MEMBER REPORT
Thailand

ESCAP/WMO Typhoon Committee
18th Integrated Workshop
ESCAP - UN Conference Center, Bangkok, Thailand
28 November – 1 December 2023

CONTENTS

I. Overview of tropical cyclones which have affected/impacted Member's area since the last Committee Session

1. Meteorological Assessment

1.1 Summary of tropical cyclones affected/impacted on Thailand from 1 November 2022 to 31 October 2023

Thailand is located in the center of Southeast Asia mainland. The country's weather is influenced by the southwest monsoon in the rainy season (mid-May to mid-October) and the northeast monsoon in the winter (mid-October to mid-February). Aside from these factors, there are also tropical cyclones from the Andaman Sea and the South China Sea.

From 1 November 2022 to 31 October 2023, there is no tropical cyclone entering Thailand. However, rainfall in Thailand experienced some effects caused by two tropical cyclones, originating over the South China Sea and the northwest Pacific Ocean, which were TALIM (2304) forming in July 2023 and the tropical depression in September 2023, as shown in figure 1. The tropical cyclone named "TALIM" (2304) initially originated over Philippine Sea region near the upper east coast of the Philippines then made landfall over Zhanjiang, Guangdong, China and downgraded to a tropical depression over Vietnam in July 2023. The other tropical cyclone which was the tropical depression occurring in September 2023 formed from an active low pressure cell over the coast of central Vietnam and made landfall at Danang, Vietnam on 25 September 2023 then downgraded to the active low-pressure cell.

1.2 Brief descriptions of the Tropical Cyclones impacted on Thailand from 1 November 2022 to 31 October 2023

Since November 2022, there is no tropical cyclone, which formed over the South China Sea and the northwest Pacific, influencing rainfall in Thailand. Until the first tropical cyclone named "TALIM" (2304) took some effects in July 2023 followed by the tropical depression in September 2023, as given below.

1.2.1 Tropical cyclone “TALIM” (2304)

The tropical cyclone “TALIM” (2304) initially forming from an active low pressure cell to the tropical depression over the Philippine Sea area made the first landfall and moved across the Philippines on 14 July before intensifying to the tropical storm over the upper South China Sea on 15 July then it was strengthened to the severe tropical storm in the morning of 16 July. After that, this storm made the second landfall over Zhanjiang, Guangdong, China on 17 July then continued moving inland along the coast of China and rapidly downgraded to the tropical depression over upper Vietnam on 18 July before eventually dissipating in the morning of the following day.

This storm resulted in abundant rainfall in upper Thailand, primarily in northern and northeastern parts of Thailand, especially during 17-19 July when heavy to very heavy rainfall was observed in some areas. The highest daily rainfall was 160.0 mm in Chat Trakan, Phitsanulok provinces on 17 July. In addition, flooding was reported in Nong Khai province on 18 July, Phayao and Chiang Mai provinces on 19 July. The accumulated amount of rainfall during 17-19 July is shown in figure 2.

1.2.2 Tropical depression

In late September 2023, the tropical depression intensified from an active low-pressure cell over central of South China Sea on 25 September before degenerating into the active low-pressure cell and making landfall over Danang, Vietnam on the same day. The remnant low-pressure cell continued moving pass the monsoon trough that lay across upper Thailand then covered over Laos, the northeastern part and the northern part of Thailand, respectively until 27 September. This cyclone brought plentiful rainfall over upper Thailand that received fairly widespread rain with heavy to very heavy rainfall in several areas mainly during 25-27 September. The highest daily rainfall in the northeastern and northern parts of Thailand was 140.7 mm at Li, Lamphun on 27 September. During that time, floods were reported in Chaiyaphum province on 26 September and Kamphaeng Phet, Sukhothai and Nakhon Ratchasima province provinces on 27 Sep. The accumulated amount of rainfall during 25-27 September is shown in figure 3.

