



FY2019 FENGYUN Satellite User Conference

“ENHANCED FY4A SATELLITE PRODUCTS FOR MONITORING TROPICAL STORM “PODUL” IN THAILAND”



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Haikou China
15 – 17 November 2019

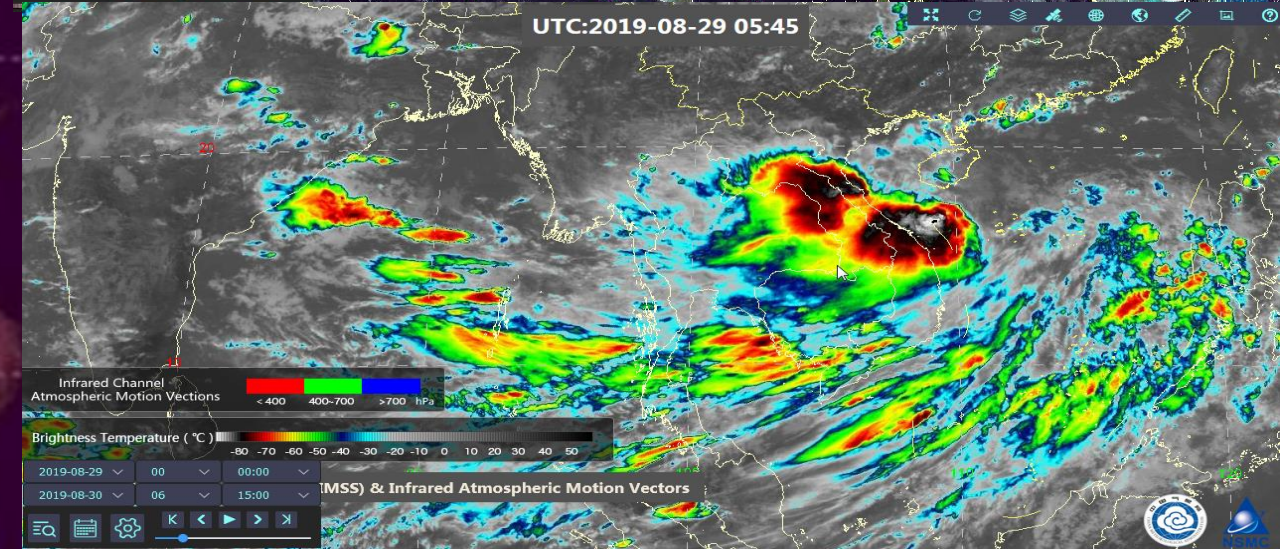
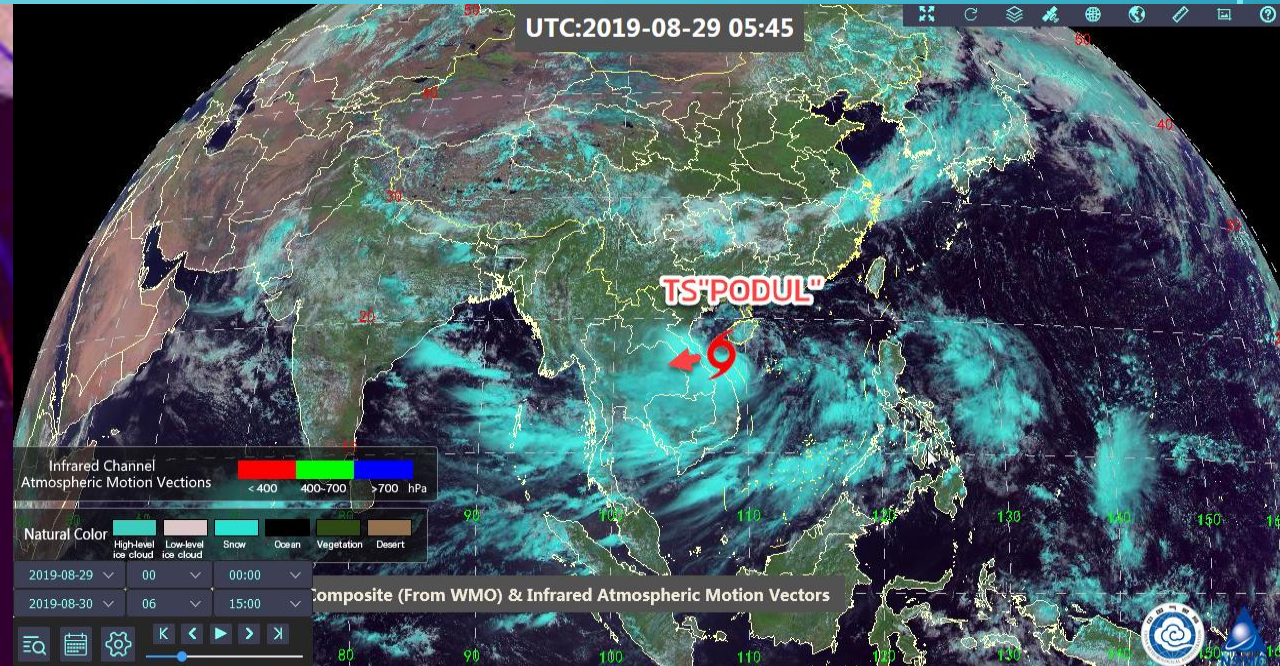
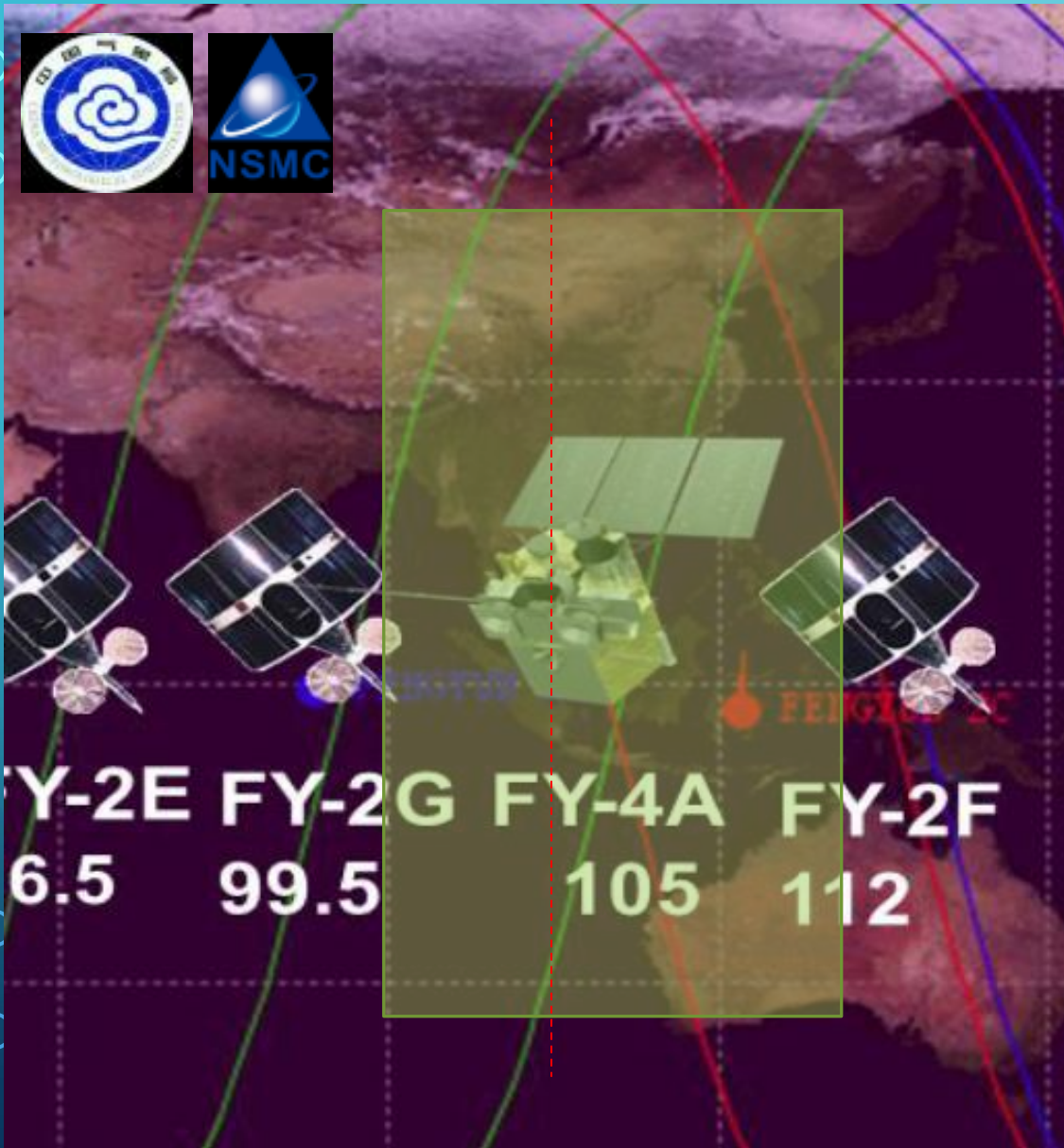
Outline

1. FY4A Satellite in orbit coverage Thailand.
2. Historical Tropical Storm strike Thailand 2019 and TS “PODUL”
And impact of tropical storm "PODUL“
3. Applying FY4A Satellite Data for Monitoring and Surveillance TS“PODUL”
4. Conclusion and Recommendations

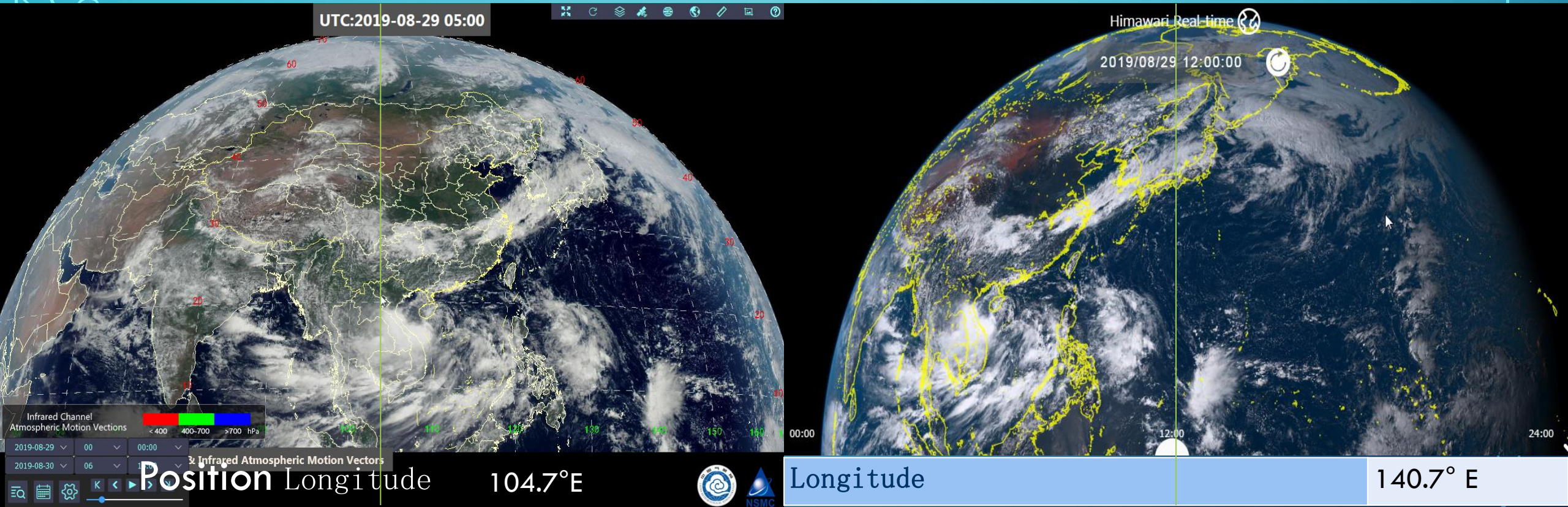
Acknowledge

First of all I would like to Thank you WMO, China National Space Administration (CNSA) and Meteorological Administration (CMA) to provided and sharing Feng Yun Meteorological Satellite (FY) products and for my country. Which will enhance the potential in weather forecasting, Prevention Disaster Monitoring and Training

1 FY4A Satellite in orbit coverage Thailand



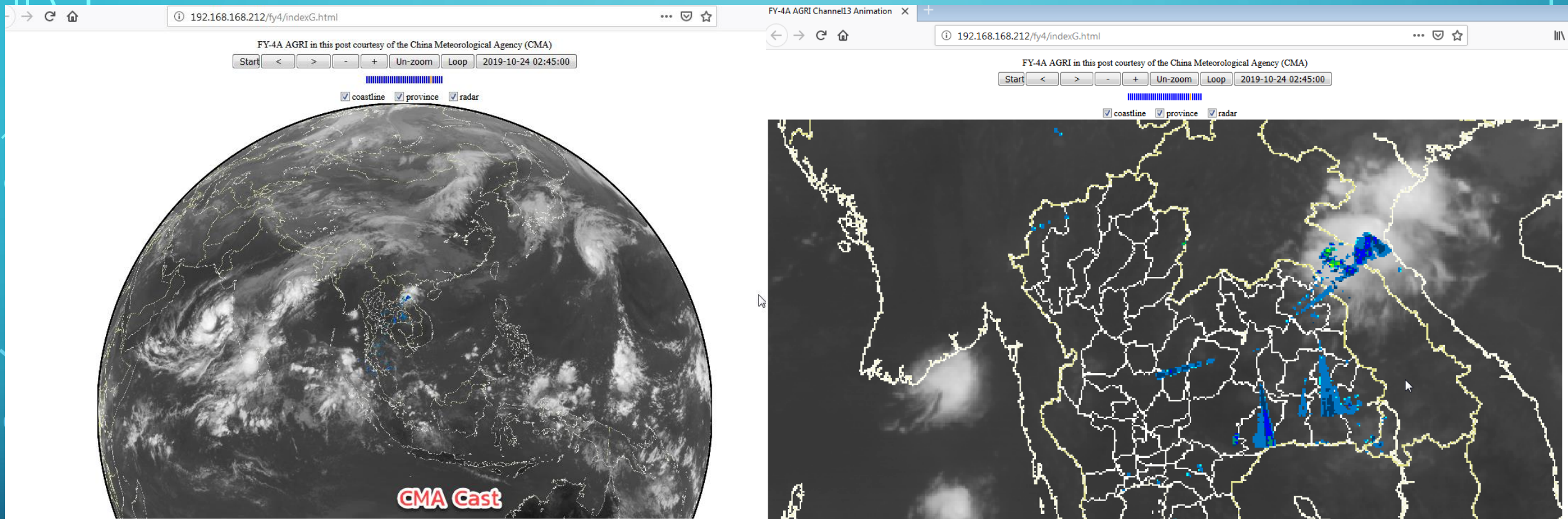
Comparison Satellite details between FY4A and Himawari-8



Geostationary meteorological satellites

As of August 2018, the on-orbit geostationary FY series are operating from 4E to 173W, the data from which are used for severe weather monitoring and forecasting.

