(Country Report)[1]

Thai Meteorological Department

boonlert.arc@tmd.go.th

Joint Meeting of RA II WIGOS Project and RA V TT-SU

Jakarta, Indonesia / 11 October 2018

BMKG Headquarter

[1] Your country reports will be posted on the meeting's web page.

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

Thai Meteorological Department (TMD) installed the satellite image receiving system namely CMACast and HimawariCast for geostationary meteorology satellite with image processing MICAPS, SATAID respectively. Additional, the satellite data from HimawariCloud which higher temporal resolution is acquiring and generating the RGBs images for various application in each sectors. The new language namely python with variety of libraries to created tools to generated B/W images and RGBs product of Natural Color, Airmass, Ash, Dust, Fog, Day Convective Storm, Day Micro-physics, and HRV Cloud. The best practice guide book: gethimawari.py for download HimawariCloud data, decodehisd.py to converted Himawari Standard data format (HISD) to Network Common Data Format (NetCDF), High-Rate Information Transmition (HRIT) and SATellite Animation And Interaction Diagnosis (SATAID), rgbcomposite.py to created RGBs product and ncx.py to interpolate data at certain latitude and longitude.

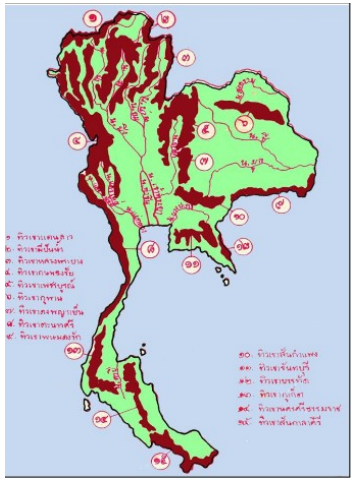
Satellite data and product requirements, training needs and infrastructure

We are required capacity building on the topics of, new algorithm for RGBs product, training for interpretation and application for risk disaster, water and air-quality management, Big data and Artificial Intelligence (AI) on the meteorological satellite data, visualization data in Virtual Reality (VR), parallel processing to analysis and visualize meteorological data, application of meteorological satellite data on the data assimilation for Numerical Models and images processing to combine with various meteorological data and geographical information system.

Appendix

Thailand

I. Country overview



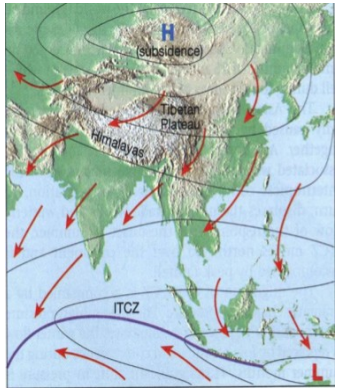
Thailand has a total surface area of 513,000 square kilometres and a population of 64 million, of which about a third live in urban areas. The main land borders are with Myanmar, Laos and Cambodia, countries at a much lower level of economic and social development than Thailand. The geographic extent of the floods was enormous, touching 65 of the 77 provinces around the country mainly in the Northeastern and Central regions. The provinces impacted in the central plains are located in the Chao Phraya Basin, which receives rainwater from the northern, mountainous regions of the country that were the landing ground for the tropical storms in August - September. Bangkok, located at the bottom of Chao Phraya Basin, is partially flooded as the river drains into the Gulf of Thailand.

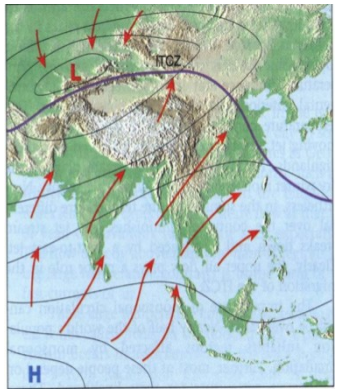
Thailand

Thailand is divided into 77 provinces and divided according to the climate pattern and meteorological conditions into 5 parts.

1. Northern part (15 provinces)
2. Northeastern part (20 provinces)
3. Central part (18 provinces)
4. Eastern part (8 provinces)
5. Southern part (16 provinces, East Coast (10 provinces) and West Coast (6 provinces))

The general climate, Thailand is under the influence of 2 monsoons wind of seasonal character. The southwest monsoon, rainy season (May-October) and northeast monsoon, the dry season (November-April) constituted the tropical savanna climate for Thailand. The flows of the Chao Phraya River are dependent upon the highly seasonal monsoon rains in the wet season. This climatic variation also determines the availability of the basin's water resources, thus, heavily responsible for floods and drought across regions each year.