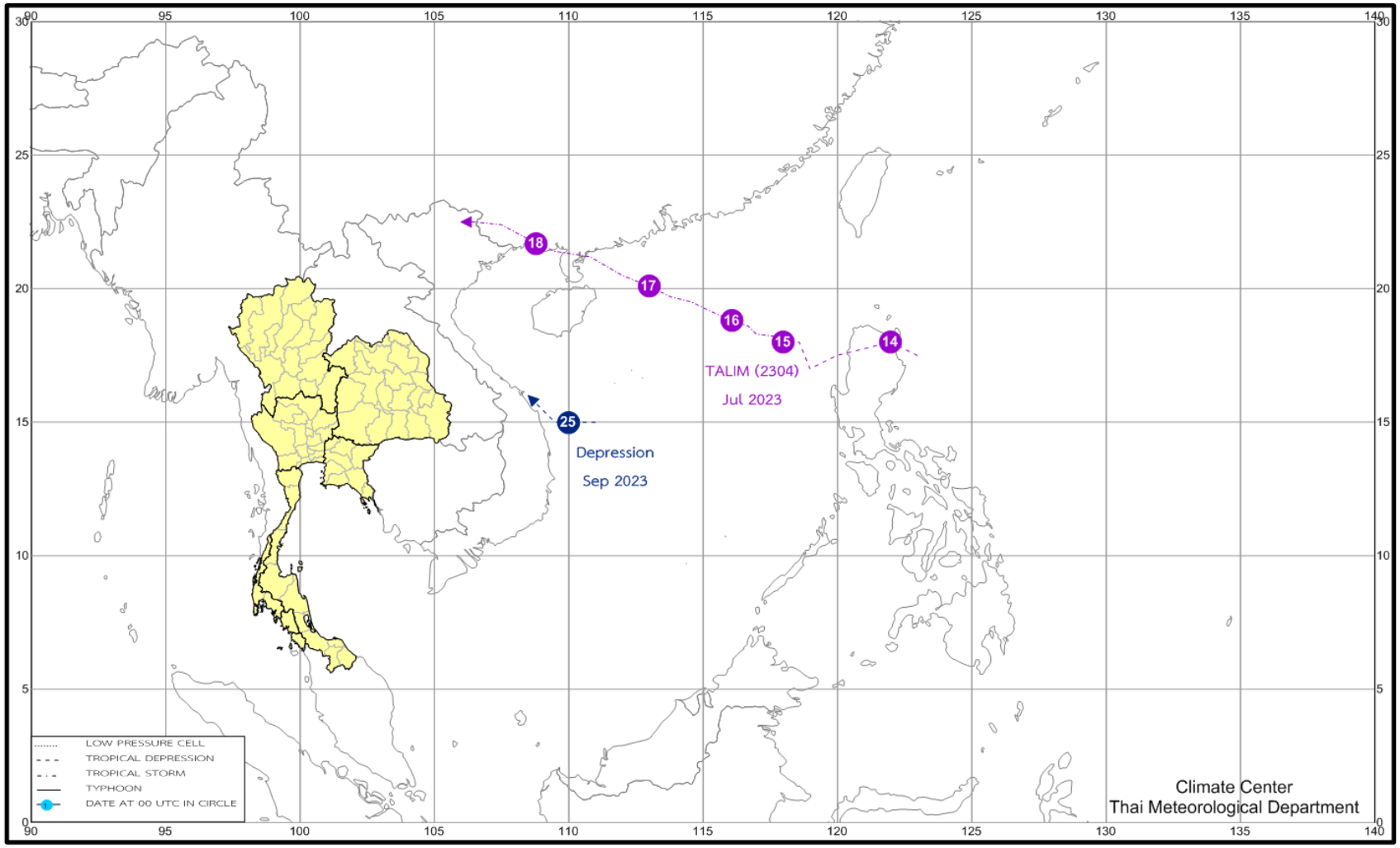

Figure 1: Tracks of tropical cyclones over the South China Sea and the northwest Pacific Ocean affecting rainfall in Thailand from 1 November 2022 to 31 October 2023