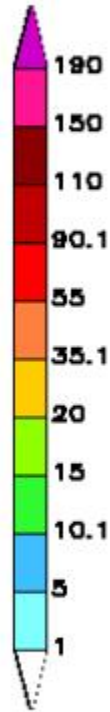
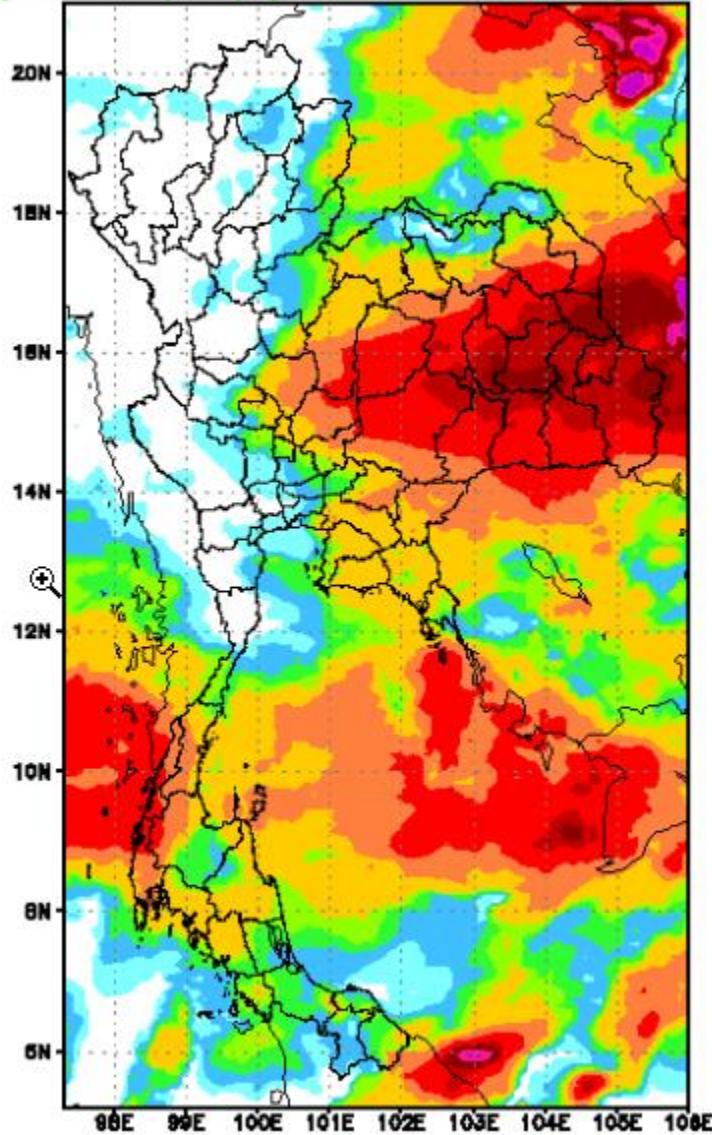
Dissemination of FY4A data on Thai Meteorological Department (TMD) internal website(intranet) to monitor and warning about extreme weather events.



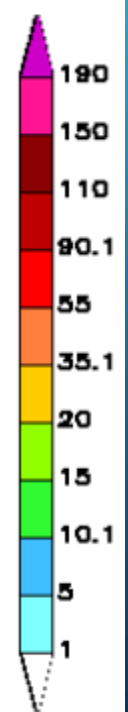
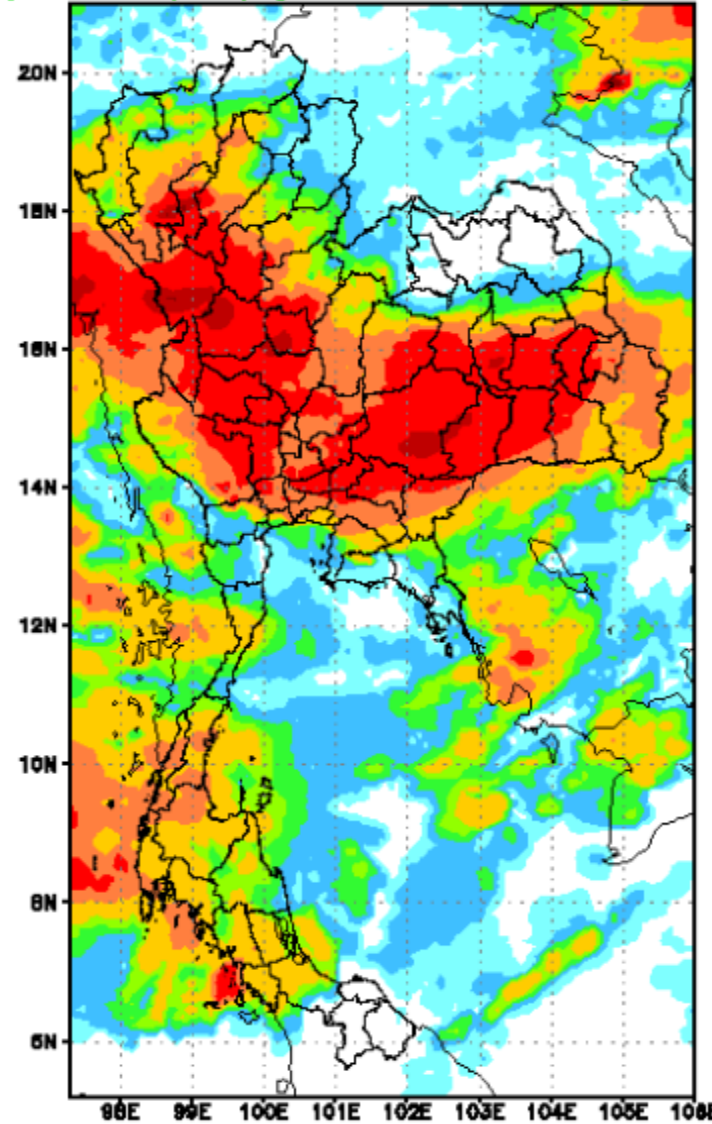
The Asia-Pacific Space Cooperation Organization (APSCO) entered into an agreement between APSCO, China National Space Administration (CNSA) and China Meteorological Administration (CMA) to establish cooperation on the application of Feng Yun Meteorological Satellite. Between APSCO and member countries Which will enhance the potential in weather forecasting Prevention / Relief / Disaster Monitoring Caused by climate change In this regard, APSCO has an operational plan to provide FY satellite data sharing services and to provide FY Satellite Data Sharing Services and Application Training in CMA Cast