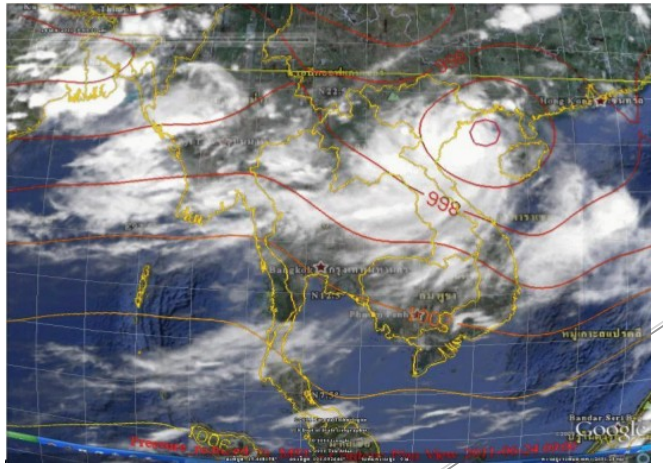




Thailand

I. Major historical hydrometeorological disasters

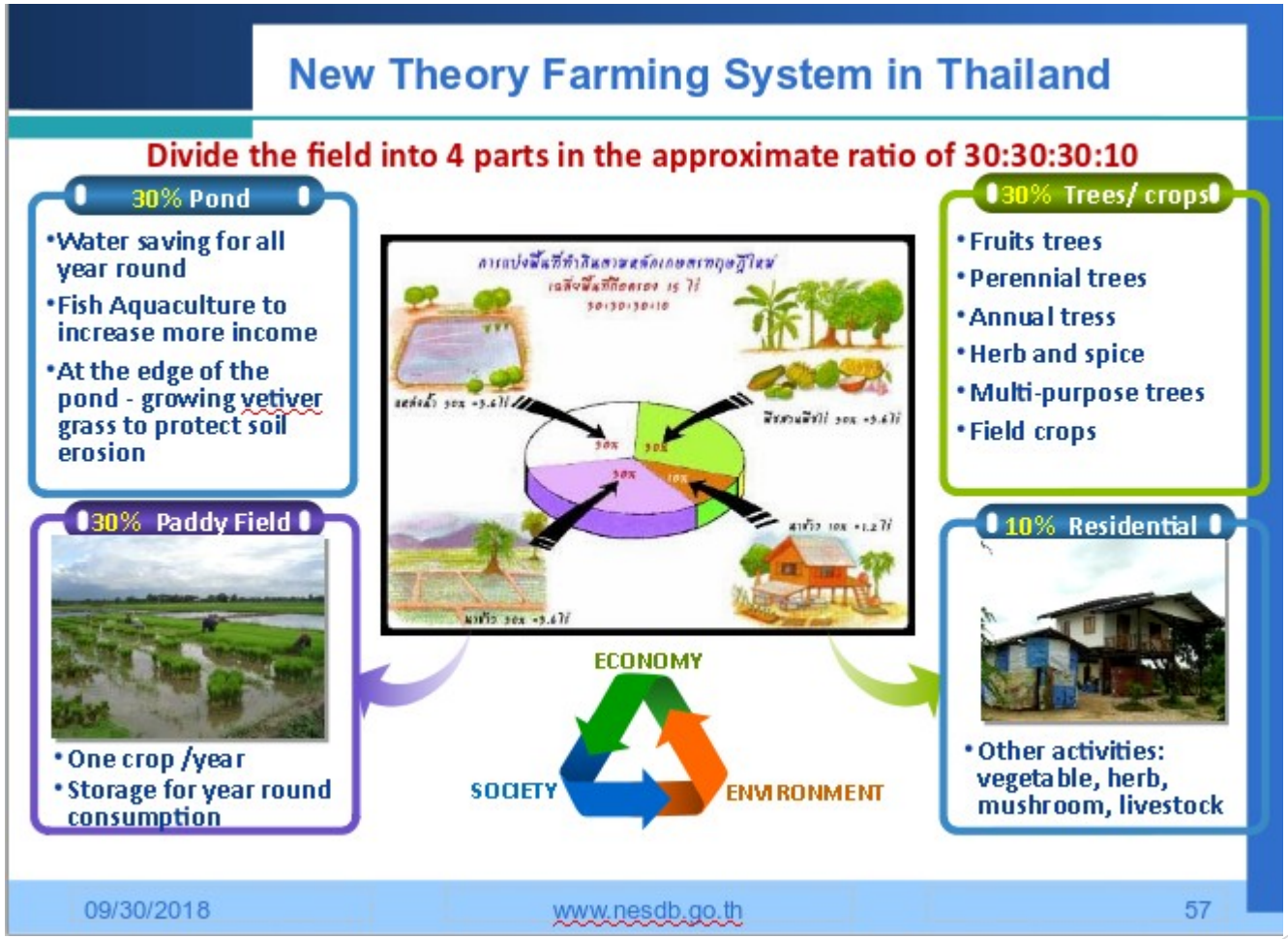
In 2011, Heavy rain combined with multiple tropical storms throughout the extended rainy season played a large part in the extensive flooding. Flash floods were reported in several areas in the north in May, and tropical depression Haima arrived in June followed by Nock-Ten in July, the combination of which caused widespread flooding. The southwest monsoon in August-September and the northeast monsoon in October added to the flood, which was making its way into the central plains, filling many major dams to capacity and causing breaches in ten major flood control structures. Severe, record-high flooding had affected 66 provinces, including the Bangkok metropolitan area and surrounds. The total damages and losses from the 2011 floods in Thailand amounted to THB 1.43 trillion (USD 46.5 billion), with losses accounting for 56 percent of the total. The manufacturing sector bore roughly 70 percent of the total damages and losses due to the flooding of six industrial estates in Ayutthaya and Pathum Thani from mid-October to November 2011.



Thailand

I. Major national economic sectors relying on NMHSs

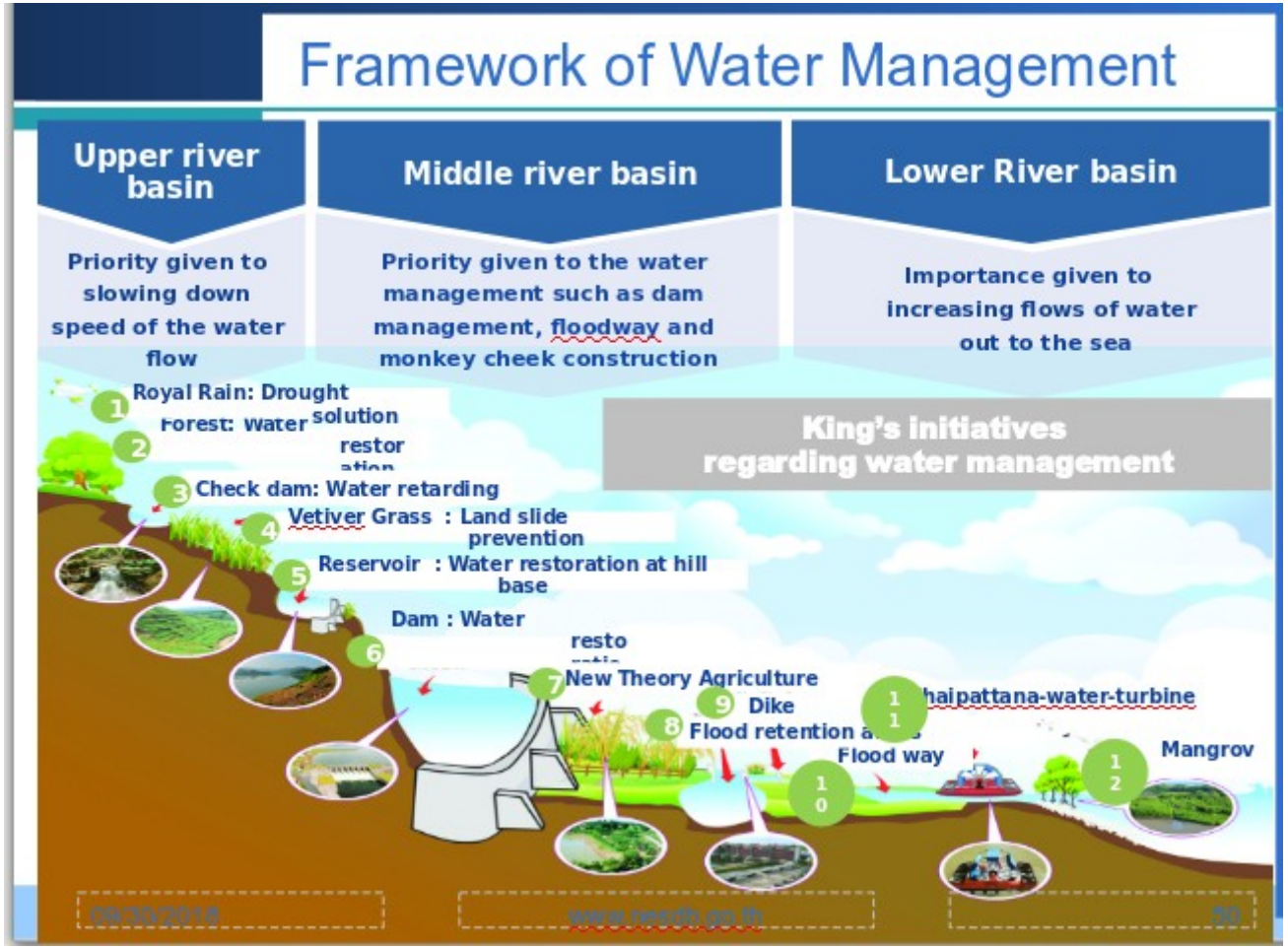
Substainable Agriculture



Thailand

I. Major national economic sectors relying on NMHSs

Water Resource Management



Short Description of NMHS Activities

Vision: Aspiring to the excellence in meteorology at the international level

Missions: As the TMD's missions have been designed to carry on meteorological administrations and managements for the sakes of 2 vital aims: the best economic, social, agricultural, and industrial benefits as well as protection of human lives and properties possessed by public members; private sectors; and governmental units against natural disasters, it has been authorized to perform the following 5 duties :

