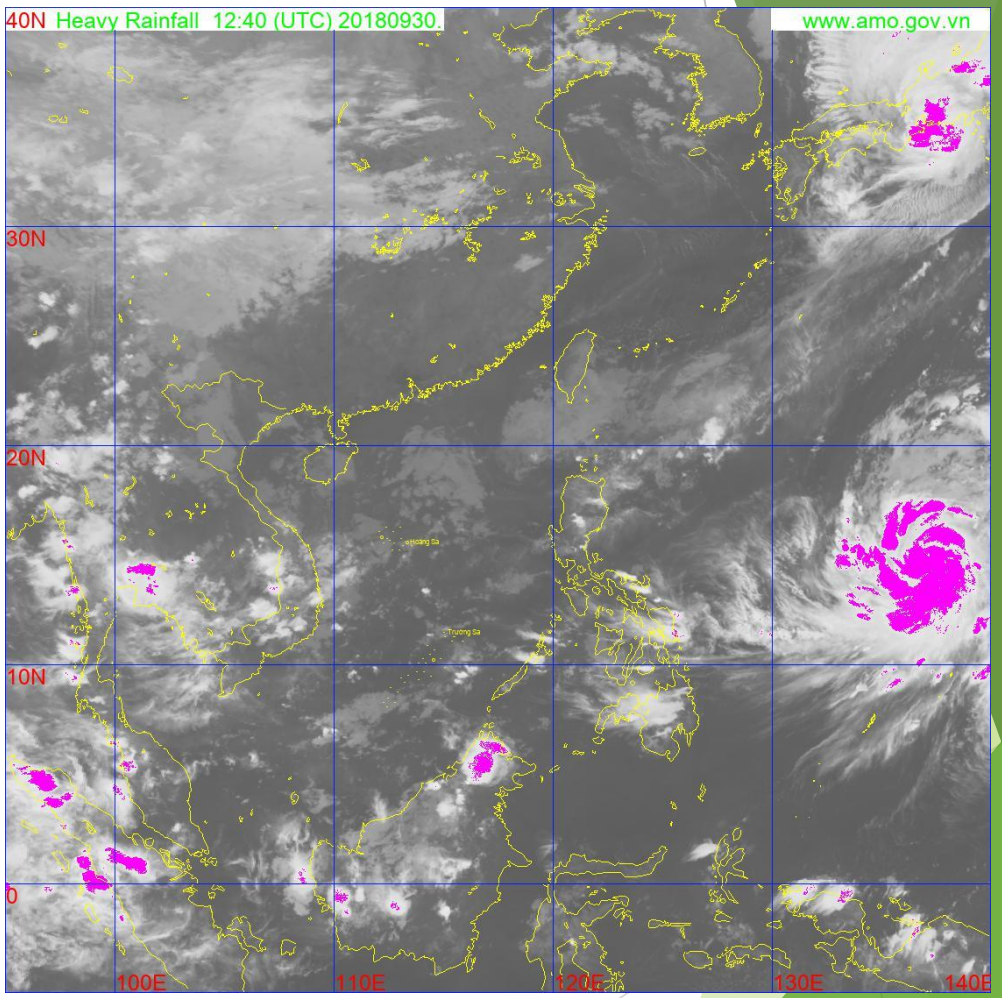
I. List of satellites/instruments currently used operationally for NWP, nowcasting and other applications:
    I. Himawari 8/9 for weather analysis and rainfall estimation
    II. NOAA sounders (ATOVS) for data assimilation experiments
    III. Sea surface wind from ASCAT for data assimilation experiments
II. Current capabilities of access, processing and archiving of satellite data and products:
    I. Directly receiving and via internet
    II. Raw data prepocessing and post-processing capabilities
    III. Storing: 100-200TB in near future
III. Current satellite data applications
    I. Key application areas:
        I. Tropical cyclone analysis,
        II. Thunderstorm monitoring
    II. Satellite-based products
        I. Rainfall estimation