Quantitative Precipitation Estimation (QPE) from FY2E/2G

Daily Rainfall (mm.) grids resolution 0.1 degree

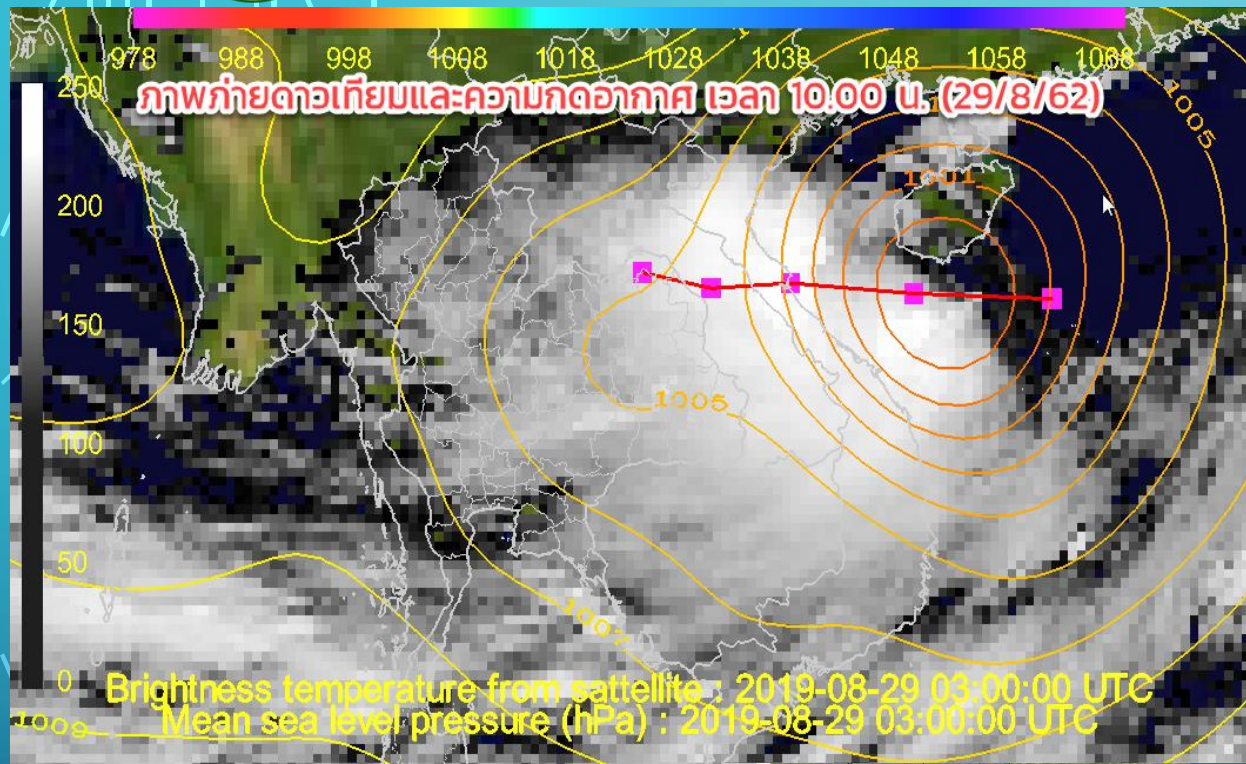


Daily Rainfall (mm.) grids resolution 0.1 degree

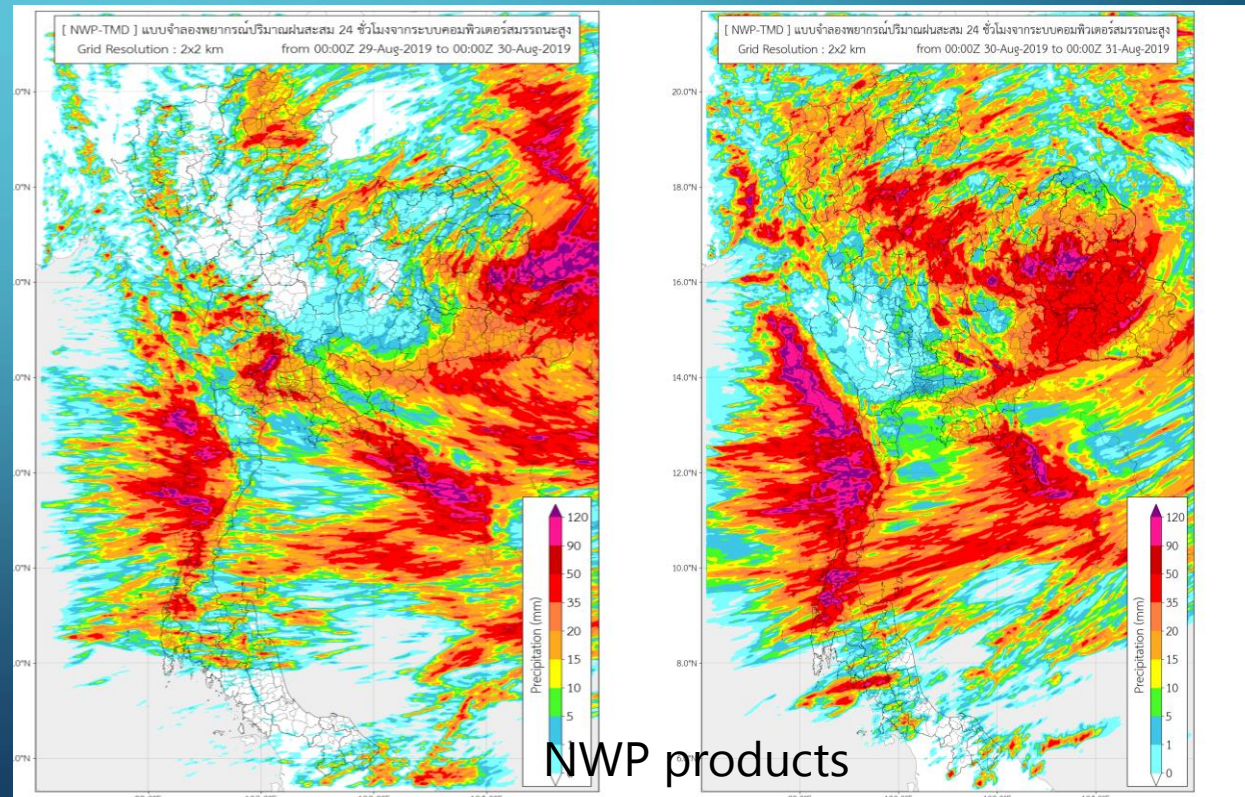
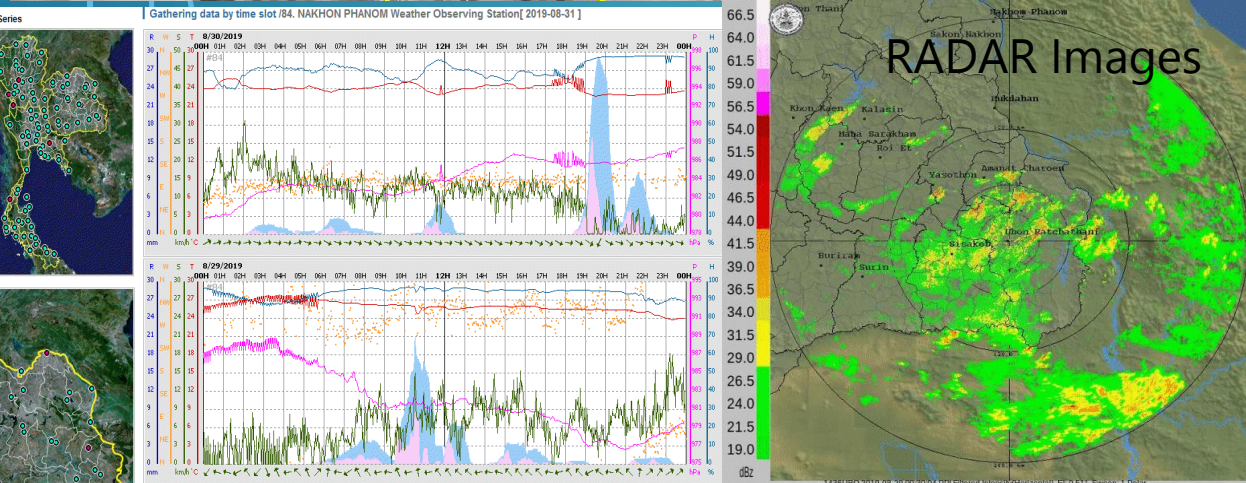




Case study : Category 3 Tropical Storm PODUL across Northeast of Thailand from 29 August to 1 September 2019



PODUL was the 12th tropical storm of year 2019 and the 3th storm that influenced on Thailand. It was also the 23rd storm in 68 years round, having a direct way to Thailand in August and damaging widely across northern and northeastern provinces.





Historical Tropical Storm PODUL across Northeast of Thailand from 29 August to 1 September 2019

พายุระดับ 2 (ดีเปรสชัน) "โพดุล" D

ณ เวลา 19.00 น. ศูนย์กลางอยู่ อ.พาขาว จ.เลย

ความเร็วลมสูงสุดใกล้ศูนย์กลาง **55 กม./ชม.**

เคลื่อนตัวทางทิศตะวันตกด้วยความเร็ว **10 กม./ชม.**

คาดว่า จะอ่อนกำลังลงสู่พายุระดับ 1 (หย่อมความกดอากาศต่ำ L) ในระยะต่อไป

ศูนย์กลางพายุ "โพดุล" วันที่ 30 ส.ค. 62

- D** 00.30 น. ดองฮอย เวียดนาม 🇻🇳
- D** 04.00 น. แขวงคำม่วน ลาว 🇻🇵
- D** 05.30 น. อ.เมือง จ.นครพนม 🇹🇭
- D** 07.00 น. อ.ปลาปาก จ.นครพนม 🇹🇭
- D** 09.00 น. อ.เมือง จ.สกลนคร 🇹🇭
- D** 13.00 น. อ.โนนสะอาด จ.อุดรธานี 🇹🇭
- D** 17.00 น. อ.โนนสัง จ.หนองบัวลำภู 🇹🇭
- D** 19.00 น. อ.พาขาว จ.เลย 🇹🇭



วันที่ 30 ส.ค. 62 เวลา 20.00 น.

กรมอุตุนิยมวิทยา
กระทรวงดิจิทัลเพื่อเศรษฐกิจและสังคม



Info : พายุ "โพดุล" 11/62



** โพดุล แปลว่า ดันหัว จากสารบัญชารัฐประศาสน์ไทยประชาชนภาคสี่
 *** เส้นทางเดินพายุอาจมีการเปลี่ยนแปลงได้ทั้งความเร็วและทิศทาง
 เนื่องจากสภาพอากาศที่เปลี่ยนแปลงไป



1182
สายด่วนกรมอุตุนิยมวิทยา
www.tmd.go.th

On 25 August an active low-pressure cell formed over the Pacific and developed into the category 2 depression. **At 1pm** it grew into the category 3 as known tropical storm PODUL.

On 27 August at 7am, the storm located east of the Philippines and **at 10am** it moved to the upper part of the South China Sea and further tracked west.

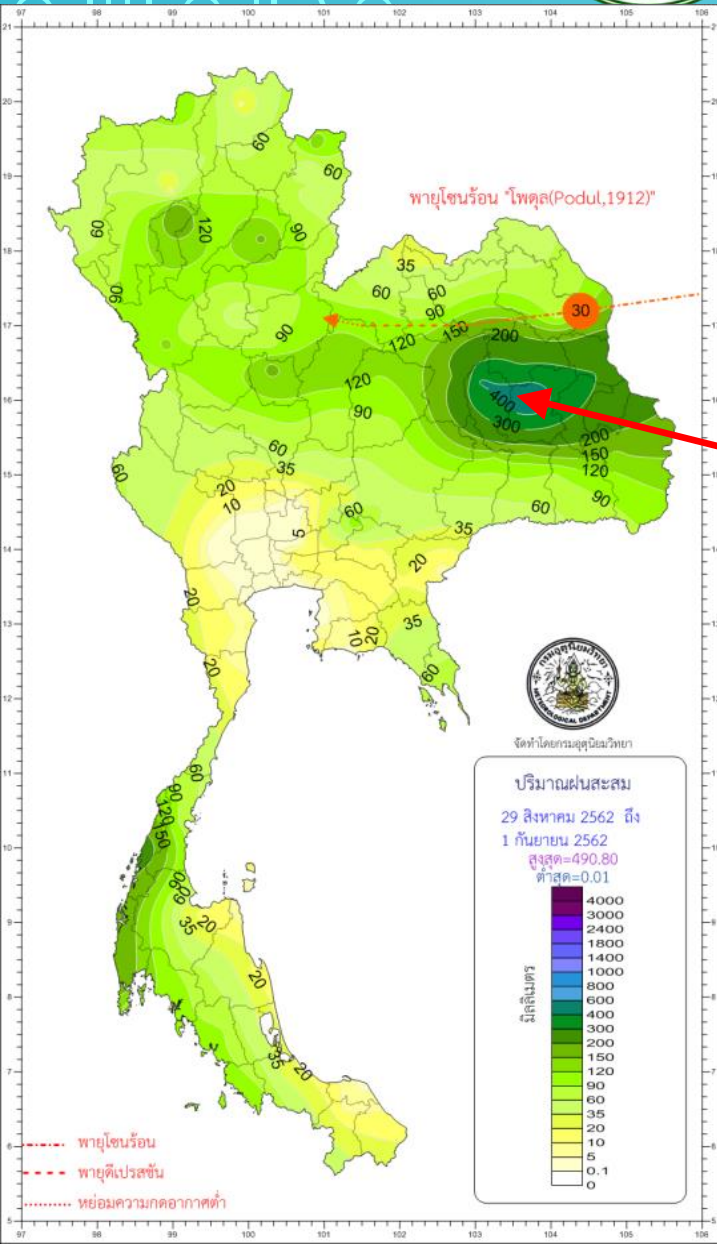
On 30 August at midnight around 0.30am, it made landfall over Dong Hoi, Vietnam before **at 4am** heading to Laos. **At 5.30am** it arrived Nakhon Phanom. While losing strength as the category 2, **at 9am** the depression covered Sakhon Nakhon and **at 1pm** headed to Udon Thani. Further at 4pm and 7pm in order, it traveled along Nong Bua Lamphu and Loei before **at 9pm** it declined to the low-pressure cell over Loei.

From 31 August to 1 September, the low cell affected severe weather over the lower North.

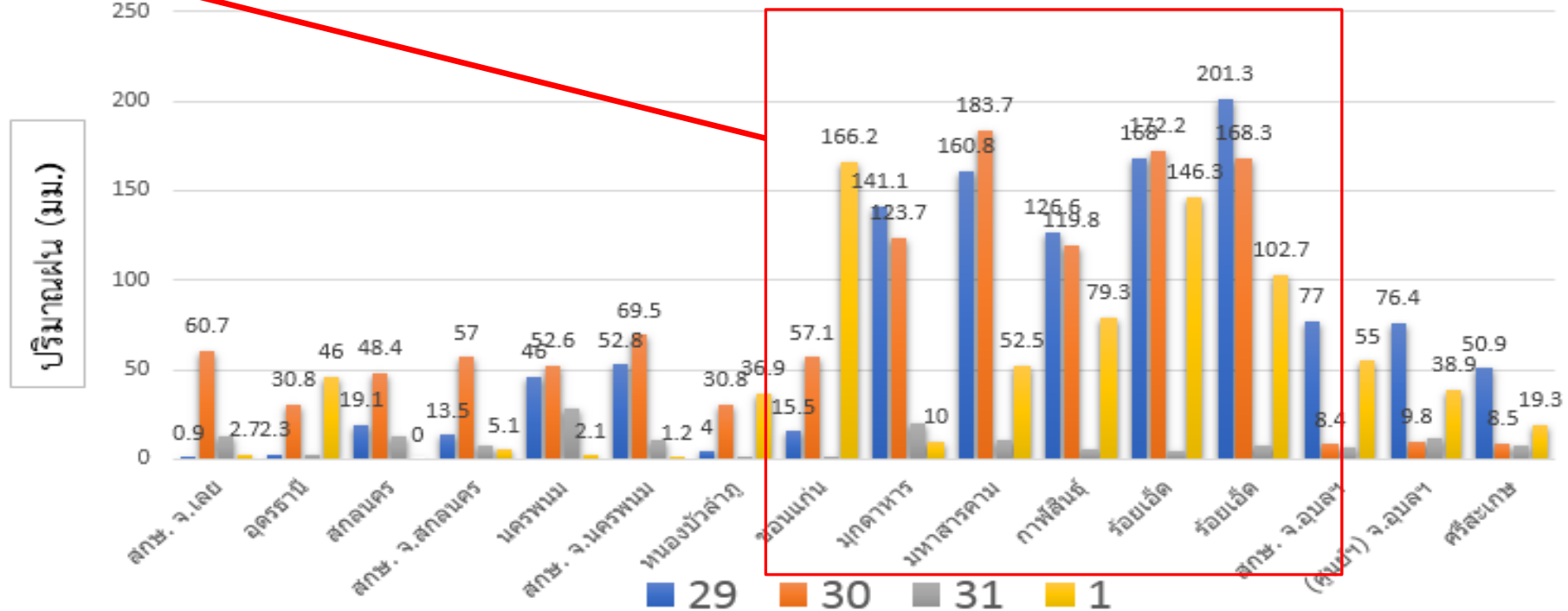


The impact of tropical storm "PODUL"

Torrential rainfall was occurred mainly in the northeastern and northern parts during Aug 29-Sep 1. The **maximum daily rainfall was 459.0 mm at Khao Ko in Phetchabun province on August 30** Flash flood was reported in several areas of northeastern and northern parts of Thailand with land slide in some areas. 57,139 families in 26 provinces were affected including 7 deaths and 3 losses .(As of 1 September, 2019)