1. To supply weather forecasts for the entire country and publicize disaster warnings to fulfill the requirement from administration and management in natural disaster mitigation,

2. To build the people's awareness toward natural disasters; enable them to perform correct surviving practices; and reduce effects from natural disasters by using modern technologies together with IT services,

3. To become the meteorological IT data and service center at the national level for users in any ventures,

4. To improve and develop the Departments research works,

5. To strengthen the Department's roles in international cooperat ion concerning meteorology and environment with the purpose of profound comprehension on changing world situation.

Please provide the description of the current mission, mandate (climate services, aviation services, hydrological services, marine, environmental, air pollution, etc) of the NMHS.

Current Observational System Overview

- Synoptic Meteorological station (122)
  - Basic Meteorological station (76)
  - Agro Meteorological station (30)
  - Hydro Meteorological station (16)
- 12 Upper Air Station (Radiosonde 5)
- 26 Doppler Radar
- 87 Automatic Weather Station
- 930 Automatic Raingauge station
- Seismic Observation Network

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

Current Observational System Overview

- Automatic Weather Station

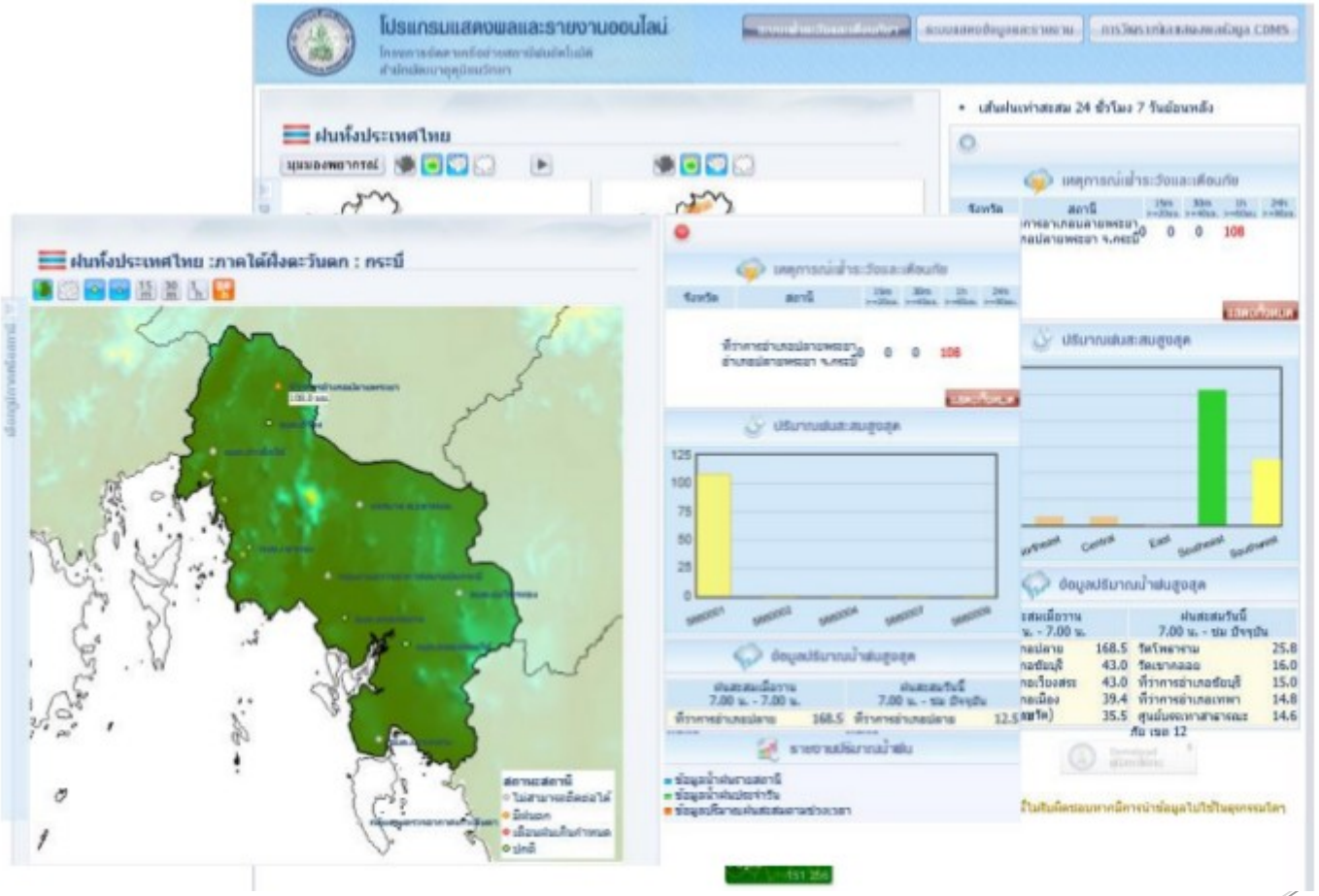
http://www.aws-observation.tmd.go.th/web/main/index.asp