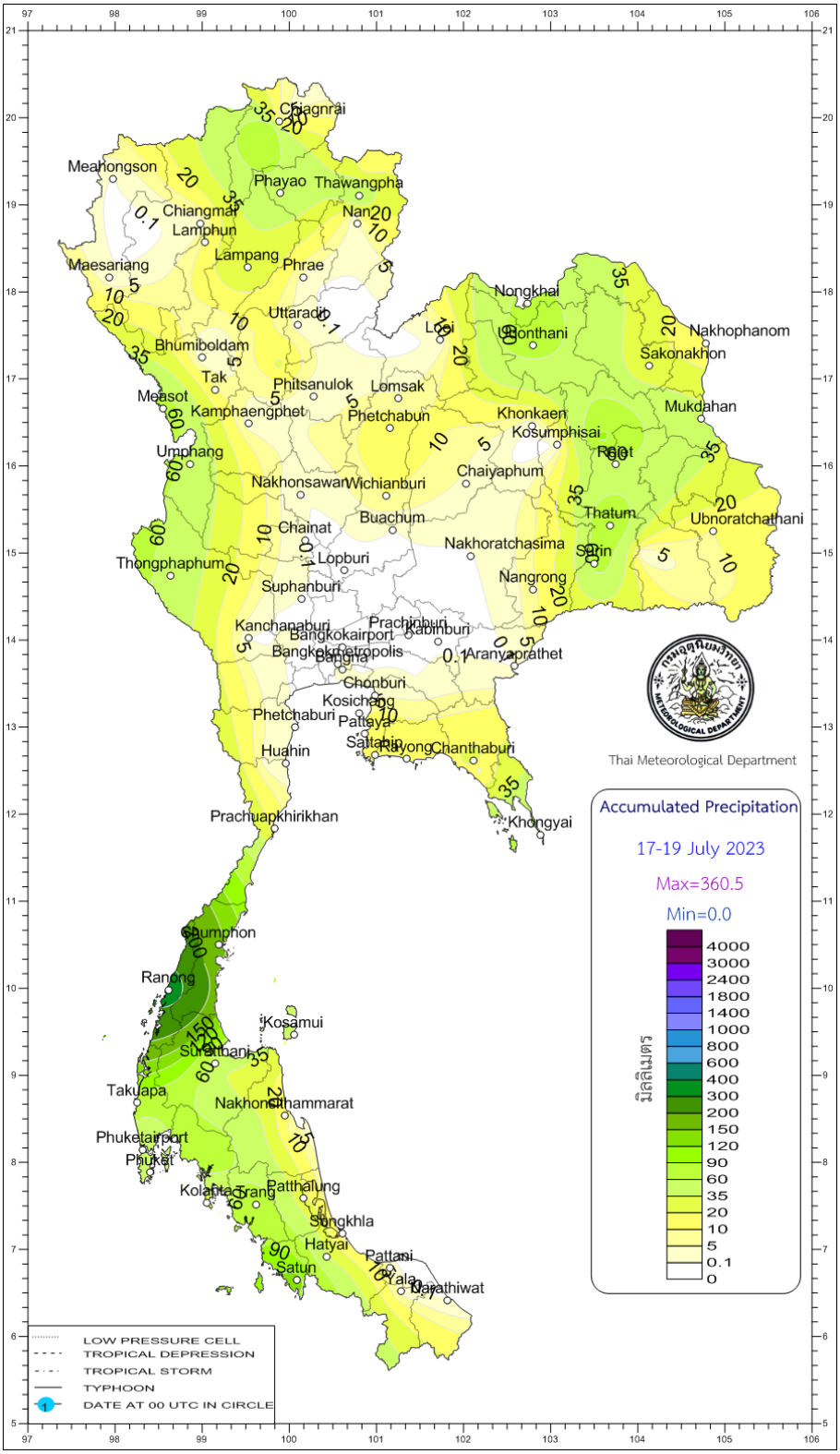

Figure 2: Accumulated amount of rainfall during 17-19 July 2023

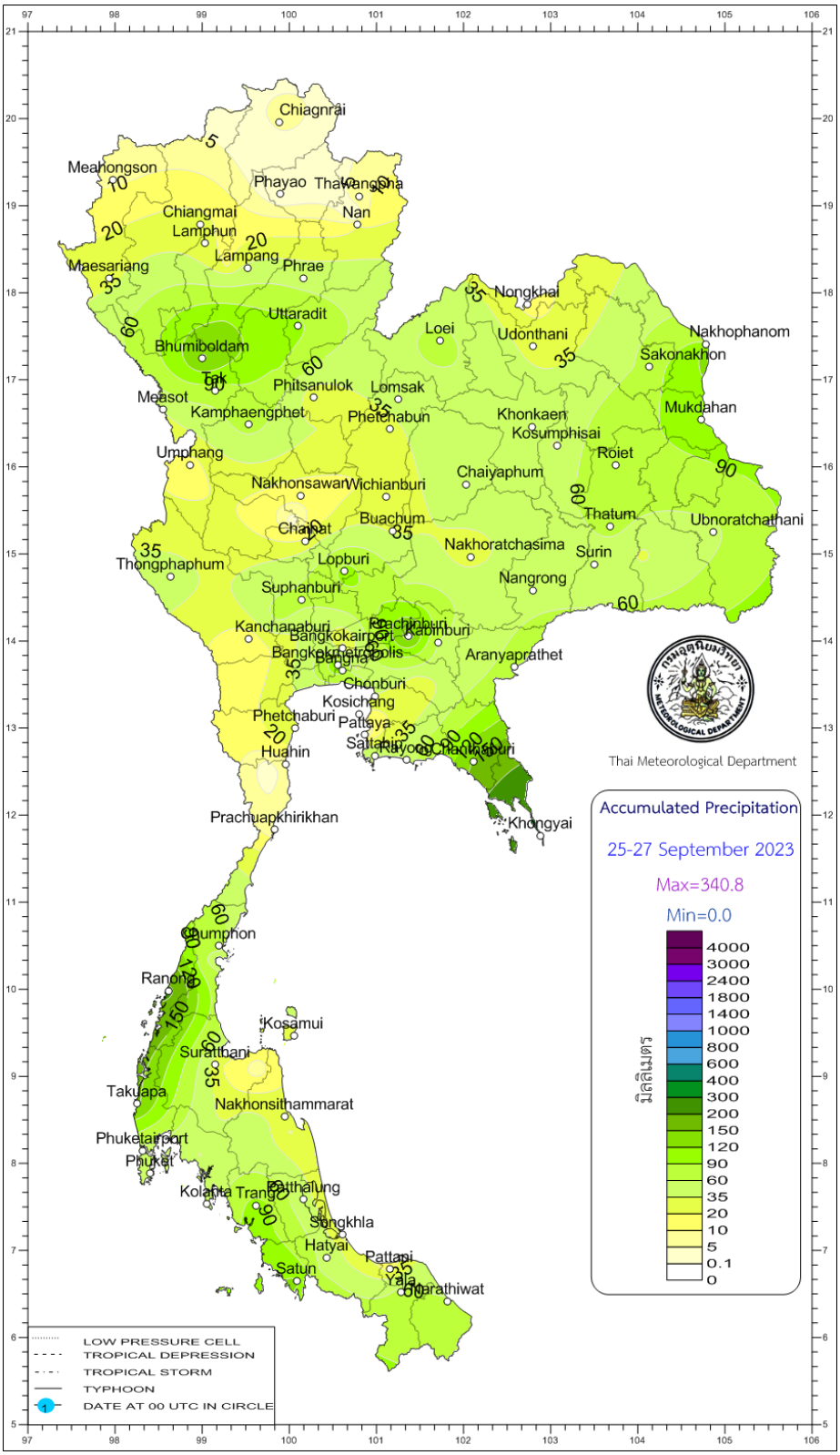

Figure 3: Accumulated amount of rainfall during 25-27 September 2023

2. Hydrological Assessment

In 2023, there are no tropical storm directly attack Thailand. The influence of Northeast monsoon over The Gulf of Thailand and the Southern of Thailand in the first 2 months of 2023, it caused heavy rain in the Southern part.

At the beginning of rainy season, the accumulate rainfall was less than average about 20% until the end of August. However, in September the monsoon trough lies across the Northern, Northeast and upper the Central. In addition, the southwest monsoon is quite strong, covering the Andaman Sea, Thailand and the Gulf of Thailand. Moreover, the strong low-pressure cell in the central of South China Sea. Meanwhile, the Southwest monsoon over the Andaman Sea, the Southern and the Gulf of Thailand is strengthening caused the flood occurred in 56 provinces in Thailand. There are more than 55 hydrological observation stations was affected.