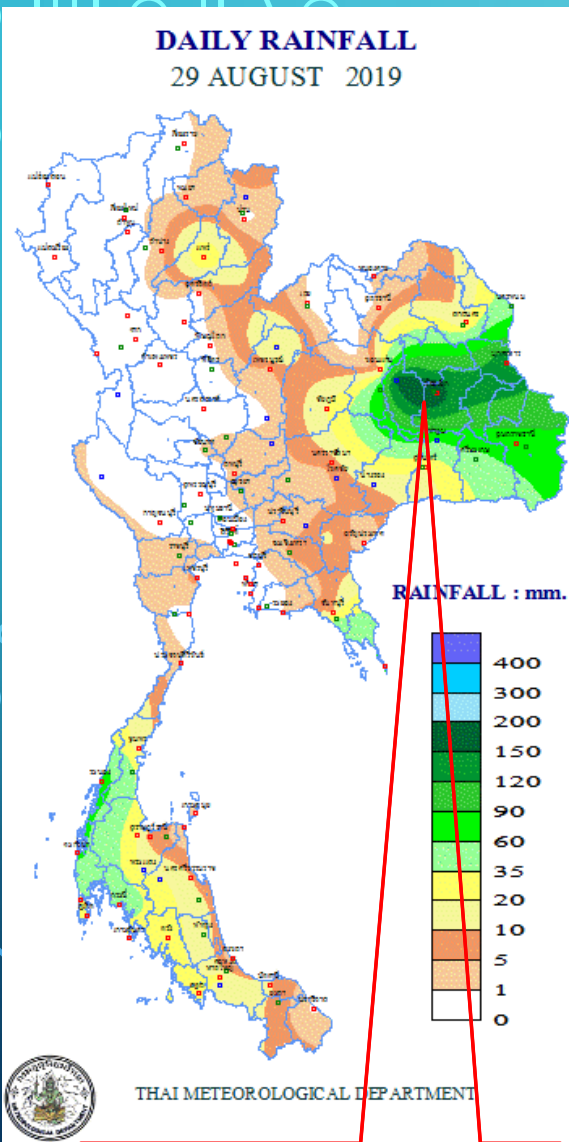


ฝนรวม 24 ชม. ระหว่างวันที่ 29 ส.ค. 1 ก.ย. 62

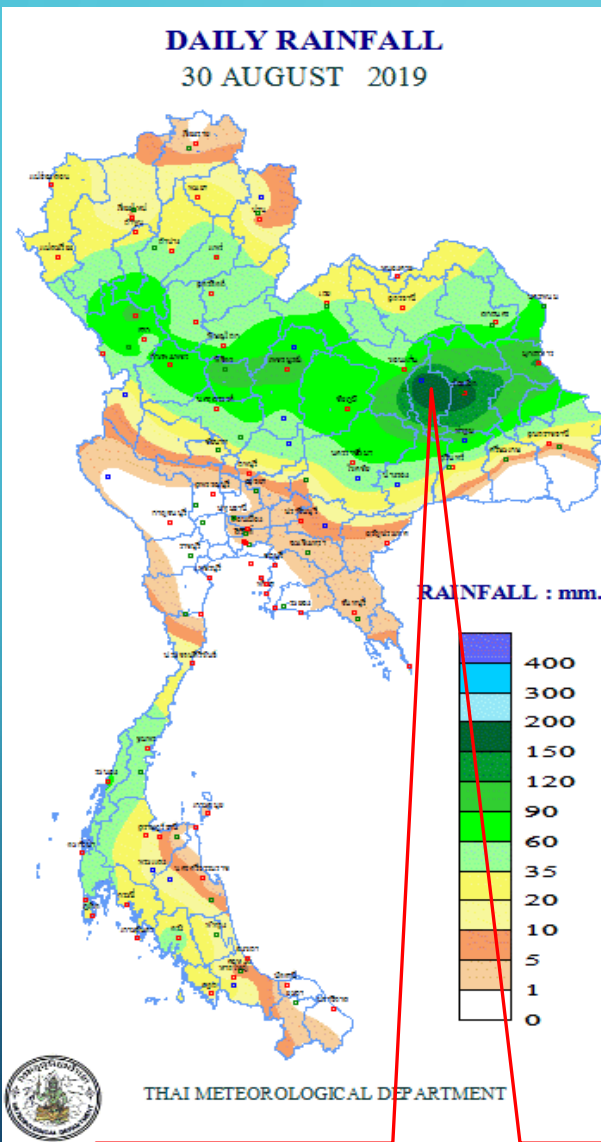




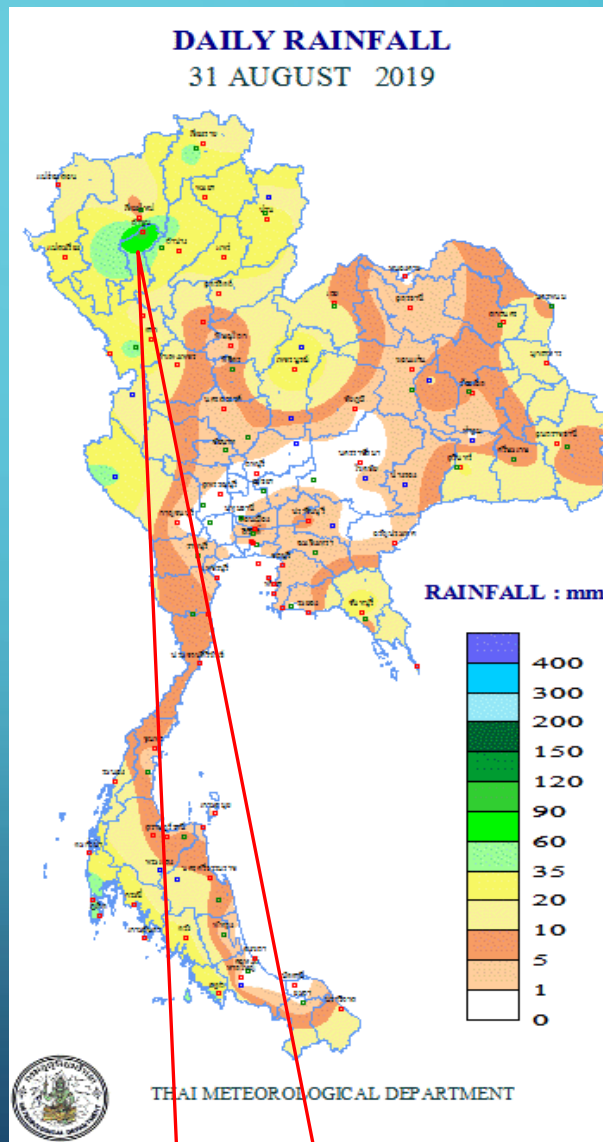
24 hrs. Accumulated rainfall impact from tropical storm "PODUL" Synoptic observation TMD



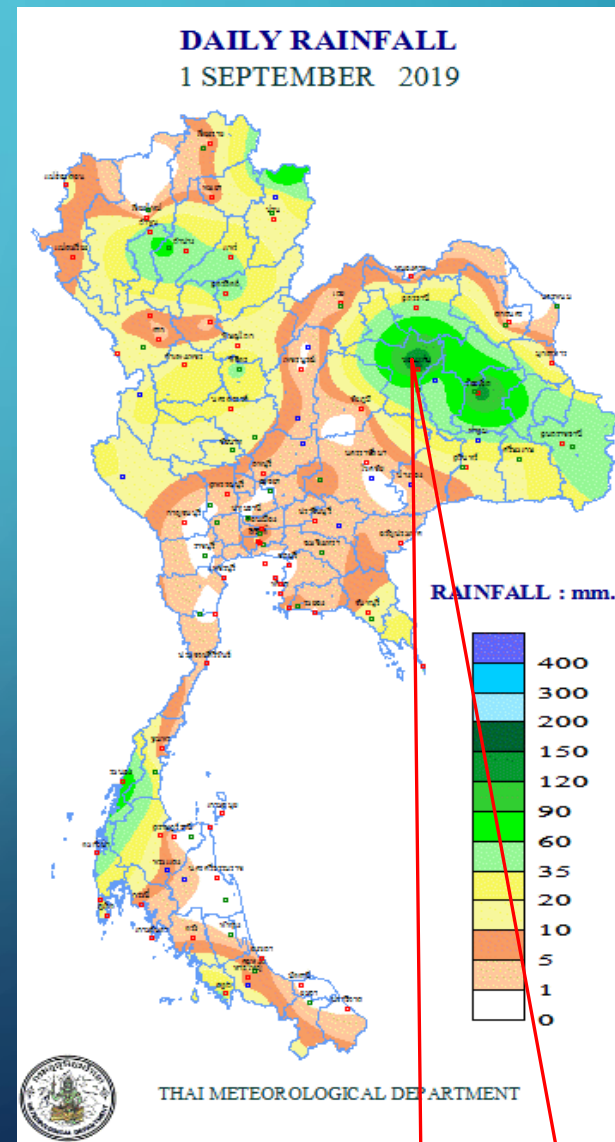
Max. rainfall 201.3 mm.
Roi-et Prov.



Max rainfall 183.7 mm.
Kosumpisia dist. Mahasarakam



Max 116.1 mm.
Meung Dist. Lumpoon



Max 166.2 mm.
Meung Konkaen



The impact of tropical storm "PODUL" (1)



There was a large area of flood in the eastern part of the north-eastern region such as Ubon Ratchathani Province, Amnat Charoen, Yasothon, Roi Et, Khon Kaen etc.

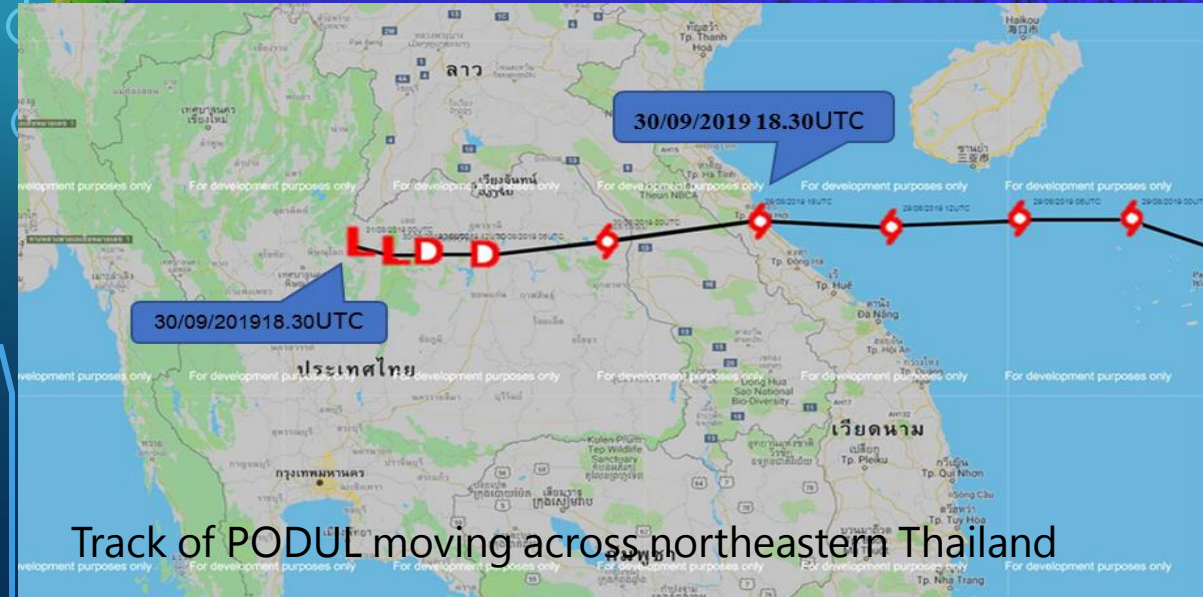
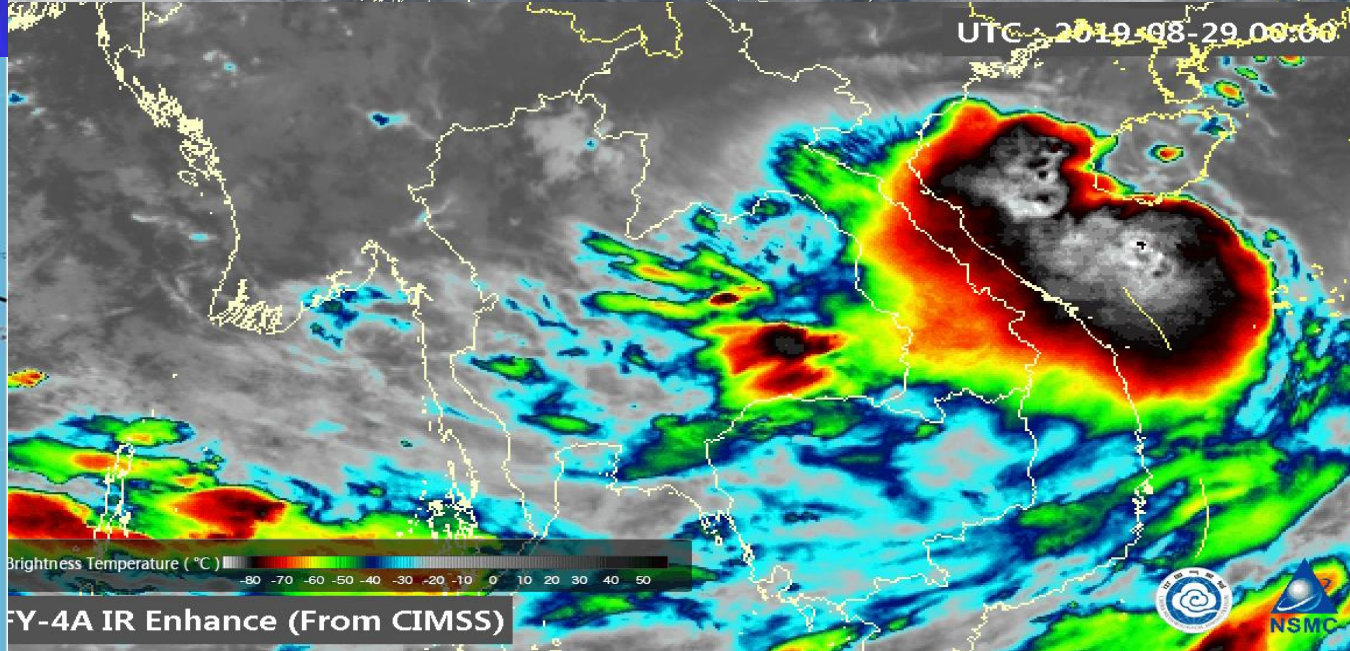
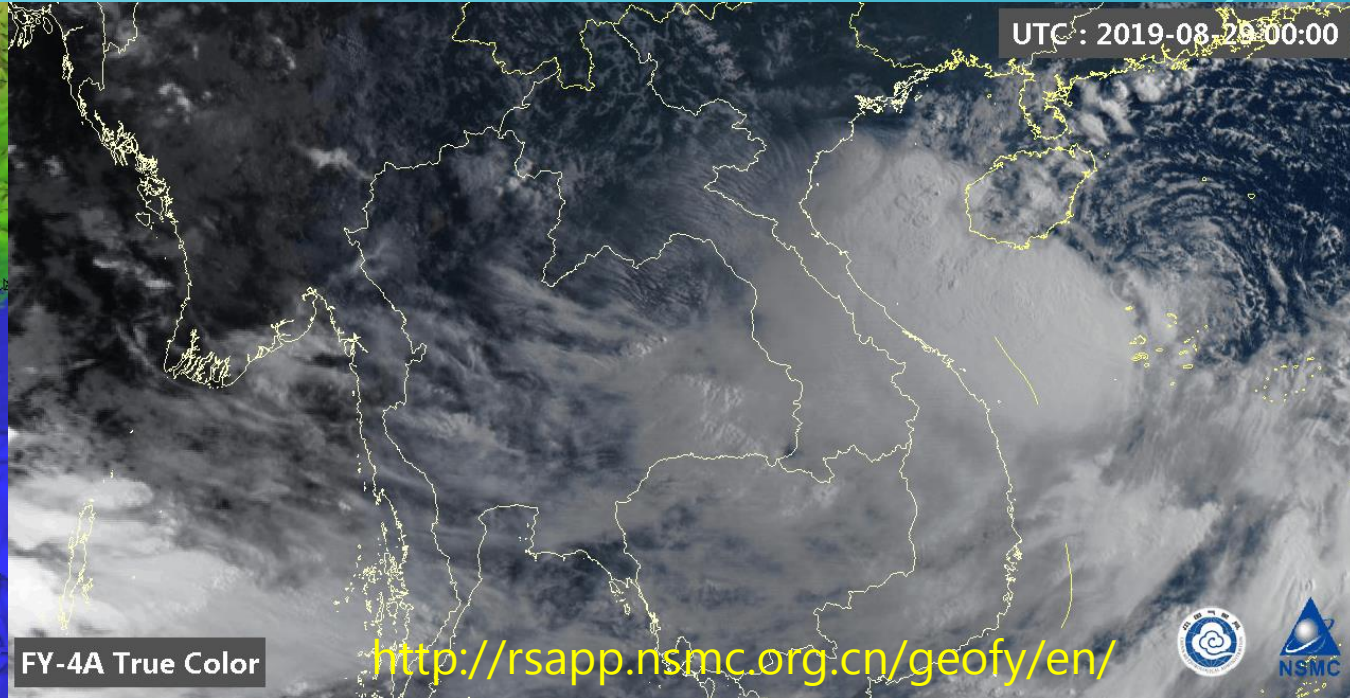
The impact of tropical storm "PODUL" (2)