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

Current Observational System Overview

- Automatic Raingauge station

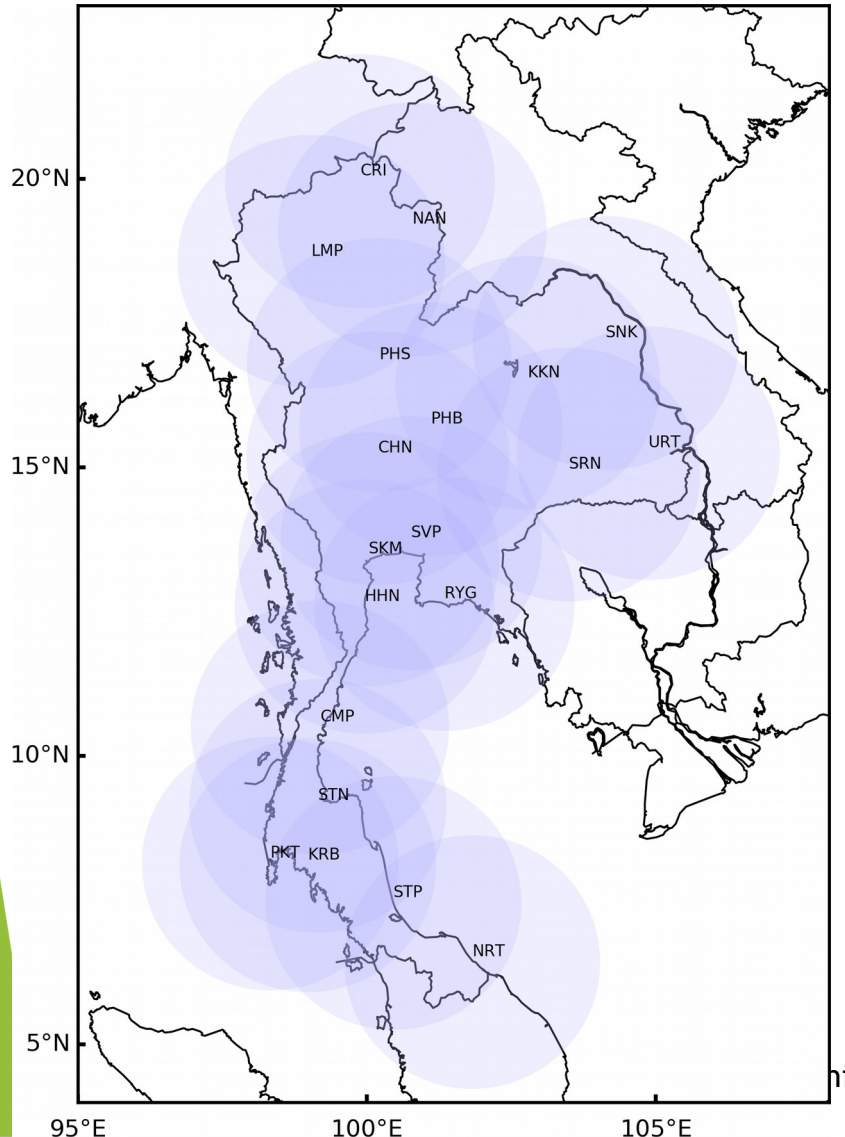
Update every 10 min.



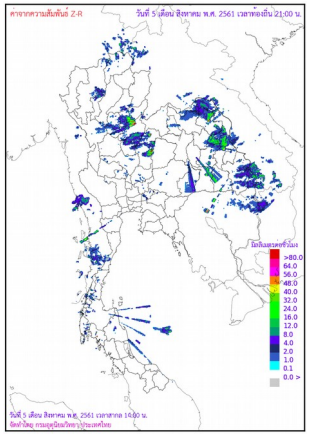
[4] This item means satellite observation project by your country. It does not include satellite data reception systems.

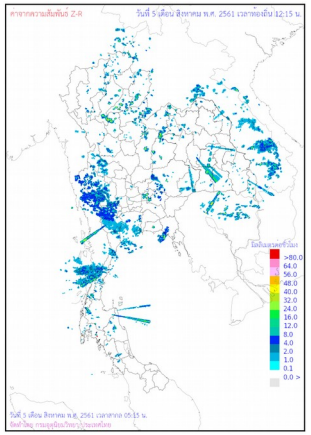
Current Observational System Overview

- Doppler Radar Networks

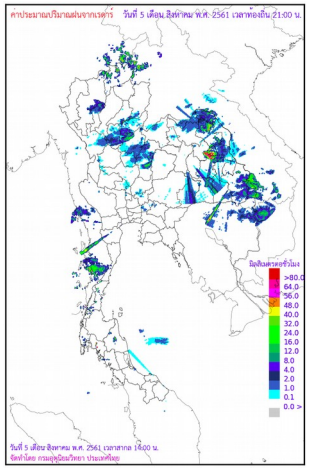


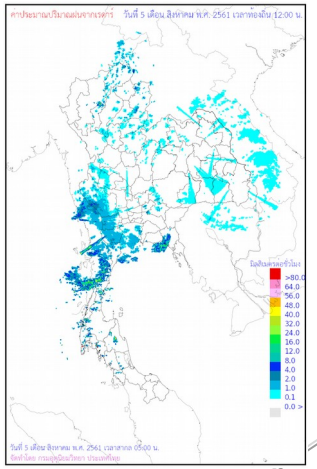
Composite 15 minutes





QPE hourly





his item means satellite observation project by your country. It does not include satellite data reception systems.

Access, Processing and Application of Satellite Data and Products

I. List of satellites/instruments currently used operationally for NWP, nowcasting and other applications

FY-2/CMAcast, Himawari-8/HimawariCast and HimawariCloud

II. Current capabilities of access, processing and archiving of satellite data and products

- MICAPS for FY-2 processing

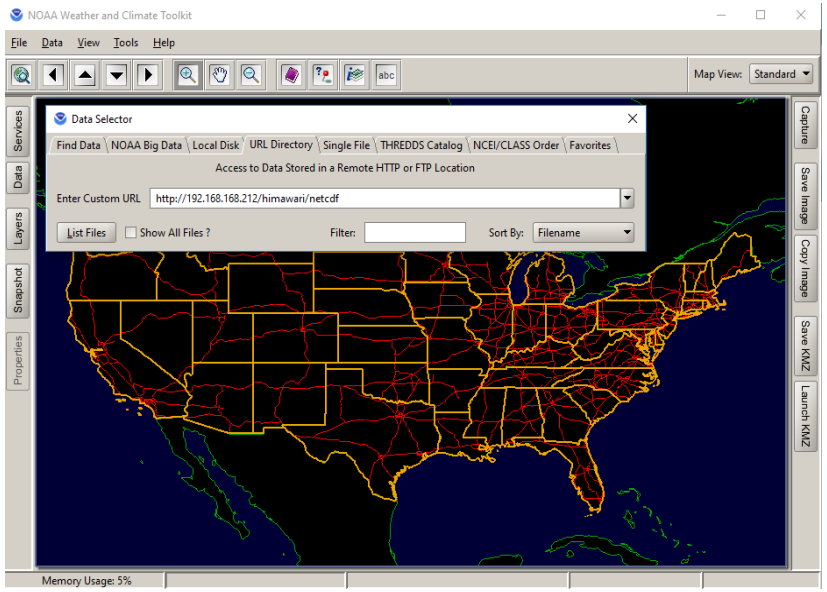
- SATAID for Himawari-8, HimawariCloud data download every 10 minute only 3,4,5,6 segment, provided image and data at