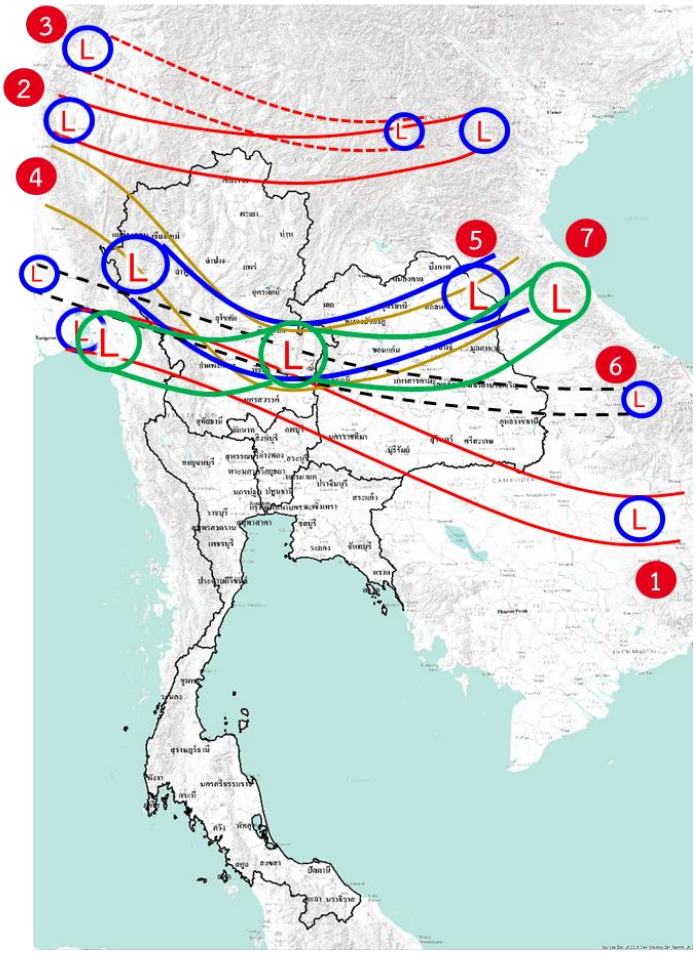

Figure 4: Annual Weather in Thailand in 2023

Descriptions of Figure 4:

1. The moderate monsoon trough lies across the lower North, the Central, the East and the lower Northeast. Meanwhile, the rather strong southwest monsoon prevails over the upper Andaman Sea, the

southern and the upper Gulf of Thailand. (22 – 24 July 2023). Affected areas are 2 provinces as Roi Et and Samut Prakan.

2. The monsoon trough lies across the upper Northern of Thailand and upper Laos into the low-pressure cell over the upper Vietnam Meanwhile, the southwest monsoon prevails over the Andaman Sea, Thailand and the Gulf of Thailand is strengthening (28 July - 3 Aug 2023). Affected areas are 7 provinces as Tak, Sakon Nakhon, Bueng Kan, Udon Thani, Nakhon Phanom, Amnan Charoen and Ubon Ratchathani.

3. The monsoon trough lies across the Myanmar and upper Laos into the low-pressure cell over upper Vietnam. Meanwhile, the southwest monsoon prevails across the Andaman Sea and the Gulf of Thailand (5 -10 Aug, 2023). Affected areas are 2 provinces as Nan and Nakhon Phanom.

4. The monsoon trough lies across the Northern, Northeast and upper the Central In addition, the southwest monsoon is quite strong, covering the Andaman Sea, Thailand and the Gulf of Thailand (29 Aug. - 10 Sep. 2023). Affected areas are 12 provinces as Mae Hong Son, Chiang Mai, Phayao, Phitsanulok, Udon Thani, Roi Et, Kalasin, Yasothon, Chanthaburi, Trat, Phetchabun and Satun.

5. The monsoon trough lies across the Northern, Northeastern and Central, together with the low-pressure cell covering the Northeastern (17 - 21 Sep. 2023). Affected areas are 28 provinces as Chiang Mai, Chiang Rai, Uttaradit, Phitsanulok, Phichit, Nakhon Sawan, Sukhothai, Kamphaeng Phet, Sakon Nakhon, Amnat Charoen, Udon Thani, Loei, Nong Bua Lamphu Khon Kaen, Maha Sarakham, Roi Et, Yasothon, Ubon Ratchathani, Nakhon Phanom, Nakhon Nayok, Chachoengsao, Chanthaburi, Lopburi, Saraburi, Phra Nakhon Si Ayutthaya, Phetchabun, Ang Thong and Phuket.

6. The strong low-pressure cell in the central of South China Sea. Meanwhile, the Southwest monsoon over the Andaman Sea, the Southern and the Gulf of Thailand is strengthening (26 - 29 Sep. 2023). Affected areas are 27 provinces as Chiang Mai, Lamphun, Lampang, Phrae, Sukhothai, Tak, Kamphaeng Phet, Loei, Udon Thani, Sakon Nakhon, Khon Kaen, Kalasin. Chaiyaphum, Roi Et, Yasothon, Amnat Charoen, Ubon Ratchathani, Nakhon Phanom, Chanthaburi,

Prachinburi, Trat, Lopburi, Phetchabun, Phra Nakhon Si Ayutthaya, Ang Thong, Saraburi and Satun.

7. The monsoon trough lies across the Central, the lower Northeastern and Eastern. Entering the low-pressure cell along the coast in the Central of Vietnam. Meanwhile the southwest monsoon covers the Andaman Sea, Thailand and the Gulf of Thailand (1 - 11 Oct. 2023). Affected areas are 37 provinces as Lamphun, Chiang Rai, Lampang, Uttaradit, Phitsanulok, Phichit, Sukhothai, Kamphaeng Phet, Tak, Loei, Nong Bua Lamphu, Udon Thani, Sakon Nakhon, Roi Et, Khon Kaen, Kalasin, Chaiyaphum, Yasothon, Amnat Charoen, Ubon Ratchathani, Nakhon Ratchasima, Rayong, Chanthaburi, Prachinburi, Sa Kaeo, Phetchabun, Saraburi Lopburi, Phra Nakhon Si Ayutthaya, Pathum Thani, Bangkok, Chachoengsao, Chainat, Ang Thong, Uthai Thani, Suphan Buri and Nakhon Pathom.