Flash Flood in Khon Kaen Province (30 Aug. 2019)



3 Applying FY4A Satellite Data for TS "PODUL" Monitoring and Surveillance

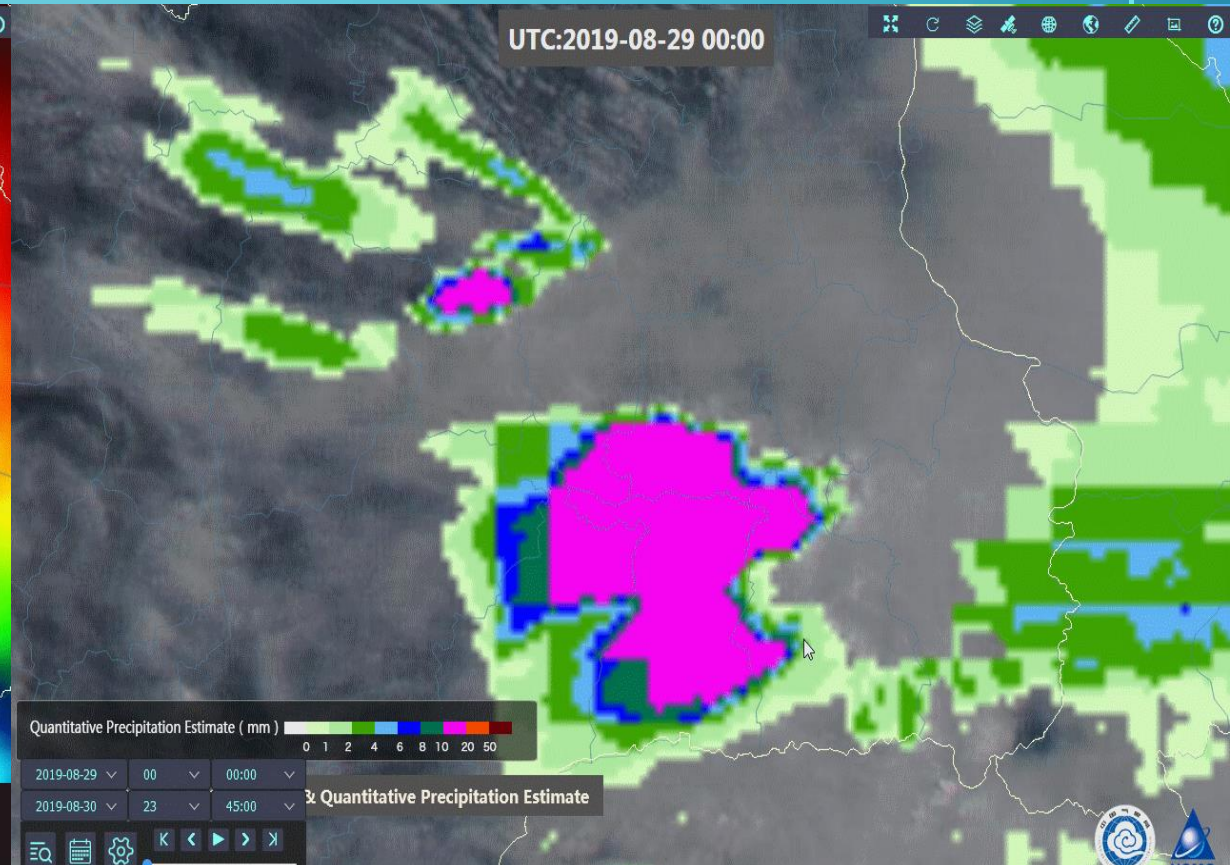
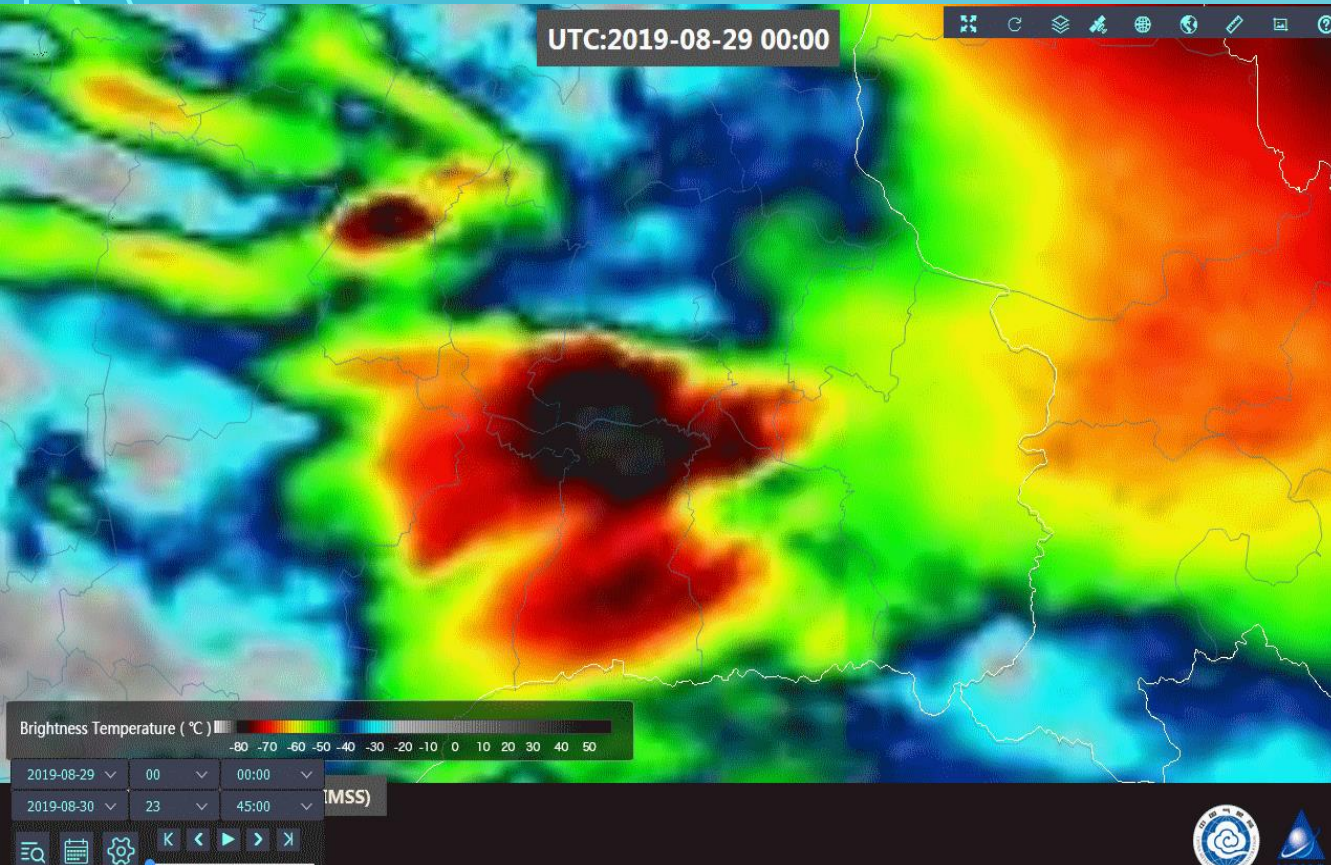