www.satmet.tmd.go.th and intranet for local users at

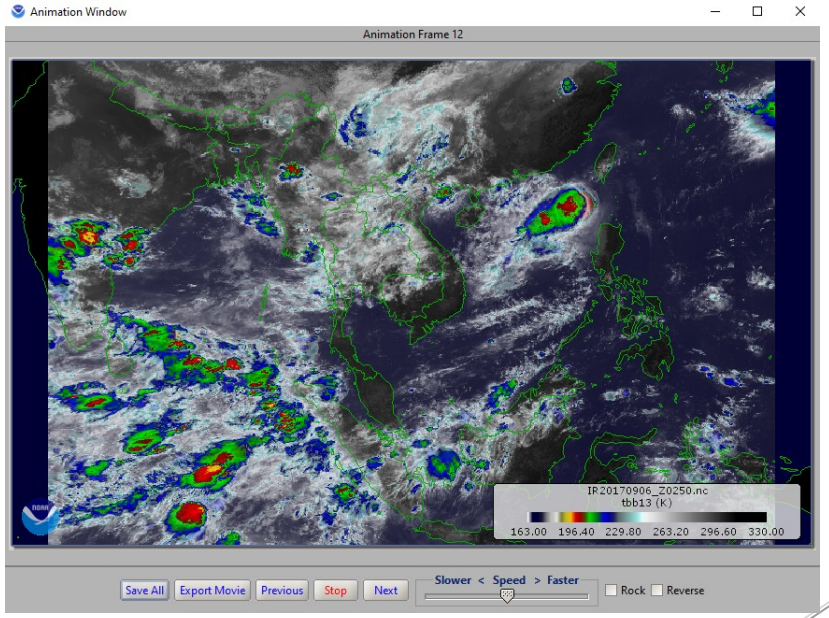
192.168.168.212/satellite

- NOAA's Weather And Climate Toolkit (WCT)

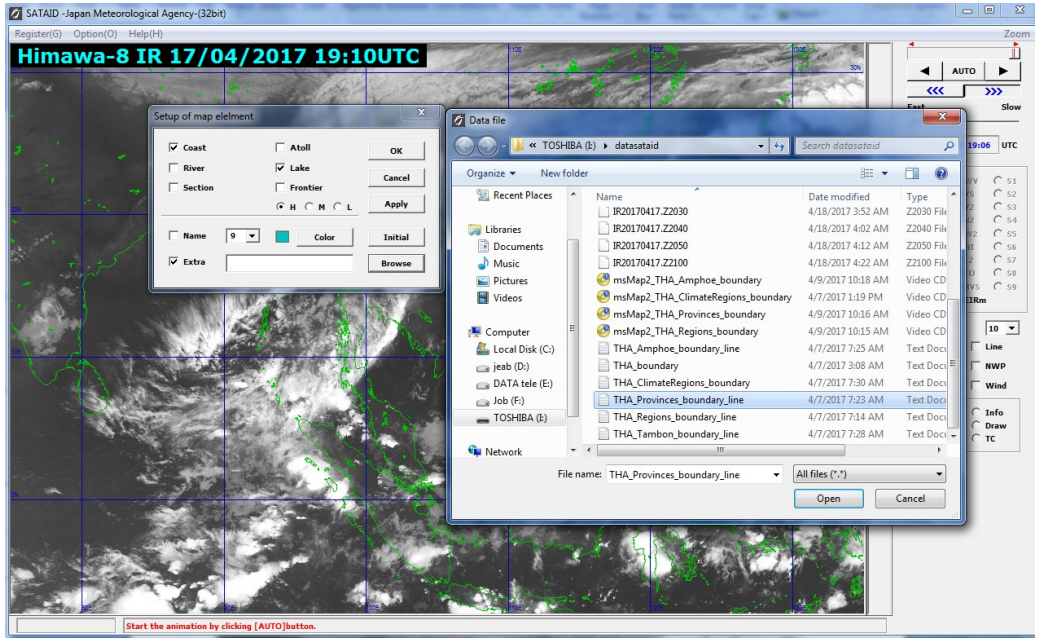
Access, Processing and Application of Satellite Data and Products



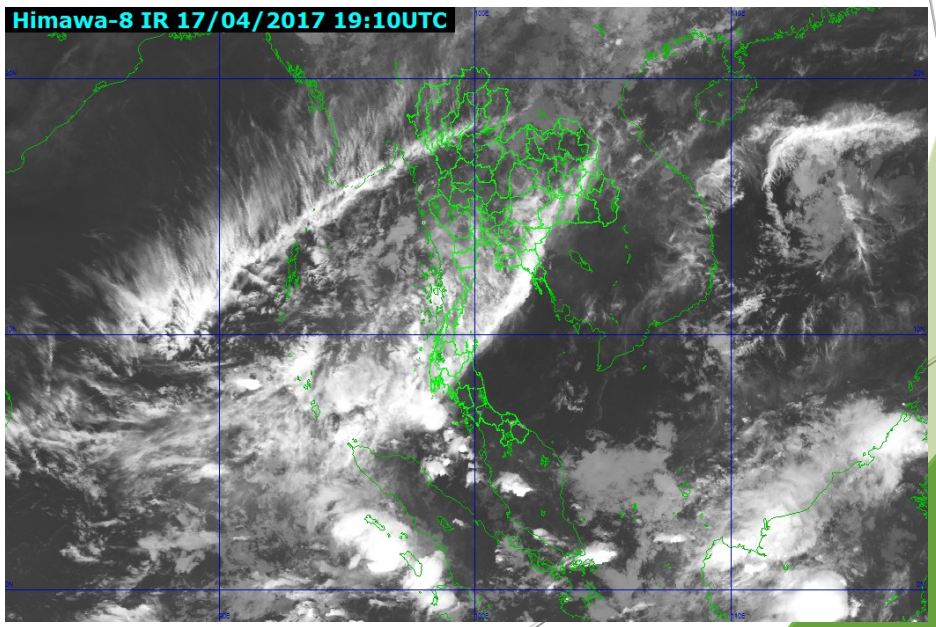
Weather And Climate Toolkit (WCT)



Access, Processing and Application of Satellite Data and Products

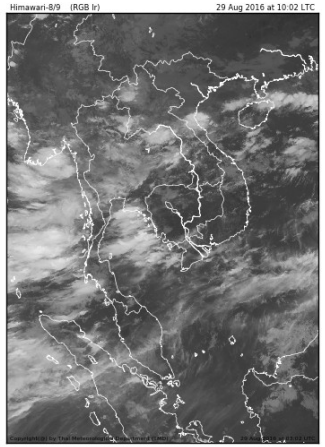


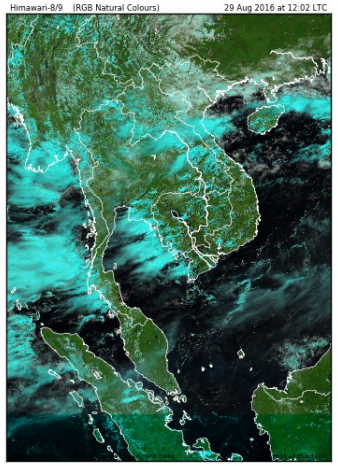
shown provincial boundary in SATAID

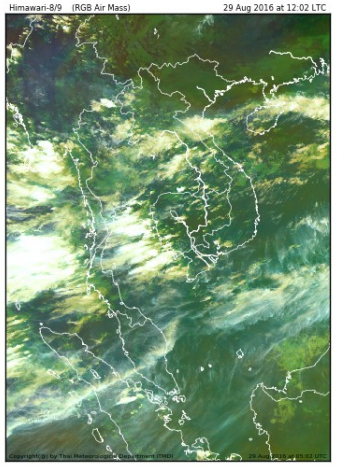


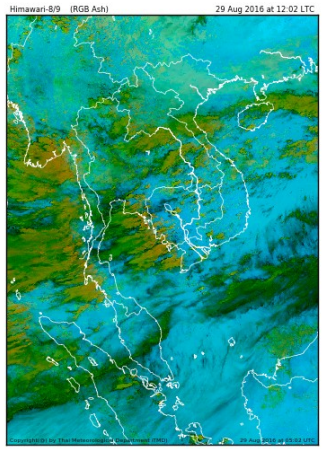
Access, Processing and Application of Satellite Data and Products