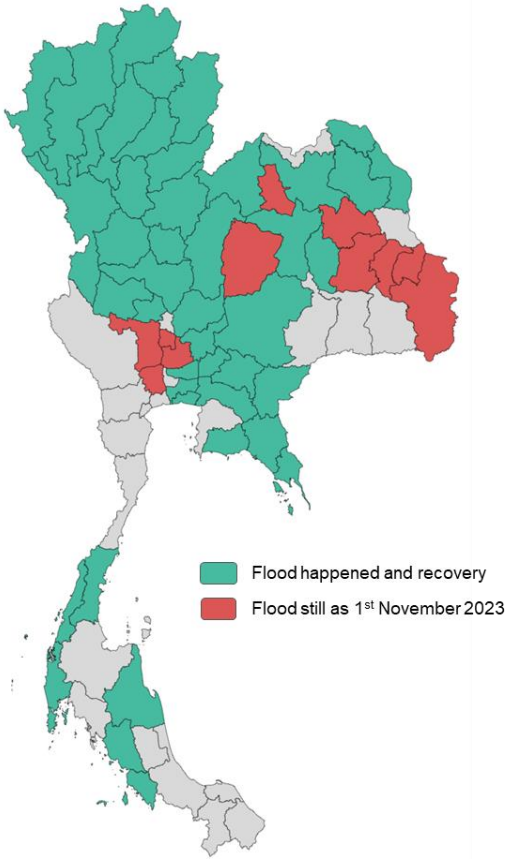

Figure 5: Flood occurred in 56 provinces of Thailand, 45 provinces are recovery and 11 provinces still flood as 1st November 2023

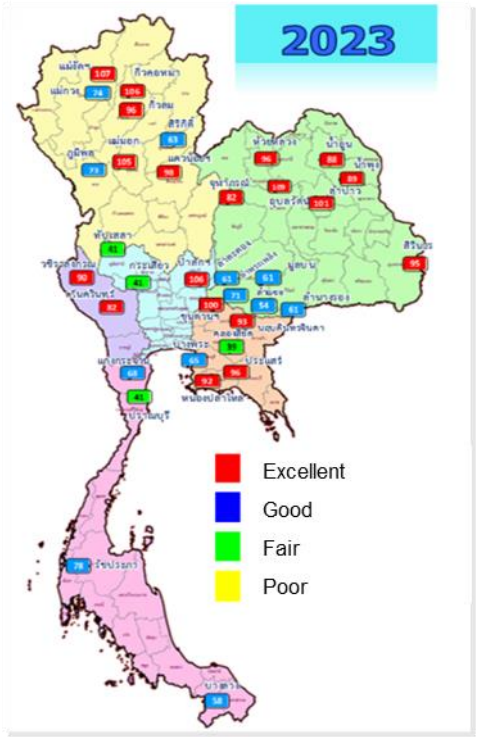

Figure 6: Water storage in large-scale dam as 1st November 2023

In 2023, water storage in 35 large-scale reservoirs is 79% of their capacity or 56,386 MCM. The water-use volume for dry season is 32,849 MCM that less than year 2022 about 3010 MCM.

The Royal Irrigation Department (RID), Office of National Water Resources and related agencies were working together on monitoring, analyzing, providing information and supporting the instruments and technology to the community.

3. Socio-Economic Assessment

Overview of tropical cyclones which had affected/impacted member's area from 1 November 2022 to 31 October 2023 by Department of Disaster Prevention and Mitigation (DDPM), Thailand.

3.1 Tropical cyclone "TALIM" (2304)

In July 2023, the tropical cyclone "TALIM" (2304) initially originated over Philippine Sea region near the upper east coast of the Philippines then made landfall over Zhanjiang, Guangdong, China and downgraded to a tropical depression over Vietnam in July 2023. Even though the tropical cyclone has not hit Thailand, it still affects the rainfall.

In the period of 17 - 19 July 2023, Department of Disaster Prevention and Mitigation (DDPM), Thailand reported that the tropical cyclone "TALIM" (2304) caused flooding which affected 2,850 households across 11 districts, 41 subdistricts

and 134 villages in 5 provinces including Ranong, Chumphon, Nong Khai, Phayao and Chiang Mai. There were no casualties from this accident.

3.2 Tropical depression

In September 2023, the tropical depression formed from an active low-pressure cell over the coast of central Vietnam and made landfall at Danang, Vietnam on 25 September 2023 then downgraded to the active low-pressure cell. Even though the tropical cyclone has not hit Thailand, it still affects the rainfall.

In the period of 26 September - 30 October 2023, Department of Disaster Prevention and Mitigation (DDPM), Thailand reported that the tropical depression caused a flash flood and overbank flow which affected 62,838 households across 38 districts, 160 subdistricts and 2,992 villages in 38 provinces including Chiang Rai, Phayao, Phetchabun, Mae Hong Son, Lamphun, Uttaradit, Chiang Mai, Lampang, Sukhothai, Phitsanulok, Nan, Tak, Kamphaeng Phet, Phrae, Nakhon Sawan, Samut Prakan, Lopburi, Kanchanaburi, Nakhon Nayok, Loei, Chaiyaphum, Nakhon Ratchasima, Udon Thani, Yasothon, Kalasin, Khon Kaen, Ubon Ratchathani, Maha Sarakham, Roi Et, Nong Bua Lamphu, Chachoengsao, Prachinburi, Chonburi, Rayong, Trat, Satun, Yala and Nakhon Si Thammarat. There were no casualties from this accident. At present (30 October 2023), the overall situation has been resolved. However, there is still a situation in 2 provinces which are Kalasin and Ubon Ratchathani. And it is expected that the situation will be resolved within 10 days.