Track of PODUL moving across northeastern Thailand

Satellite Band selected in hires solution

Satellite Band

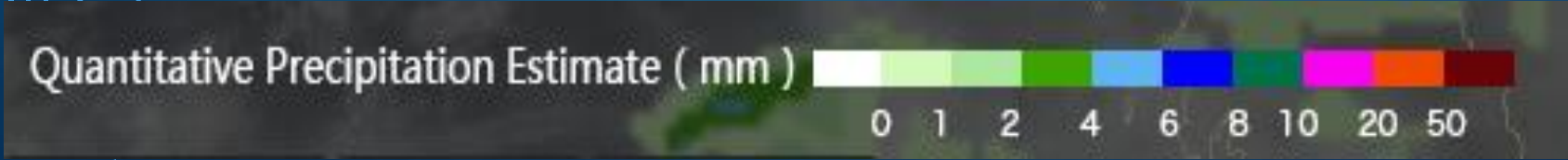
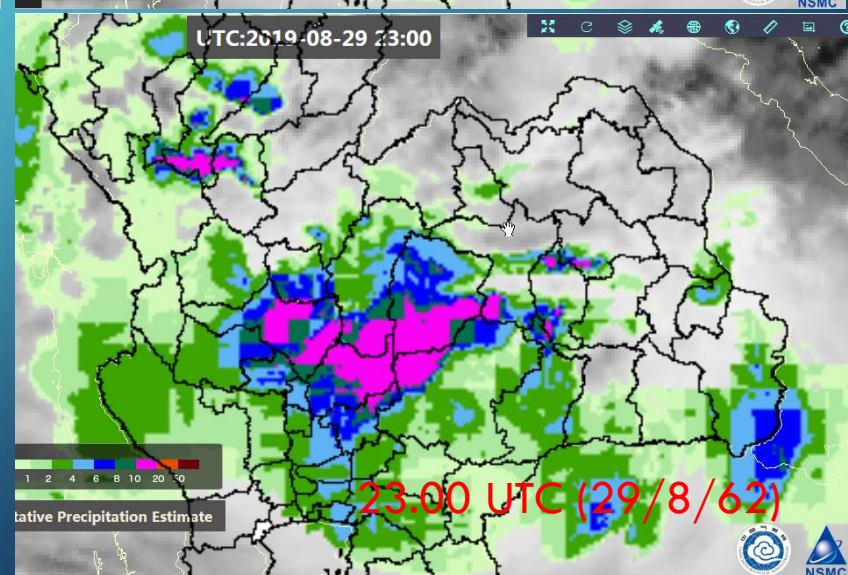
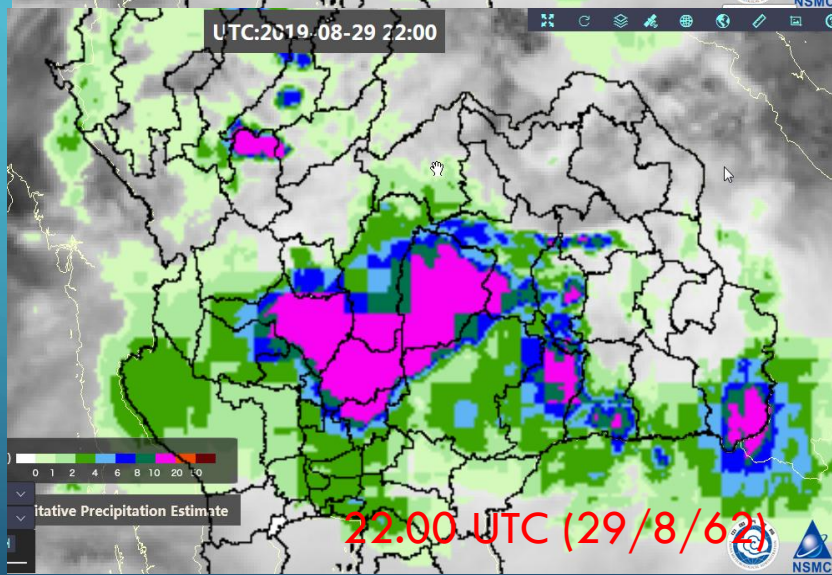
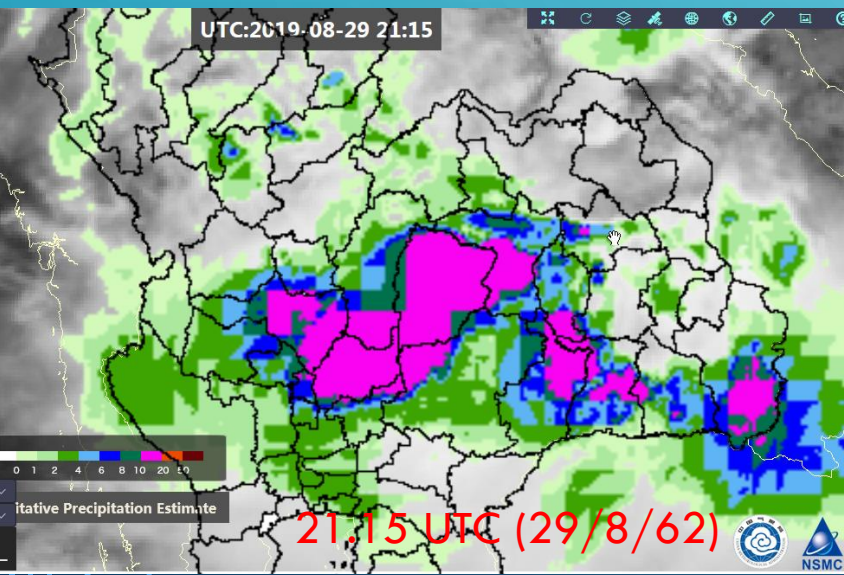
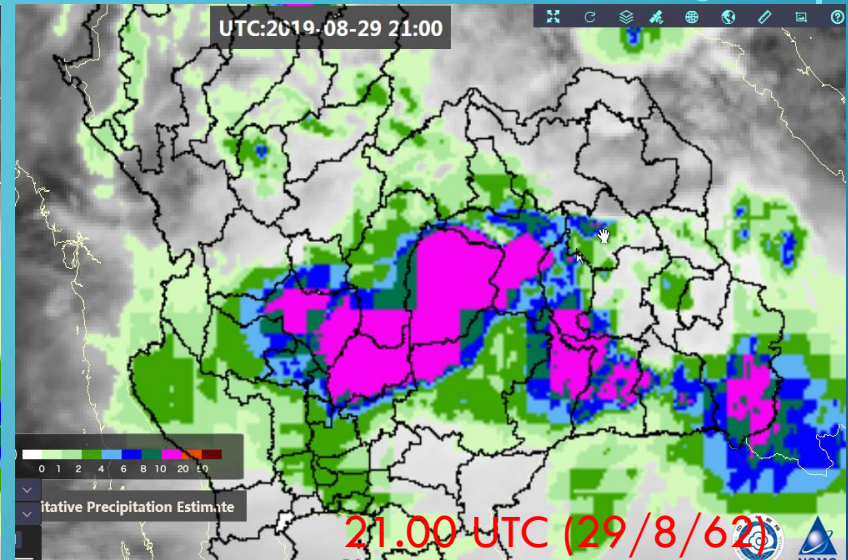
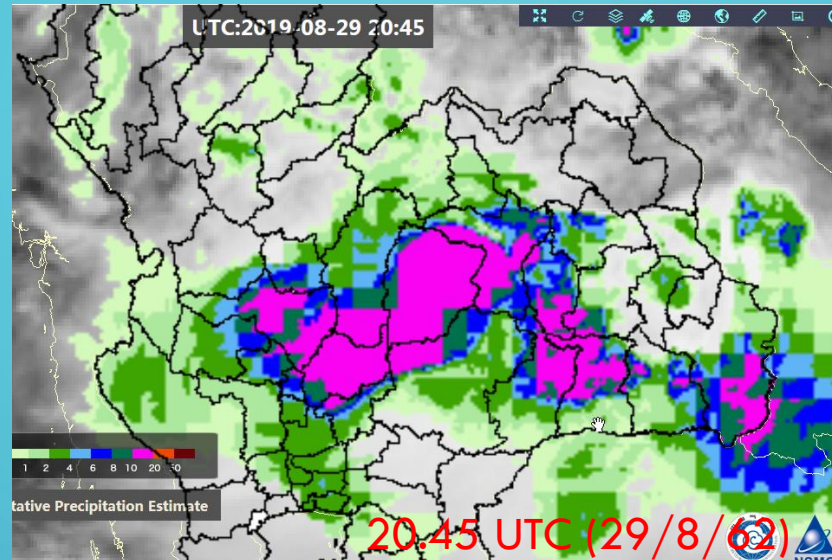
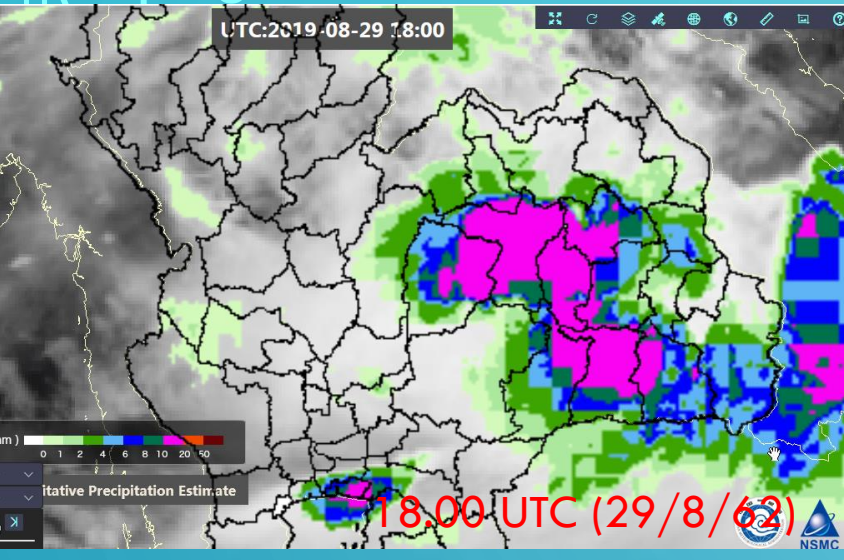
Satellite products



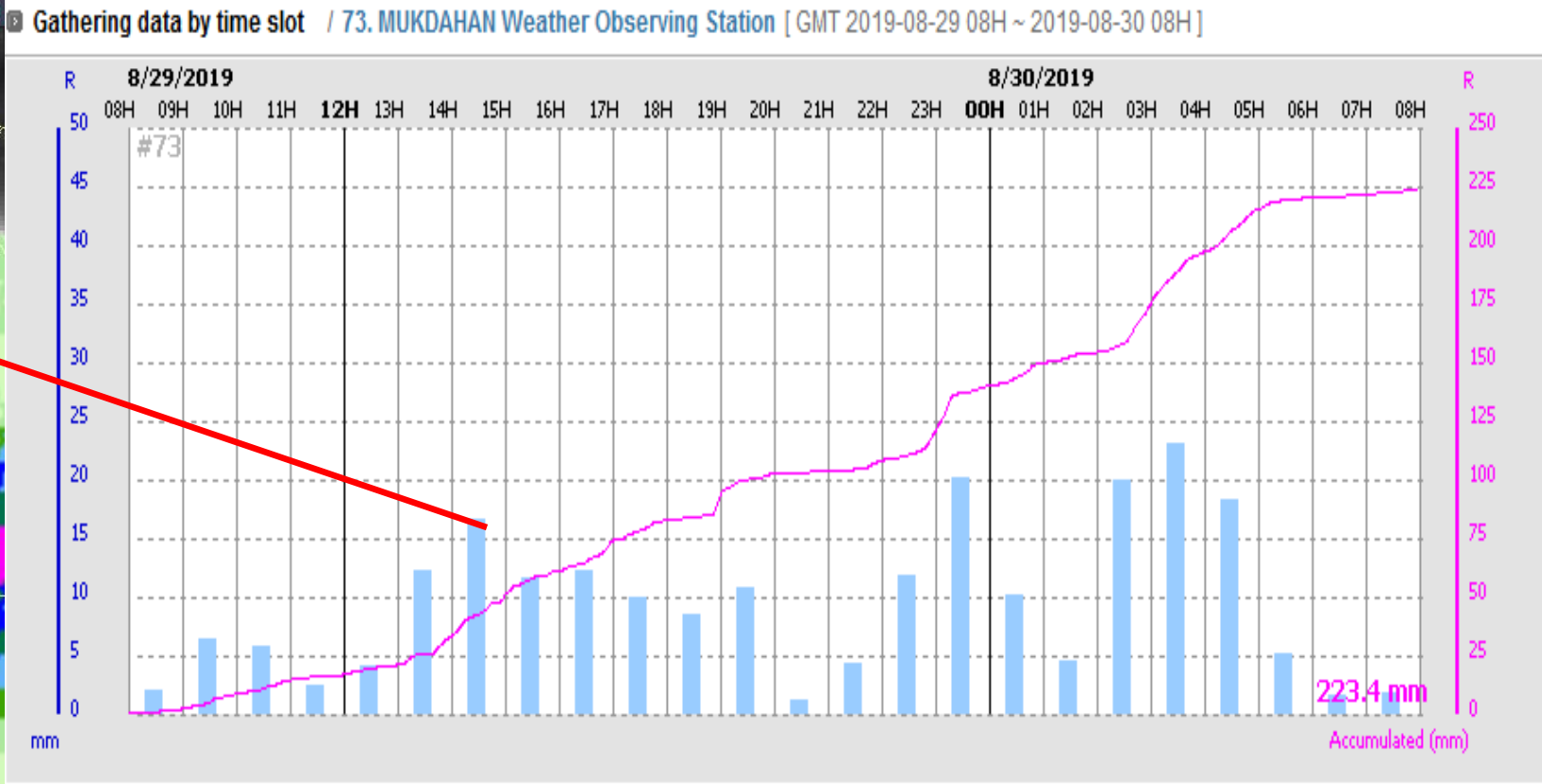
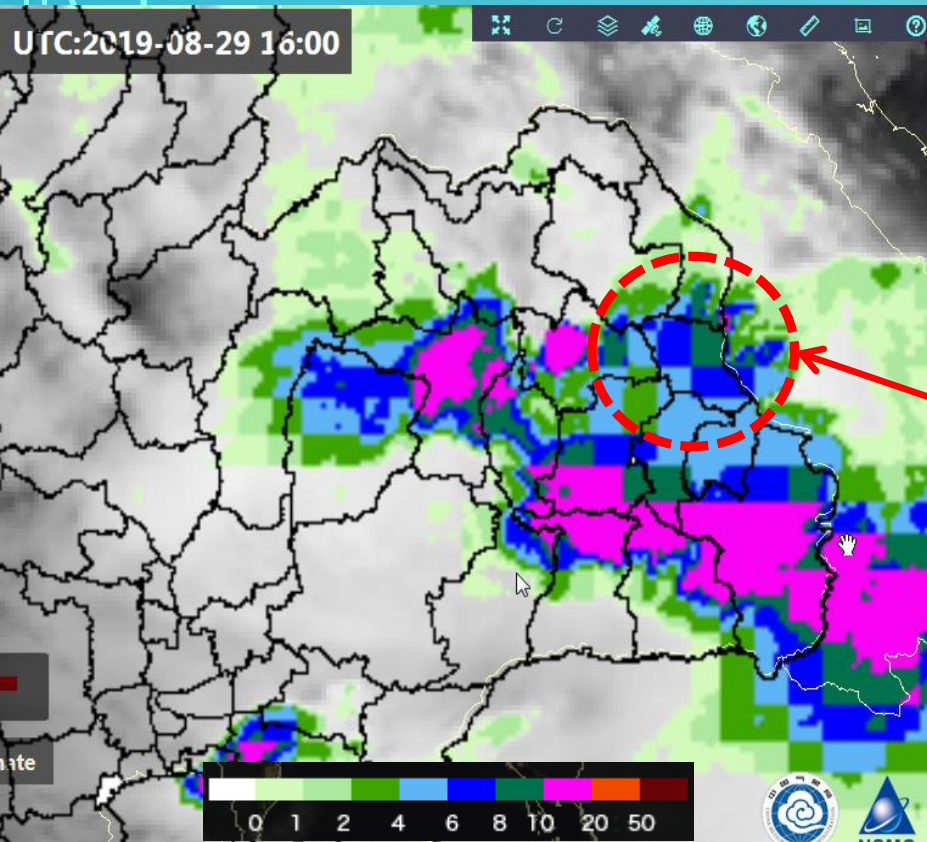
IR Enhance (from CMSS)