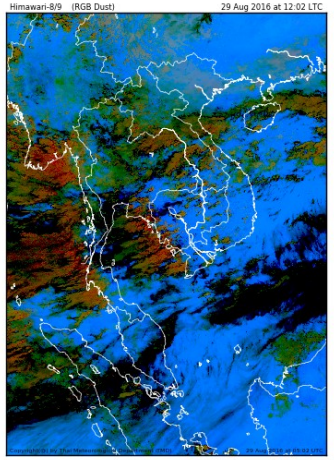
rgbcomposite.py

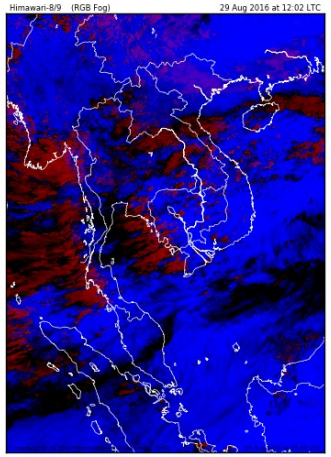


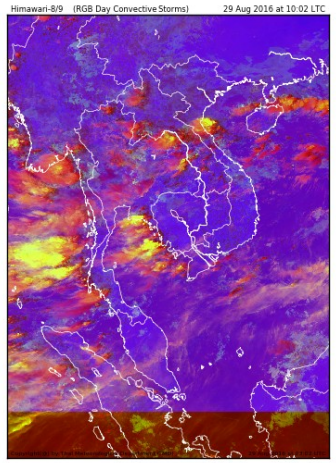


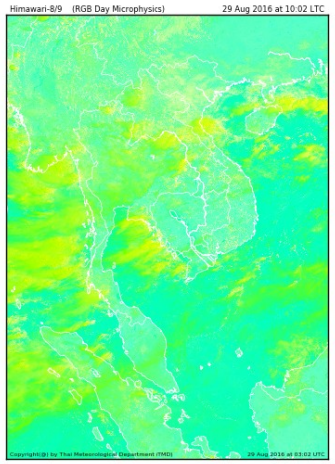


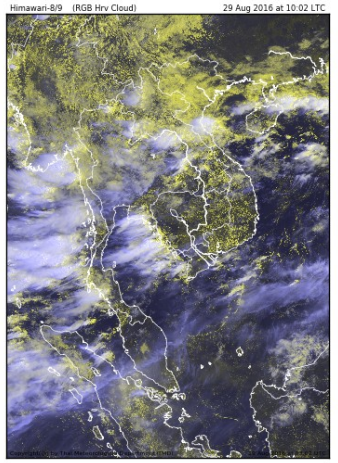






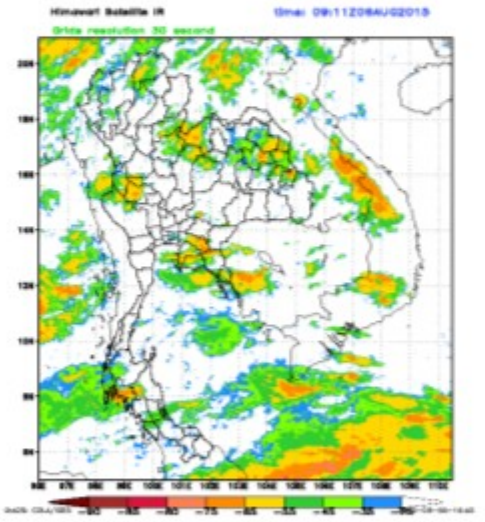




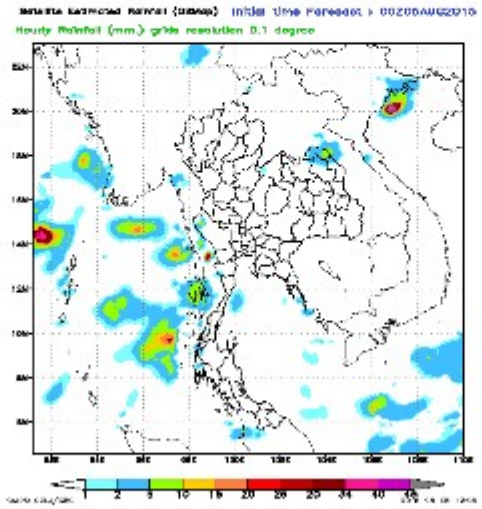


Access, Processing and Application of Satellite Data and Products

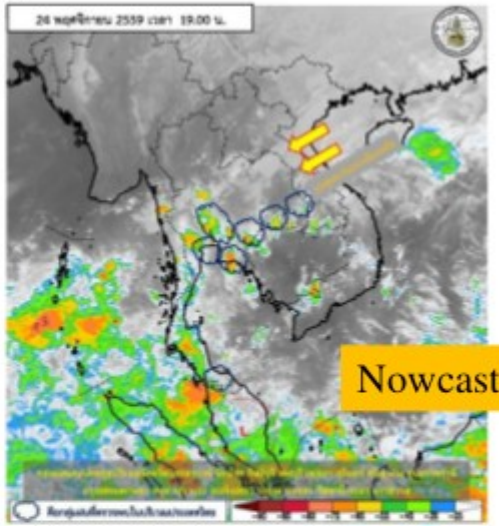
- Cloud Top Temperature
- GsMap
- Estimate Rainfall from Satellite
  - xls format
  - csv format



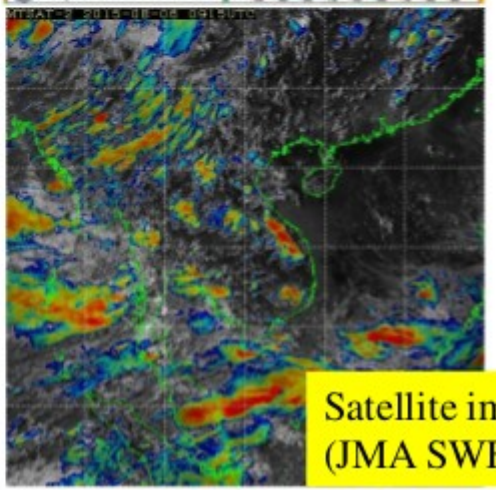
Cloud Top temperature



Satellite Estimate Rainfall (GsMap)