Summary of Progress in Priorities supporting Key Result Areas

1. Development and exchange radar composite data

Main Text:

With the initiative of JMA, TMD has participating in the AOP3：Development of regional radar network under the Working Group on Meteorology (WGM) since 2011. Under the implementation, TMD can develop nationwide radar composite and share data with JMA and MMD. The composite radar system in Thailand has developed in terms of data quality by adding imported data into the system as follows.

1. Radar data Trang Station as shown in figure 8-9
   Latitude: 7:30:44.265625°N
   Longitude: 99:37:14.53125°E
   Type: C-Band

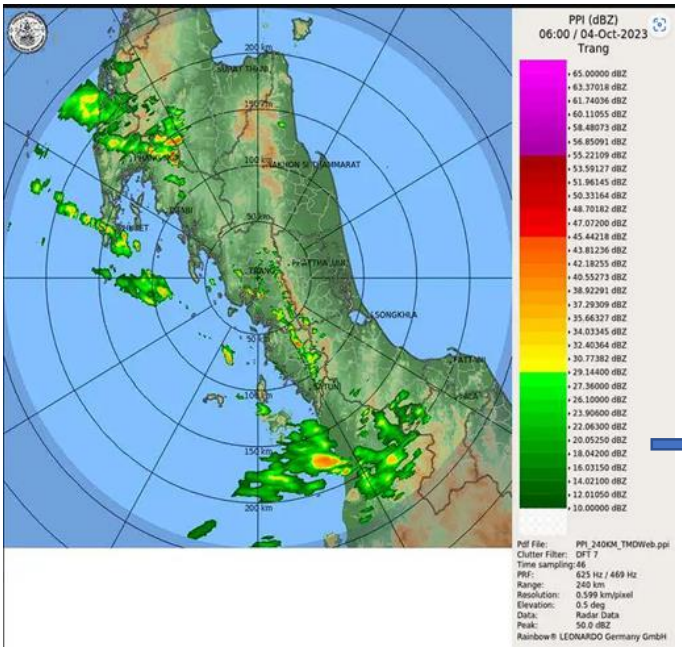

Figure 7: 0.5° PPI dBZ (TRANG Station)

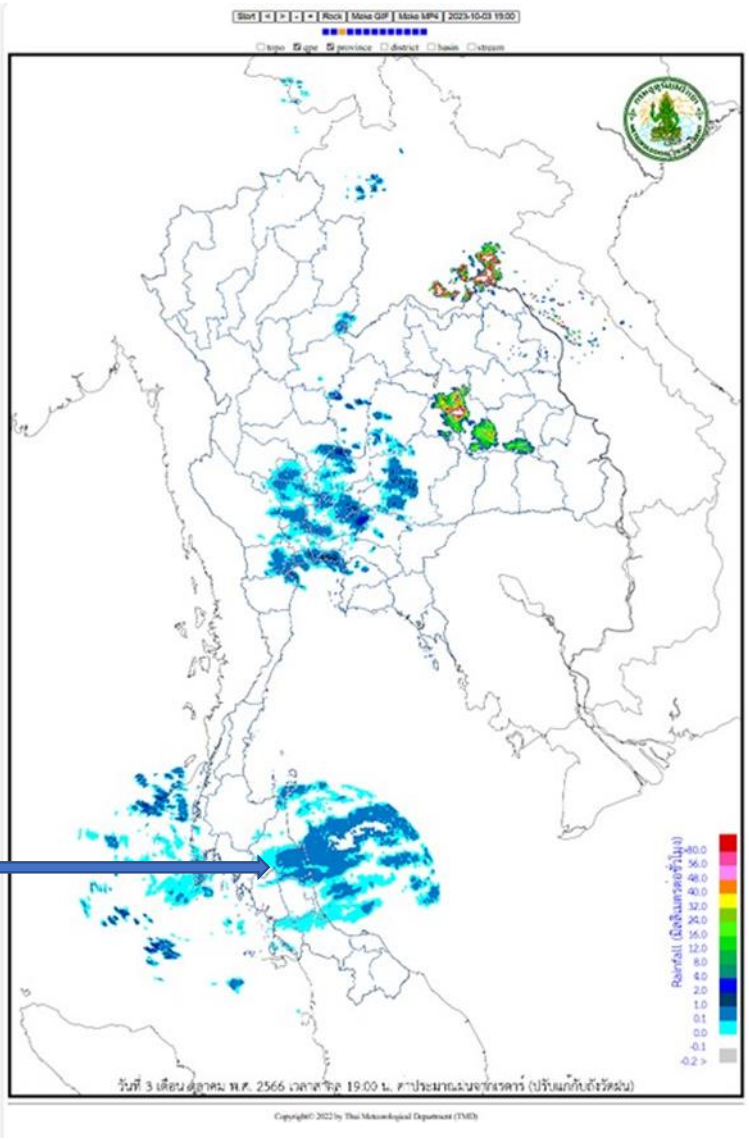

Figure 8: Nationwide Radar Composite

2. Telemetering Data for Calibration

2.1 HII Data

Increasing 1,304 units of telemetering on streamlines over Thailand. Data's Owner is Hydro - Informatics Institute (Public Organization).

2.2 DDS-BKK

Increasing 127 units of telemetering over Bangkok Area. Data's Owner is Department of Drainage and Sewerage, Bangkok Metropolitan Administration. The Telemetering in system around 1,500 units over Thailand.

Identified challenges

1. The risk map used radar composite data are under developing. Products will be analyzed in district areas in Thailand by 2 conditions:
    1) Yellow zone is Heavy Rainfall (35 – 90 mm)
    2) Red Zone is Very Heavy Rainfall (over 90 mm)
2. The nowcasting system uses Machine Learning by radar composite data and the products will support early warning system.