# Satellite Data to address Regional Challenges

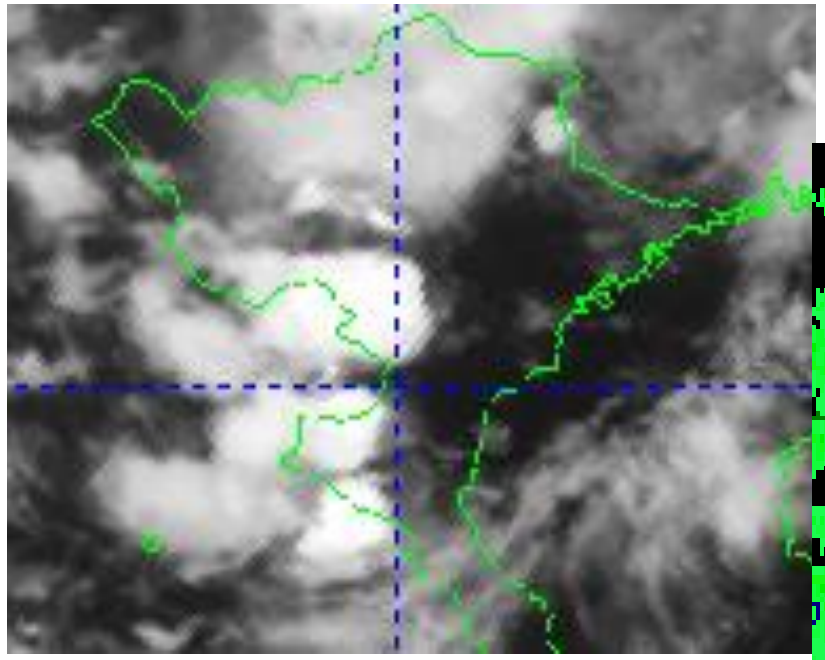
Some examples on the satellite data used in Vietnam

# Rainfall estimation

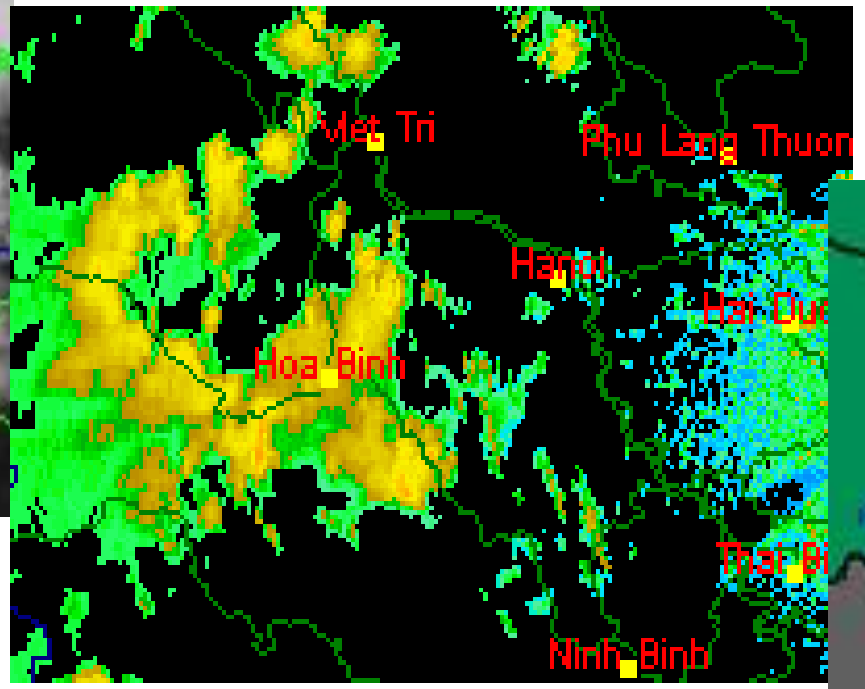


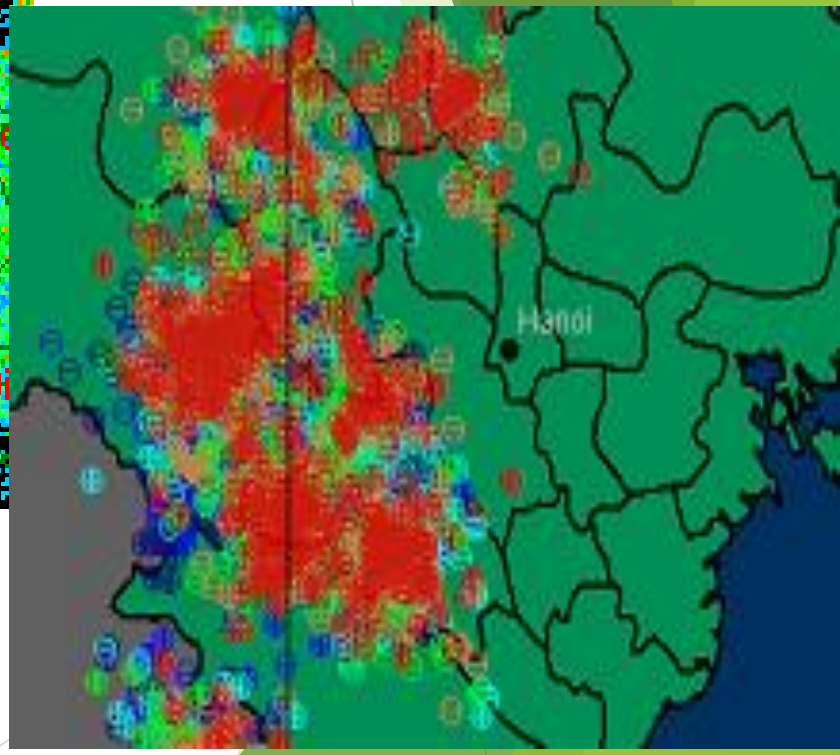
# Monitoring thunderstorm with other remote sensing data