Quantitative Precipitation Estimation

Quantitative Precipitation Estimate (mm.) from FY4A

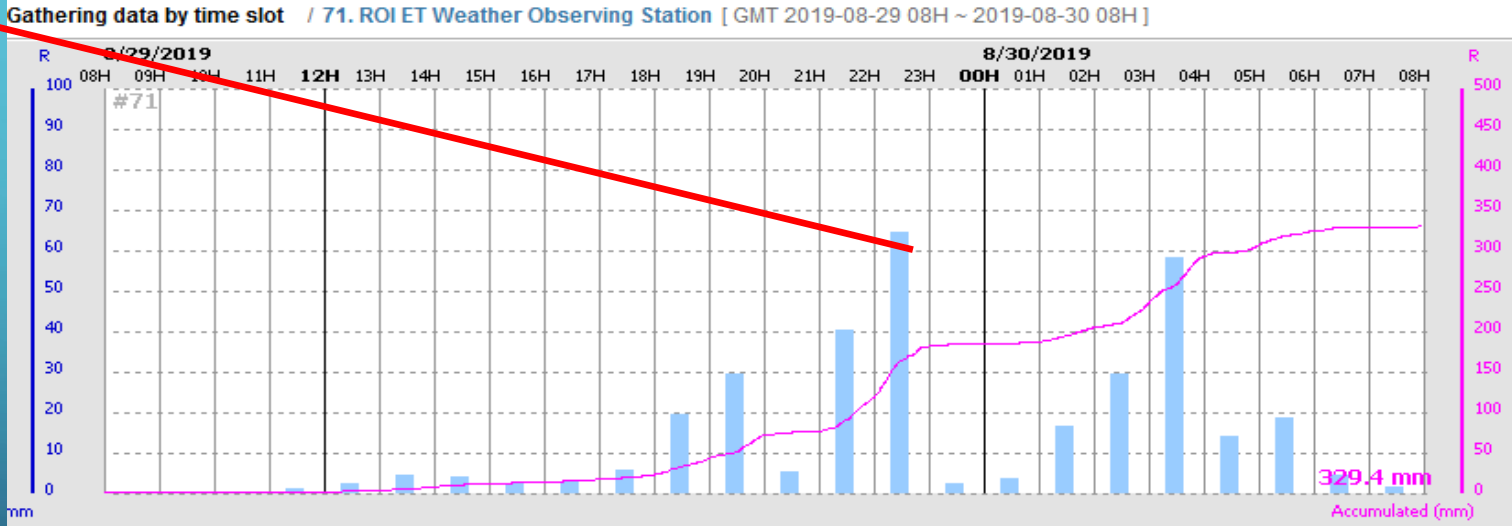
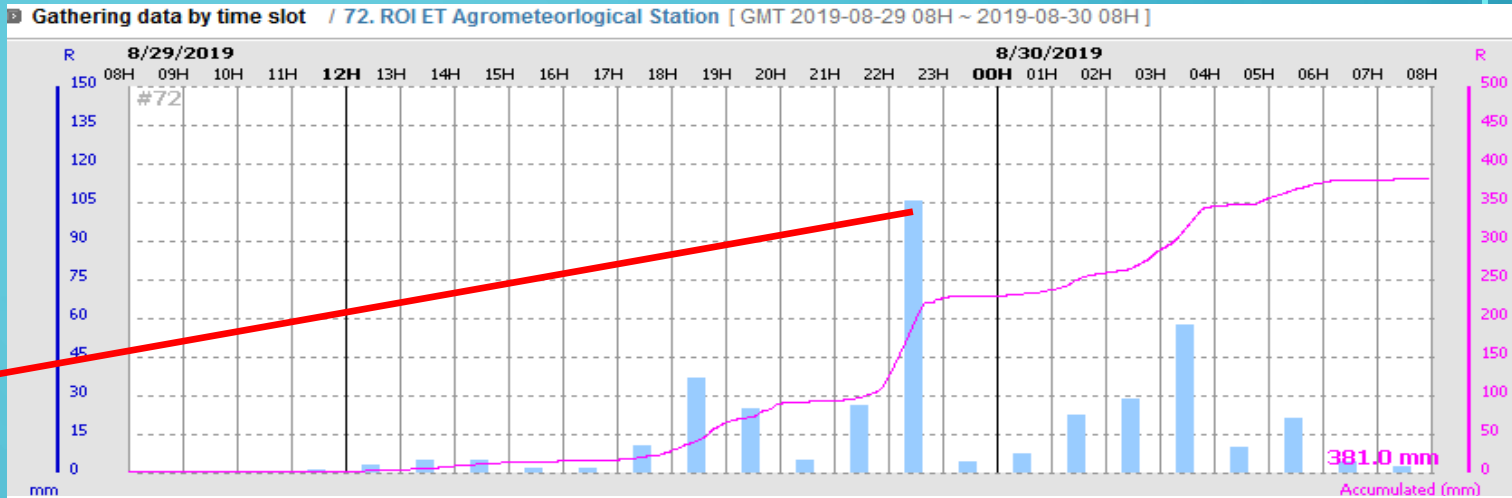
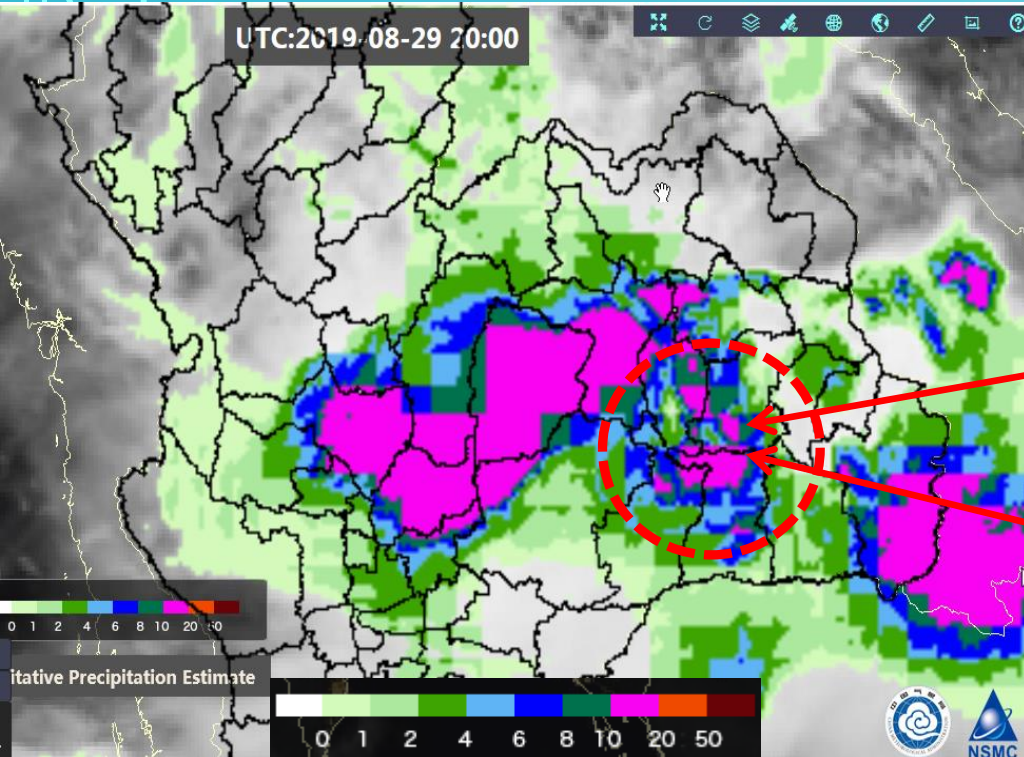


Rainfall in Mukdahan automatic station (29 Aug. – 1 Sep. 2019)



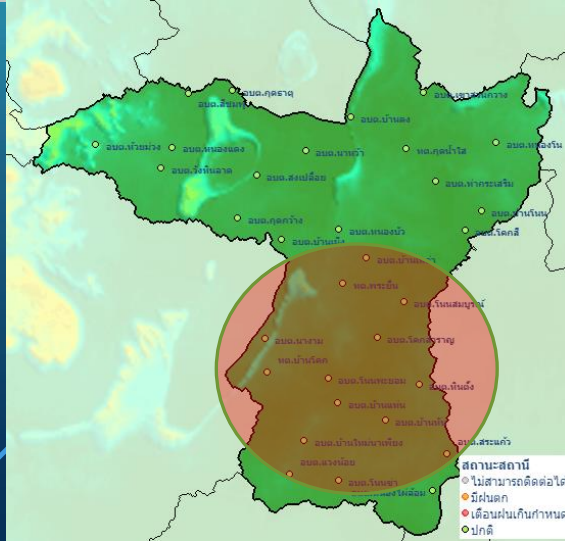
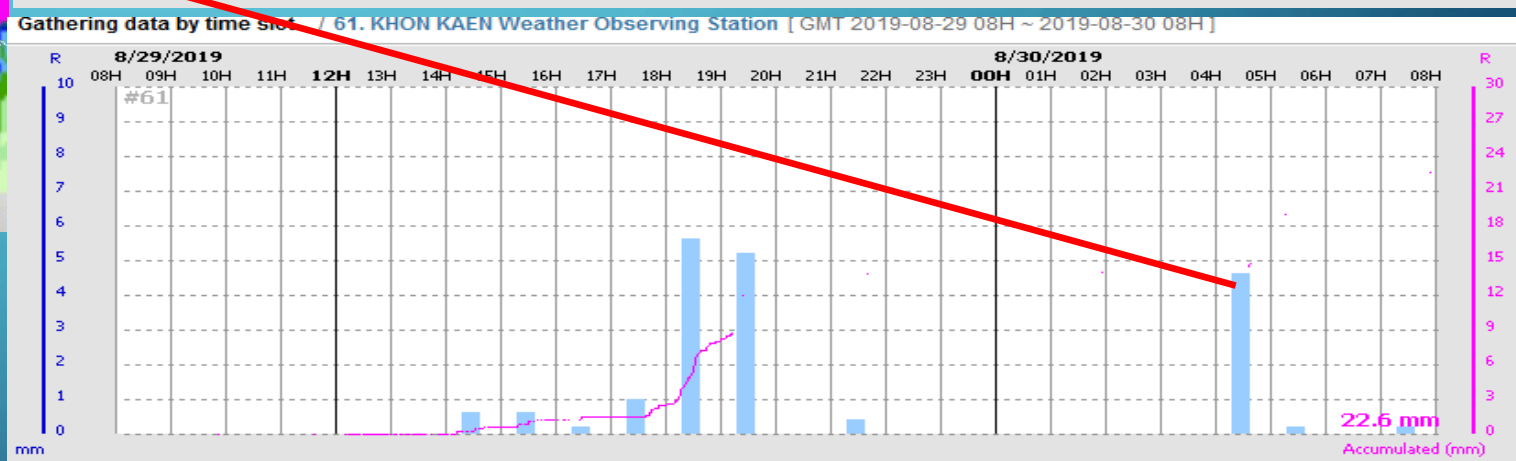
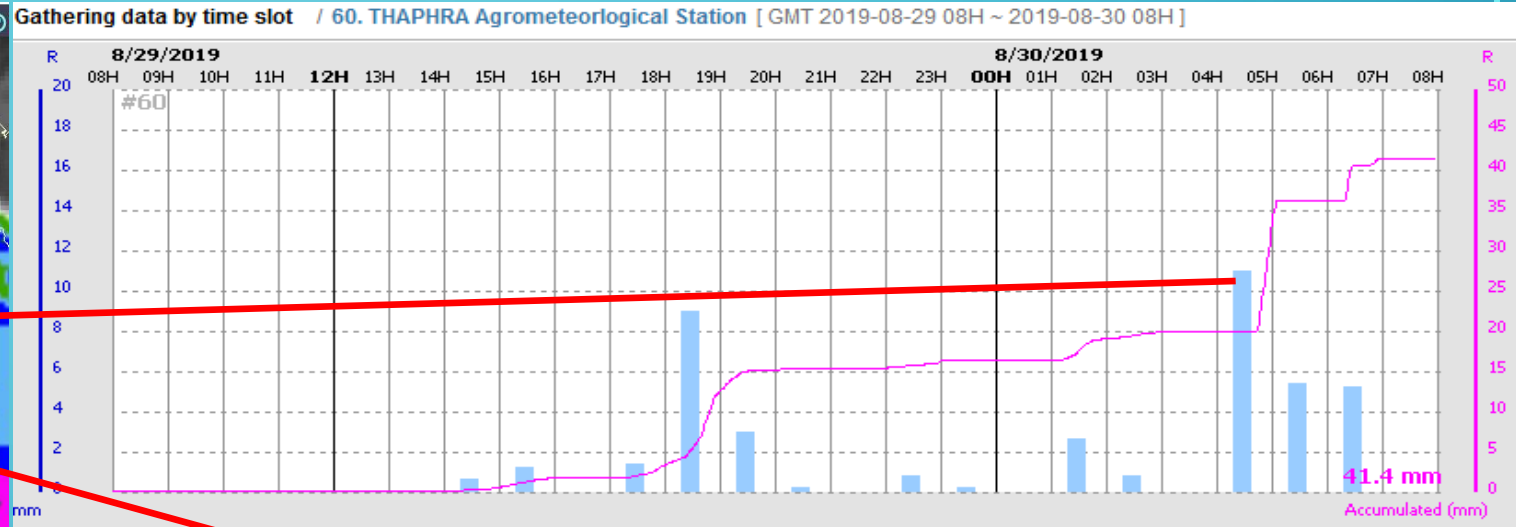
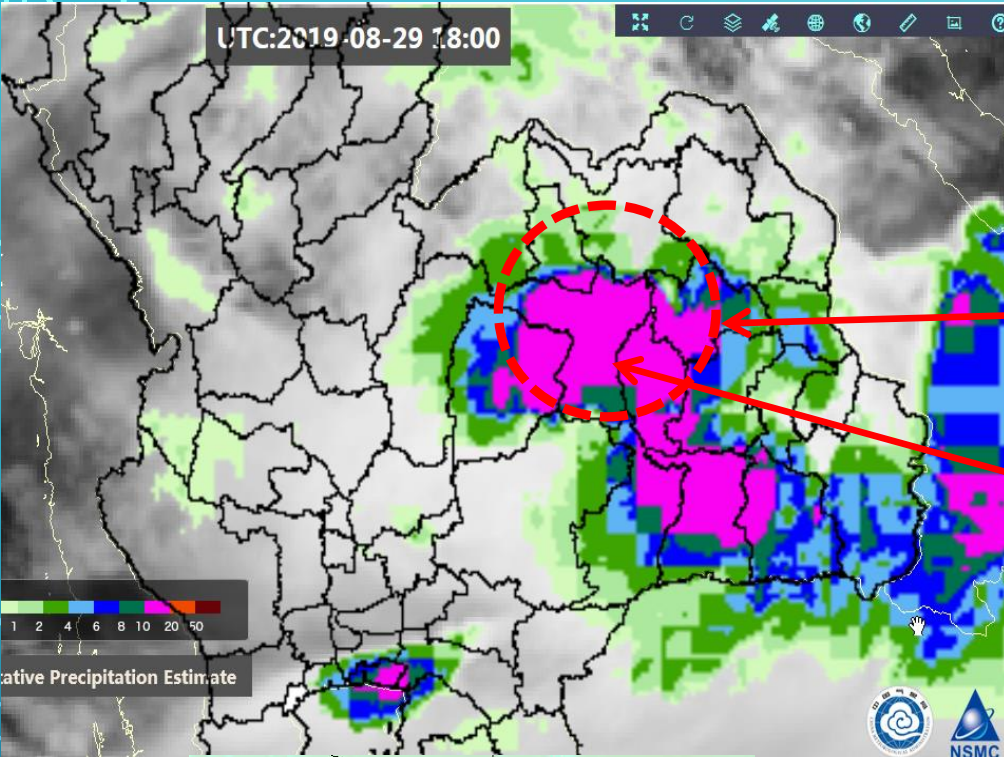
| station | 29 Aug. | 30 Aug/ | 31Aug. | 1 Sep. |
|------------------------------|---------|---------|--------|--------|
| Suan Mon-mai Meaung District | 157.2 | 170.6 | 40.9 | 18.5 |
| Meaung District | 141.1 | 123.7 | 20.2 | 10.0 |
| Nikomkamsoi District | 147.6 | 147.0 | 26.0 | 22.6 |