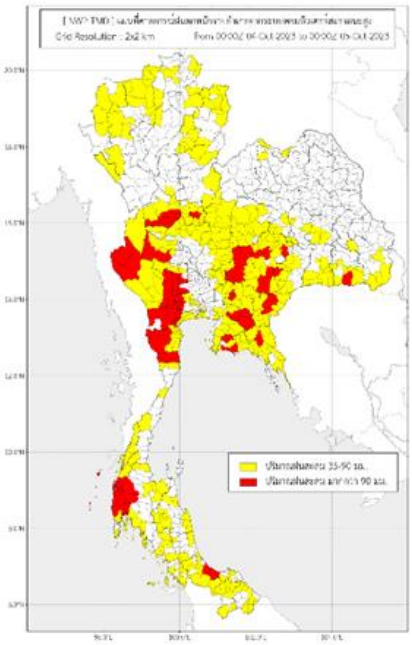

Figure 9: Risk map of QPE

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Strengthen cross-cutting activities among working groups in the Committee.

Meteorology

- Develop and enhance typhoon analysis and forecast techniques from nowcast to medium-range, and seasonal to long-range prediction.
- Enhance and provide typhoon forecast guidance based on NWP including ensembles, weather radar and satellite related products, such as QPE/QPF.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.
- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	
Preparedness and response capabilities	

Contact Information:

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2. CAP Implementation

Main Text:

Thai Meteorological Department (TMD) has implemented and provided alerts and warnings on severe weather in CAP format since 2019 which have been linked and made available on the GMAS-A platform. The warnings and alerts in the CAP format have been disseminated immediately and updated twice a day if events comply TMD's criteria. TMD has also improved our website to display the locations of disseminated CAP warnings and alerts on the map (https://www.tmd.go.th/en/CAP) and we intends to improve this service for more effective in the future.

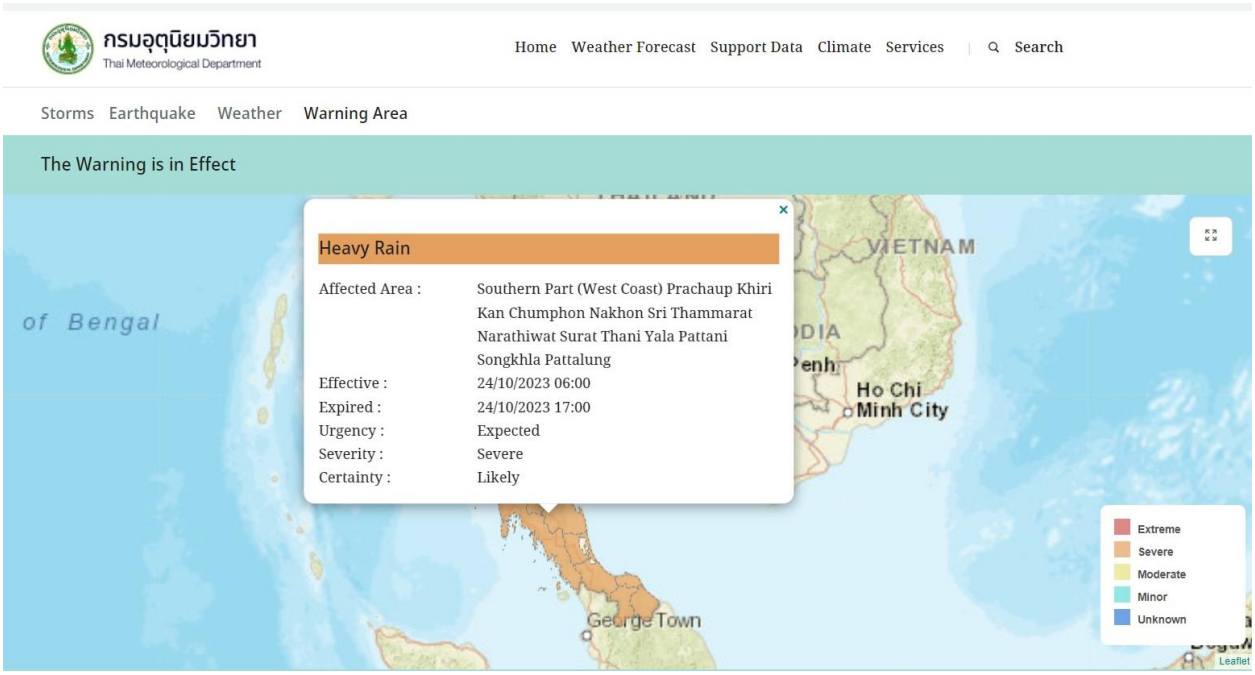

Figure 10: https://www.tmd.go.th/en/CAP

Identified challenges:

- More CAP warnings for other categories.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Enhance collaborative activities with other regional/international frameworks/organizations, including technical cooperation between TC/AP-TCRC and TC/PTC cooperation mechanism.

Meteorology

- Promote communication among typhoon operational forecast and research communities in Typhoon Committee region.
- Enhance RSMC capacity to provide regional guidance including storm surge, responding to Member's needs.