Himawari data

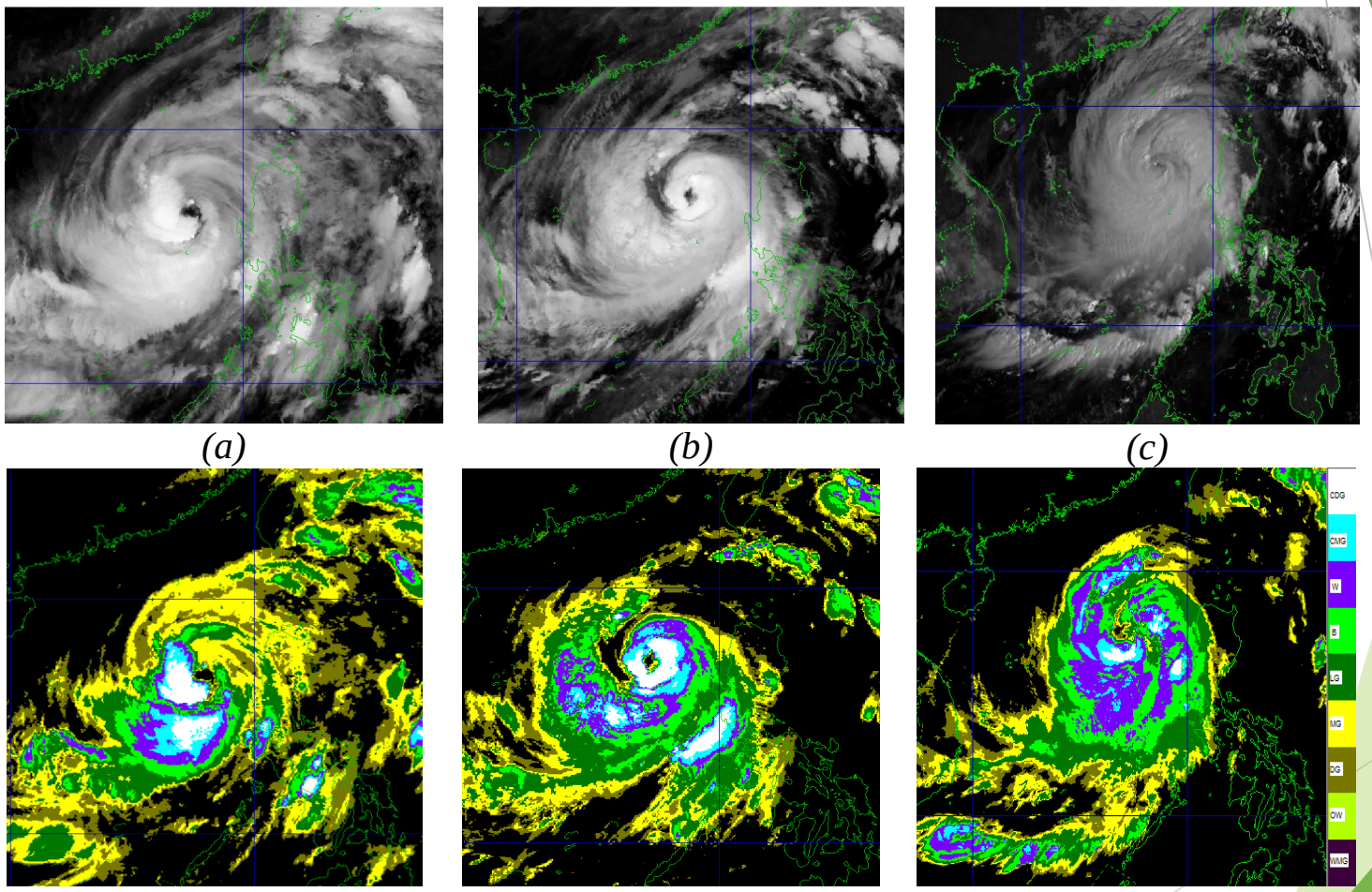



Local radar




Lightning data

# Tropical cyclone analysis



*(a)* *(b)* *(c)*

*(d)* *(e)* *(f)*

*TC Megi in IR (a,b,c) and EIR (d,e,f) at 1230z, 1830z on 19/10/2010 and at 0030z on 20/10/2010*

# Very high resolution data from HimawariCloud