Roi-Et station 29 - 30 Aug. 2019



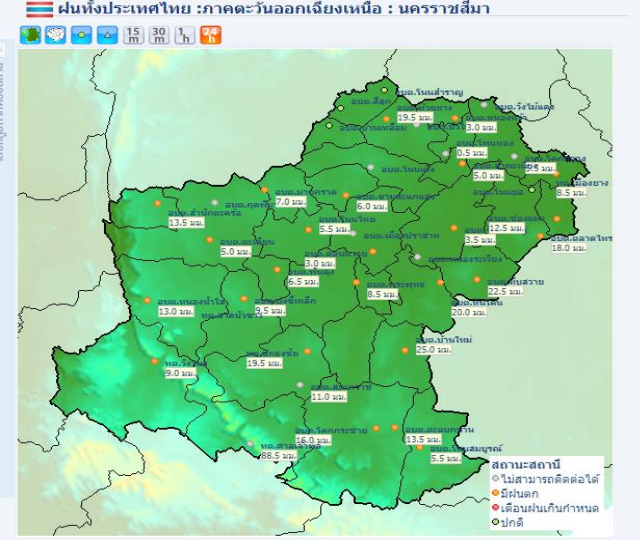
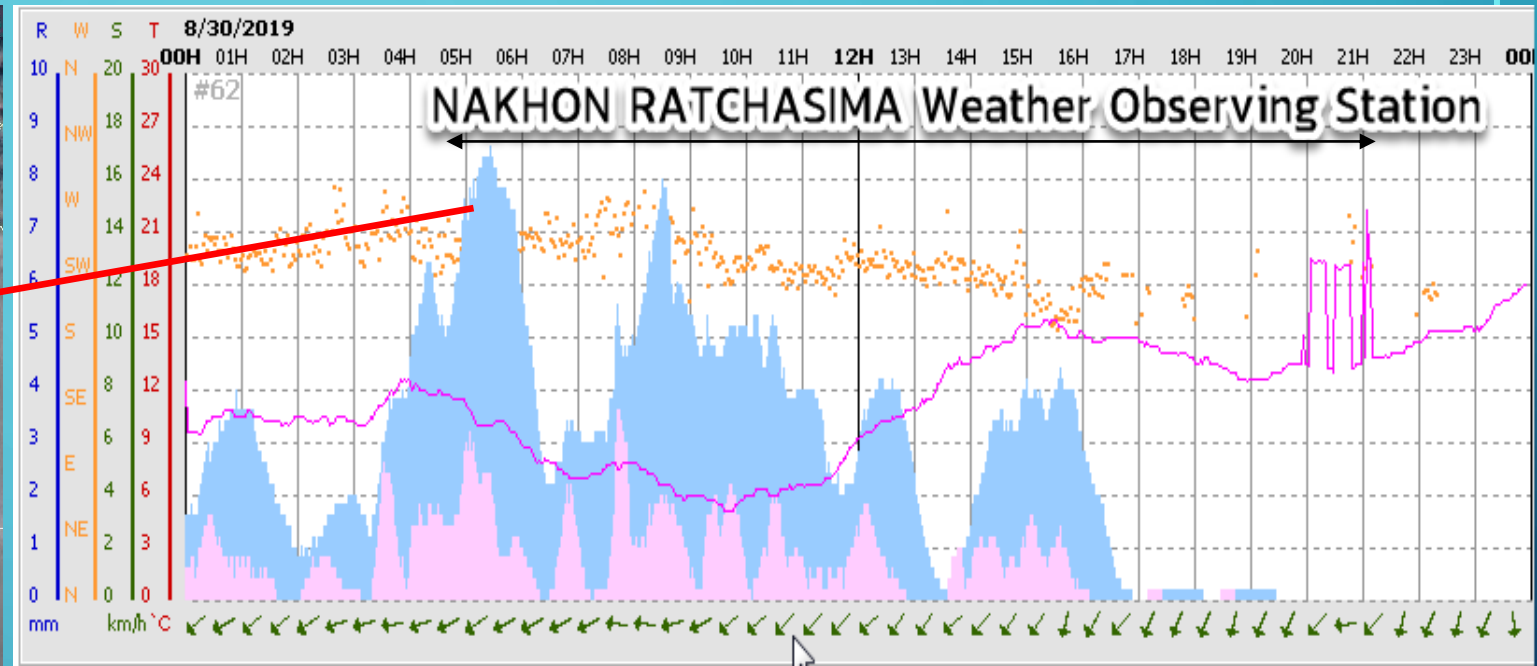
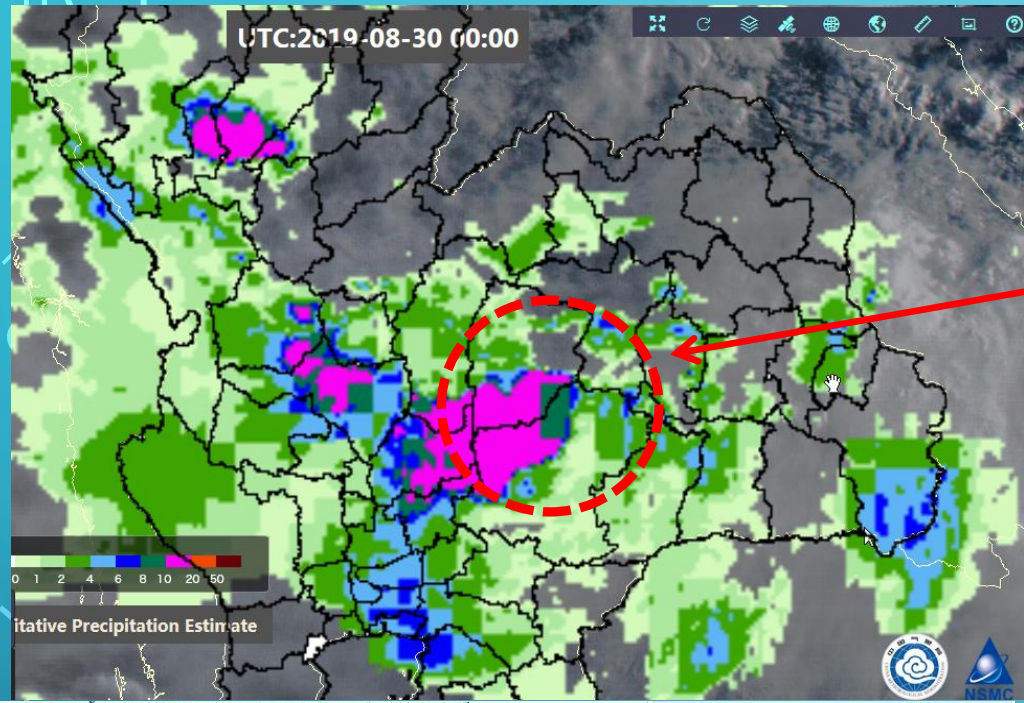
| station | 29 Aug. | 30 Aug/ | 31Aug. | 1 Sep. |
|----------------------------|---------|---------|--------|--------|
| Meaung District | 201.3 | 172.2 | 4.3 | 146.3 |
| Agrometeorological station | 168.0 | 168.3 | 7.5 | 102.7 |

Khon -Kaen station 29 - Aug. 2019



| station | 29 Aug. | 30 Aug/ | 31Aug. | 1 Sep. |
|--------------------------------------|---------|---------|--------|--------|
| Meaung District | 15.5 | 57.1 | 1.7 | 166.2 |
| Agrometeorological station (Thaphra) | 21.1 | 96.9 | 1.3 | 89.8 |

Nakhon - Ratchasima station 29 Aug. – 1 Sep. 2019



| station | 29 Aug. | 30 Aug/ | 31 Aug. | 1 Sep. |
|-----------------|---------|---------|---------|--------|
| Meaung District | 6.3 | 56.2 | 0.1 | 0.9 |
| Phimai | 12.0 | 131.1 | 1.3 | T |
| Bua Yai | 24.0 | 184.5 | 3.0 | 1.8 |
| Prathai | | 205.0 | | |
| A.Sida | | 200.8 | | |
| Chum Phuang | | 136.5 | | |

ACTIVITIES: Cooperation with APSCO and the Chinese Meteorological Department (CMA) for the installation of Feng Yun (FY) satellite system for Thailand.



16 – 20 Sep. FY Expert team (Mr. Xu Yansong, Mr. Bai Yu, Dr. Liu Weiyi) visit Thailand to survey possible location of Feng Yun (FY) ground Meteorological Satellites station.



Conclusion and Recommendations

FY satellite data is very useful for Thailand. Due to there is a coordinate position that matches Thailand exactly. We are able to use the products to monitor and Early Warning System (EWS) such as Track movement and storm track. Which can choose to use various products from FY such as Satellite band (IR Enhance (CIMSS).Cloud top, Shortwave Longwave etc.), Synthetic scheme (true color, Naturecolor, Natural color RGB, Airmass etc.), Satellite products(Lighting Frequency, Qualitative Precipitation(QPE) SST, Temperature etc.), vector layer. Easy to use as well as highly detailed. Continuous updates can be exported as animation and have convenient operation functions. Able to select historical data

Recommendations

- Demonstate NWP products on FY satellite data
- Provide data in other format such as netcdf, .csv etc.
- Ingest FY Satellite data to NWP model and data assimilation



"สวัสดี"

Thank You