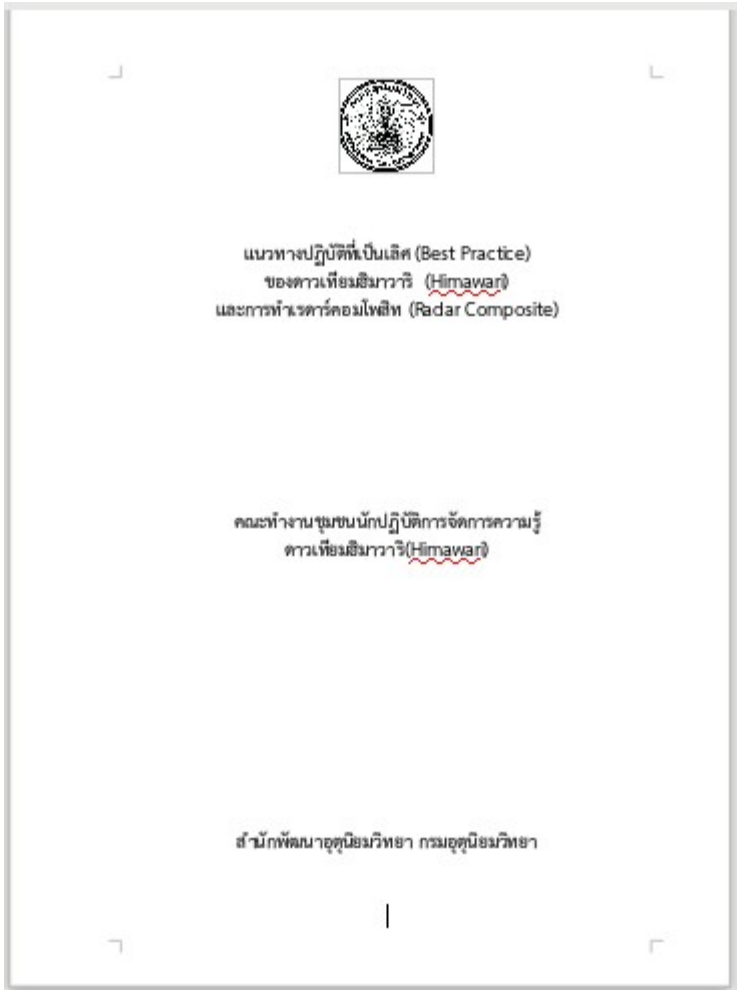


Nowcasting



Satellite image (JMA SWFDP)

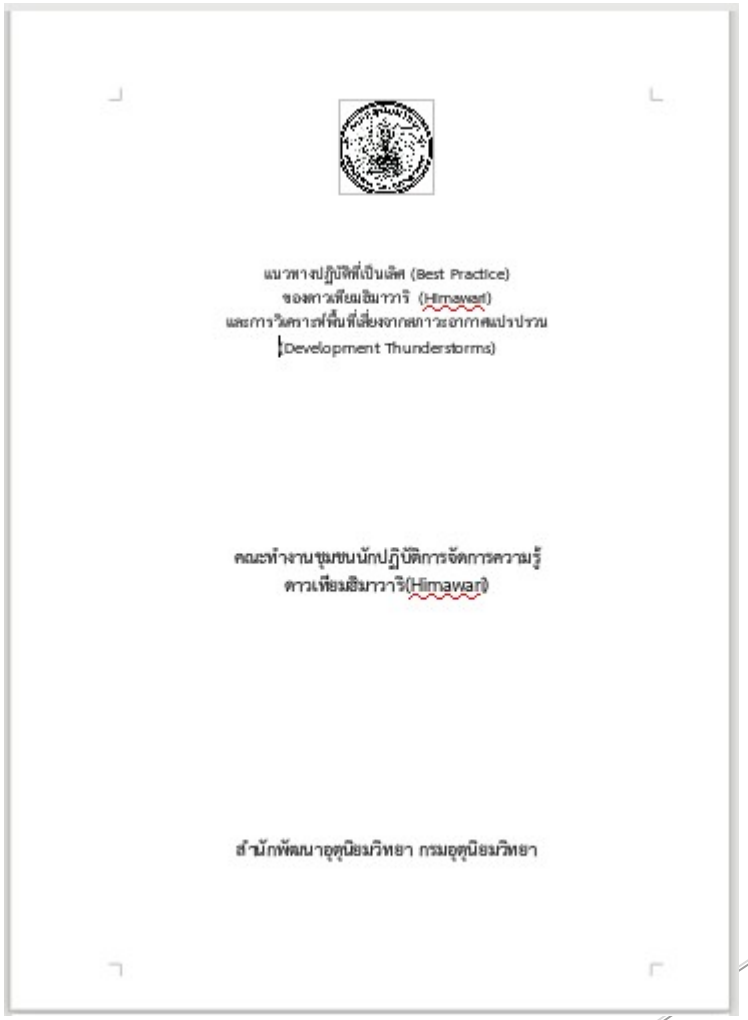
Access, Processing and Application of Satellite Data and Products



แนวทางปฏิบัติที่เป็นเลิศ (Best Practice)
ของดาวเทียมฮิมาวาริ (Himawari)
และการทำเรดาร์คอมโพสิท (Radar Composite)

คณะทำงานชุมชนนักปฏิบัติการจัดการความรู้
ดาวเทียมฮิมาวาริ(Himawari)

สำนักพัฒนาอุตุนิยมวิทยา กรมอุตุนิยมวิทยา



แนวทางปฏิบัติที่เป็นเลิศ (Best Practice)
ของดาวเทียมฮิมาวาริ (Himawari)
และการวิเคราะห์พื้นที่เสี่ยงจากสภาวะอากาศแปรปรวน
(Development Thunderstorms)

คณะทำงานชุมชนนักปฏิบัติการจัดการความรู้
ดาวเทียมฮิมาวาริ(Himawari)

สำนักพัฒนาอุตุนิยมวิทยา กรมอุตุนิยมวิทยา

Access, Processing and Application of Satellite Data and Products

III. Current satellite data applications

I. Key application areas

Weather Warning, Disaster and Water management, Forest Fires

II. Satellite-based products

IR,VIS, WV and RGBs

Satellite Data to address Regional Challenges

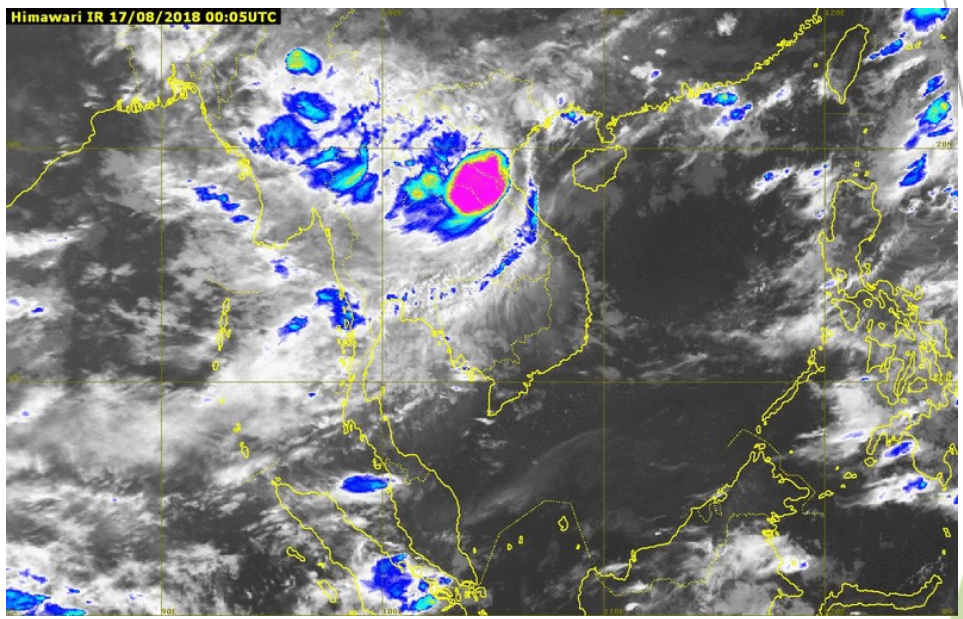
Disaster Alert

Weather Warning

"Tropical storm “BEBINCA”"

No. 12 Time Issued August 13, 2018

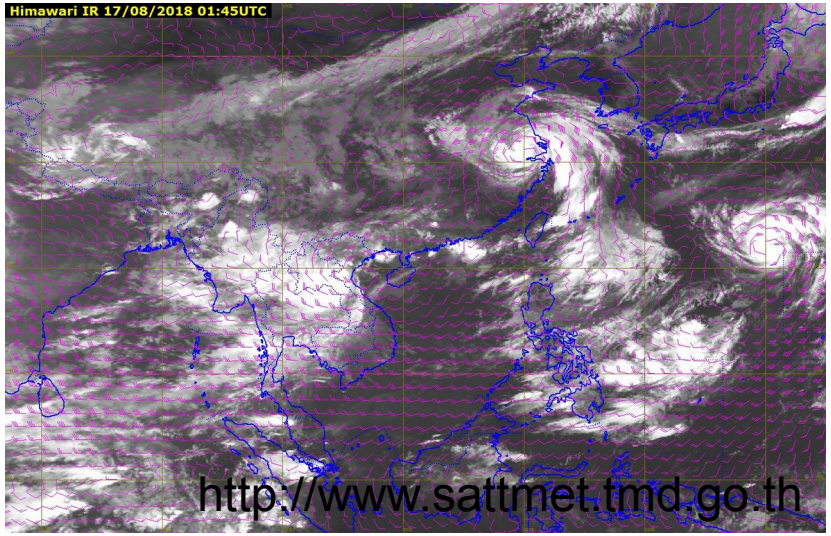
At 10.00 a.m. LST on 13 August, the tropical depression over the coast of southern China which upgrade to tropical storm “BEBINCA”centered at latitude 20.6 degree north and longitude 112.8 degree east with the maximum sustained winds about 65 km/hr. The storm was almost stationary.



Satellite Data to address Regional Challenges

Disaster Alert

From 17-19 August 2018, Typhoon Bebinca caused flash floods and landslides in six Northern provinces of Thailand - Nan, Chiangrai, Lampang, Payao, Chiang Mai and Mae Hong Son. More than 9,000 households have been affected.



Satellite Data to address Regional Challenges

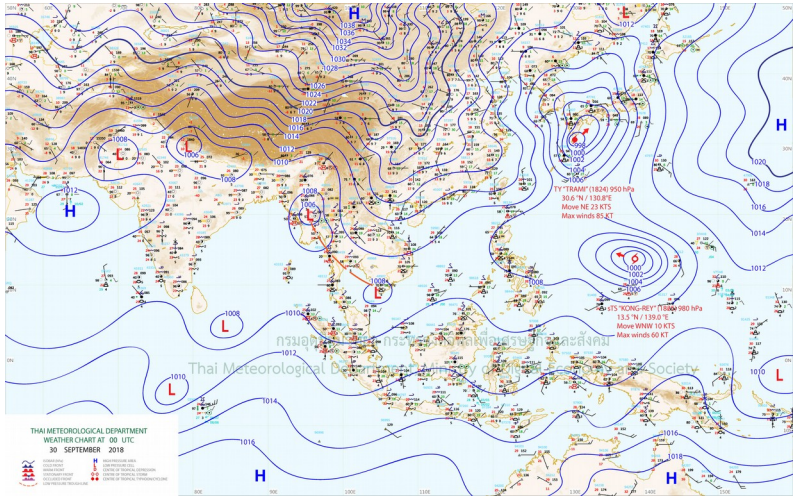
Tropical storm Barijat and Typhoon Mangkhut to affect Thailand,

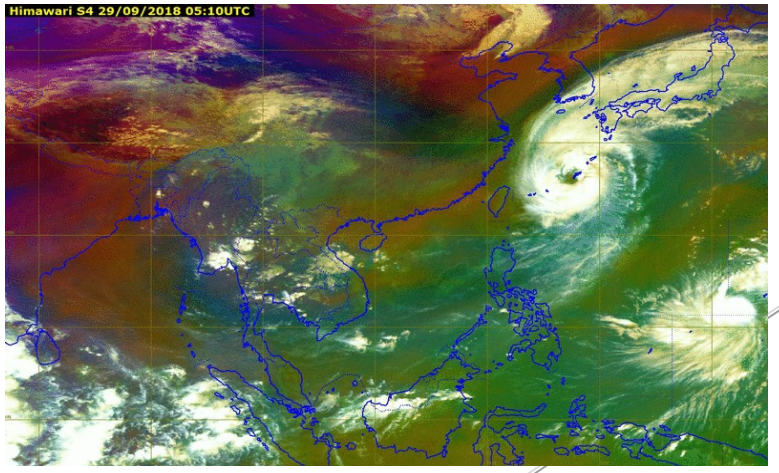
The storm, which is packing winds up to 70 kilometers per hour and traveling 20 kilometers per hour through the South China Sea, will pass over Hong Kong, Hainan and southern China today before arriving in Vietnam by tomorrow. The storm will combine with a monsoon system covering the Andaman Sea and Gulf of Thailand, resulting in increased rain in Thailand’s northeast.

Typhoon Mangkhut is expected to follow from the Pacific Ocean, passing over Luzon Island in the Philippines to reach Taiwan between September 14 and 15 before entering the South China Sea and again bringing monsoon conditions to Thailand during the period between September 17 and 19.

Satellite Data to address Regional Challenges

The Inter-tropical Convergence Zone (ITCZ) is the region near the Equator where the north-easterly and south-easterly tradewinds converge, forming an often continuous band of clouds or thunderstorms. The location of the ITCZ zone varies seasonally, following the sun's zenith point from the Northern to the Southern Hemisphere.





Satellite Data to address Regional Challenges

Engineering concerned on Big data, AI, Neural Network, Machine Learning to Meteorological Data