DRR

- Promote international cooperation of DRR implementation project.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	

Contact Information:

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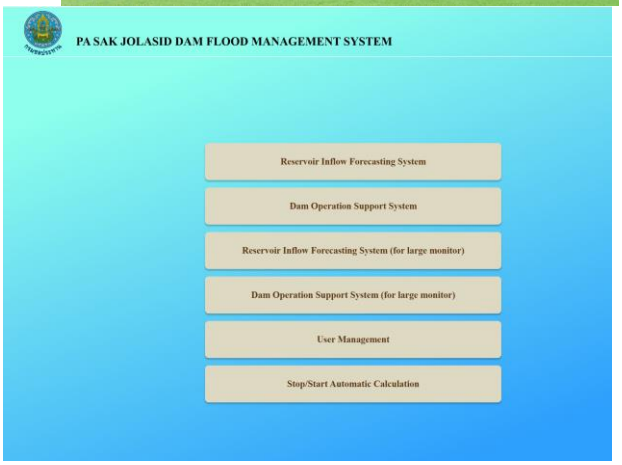
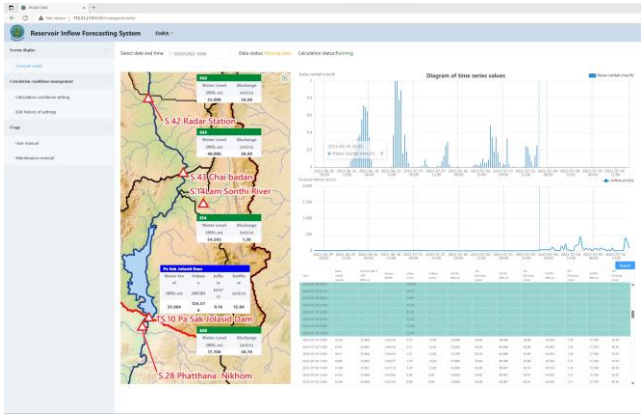
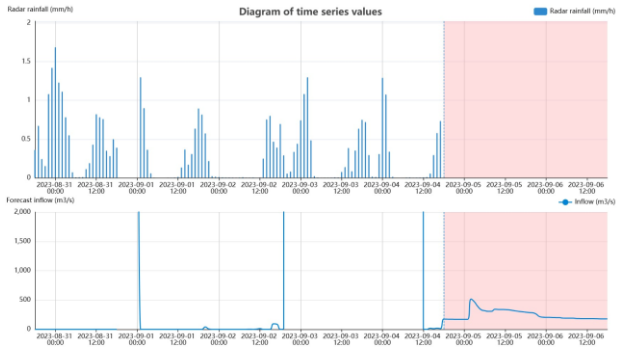
3. The Improvement of Pasak Jolasid Dam operation system based on a Solid-State Polarimetric X-band Radar System

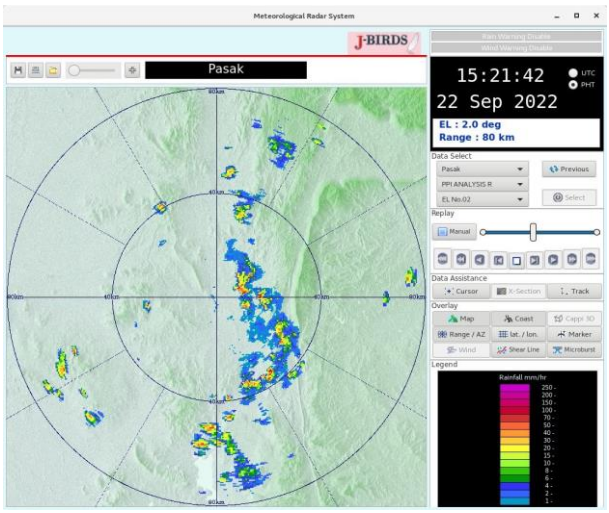
Main text:

Royal Irrigation Department (RID) create cooperation with the Ministry of Internal Affairs and Communications of Japan (MIC) establish the x-band radar station, the first radar of RID, at Wichianburi district Phetchabun province, the upstream of Pasak Dam. This radar system start collecting data since March 2023 and had a grand opening on 16th June 2023. This system will collect and calibrate the data for 2 rainy season. This project expected to operate the dam operation system and software in rainy season of 2025.









Identified opportunities/challenges, if any, for further development or collaboration:

Using radar for detect the rainfall in upstream area to forecast the inflow of Pasak Dam. Pasak river is the tributary of Chao Phraya River and has the important role of flood controller for Ayuthaya and Bangkok. Pasak Dam can reach their capacity within 3 days by the large amount of inflow so it's very sensitive operation during the rainy season.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Hydrology

- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.
- Develop capacity in projecting the impacts of climate change, urbanization and other human activities on typhoon-related flood disaster vulnerability and water resource availability.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	

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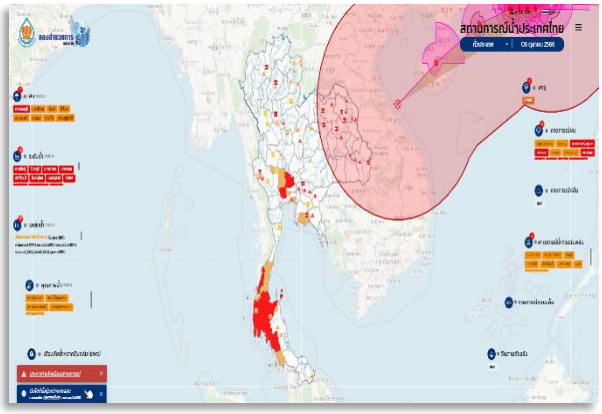
4. Strengthen the capacity of flood forecasting and early warning system.

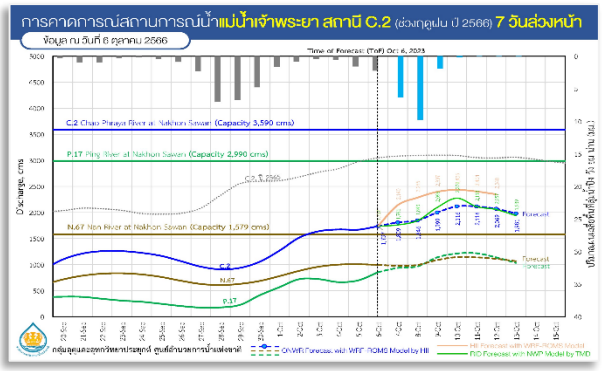
Main Text:

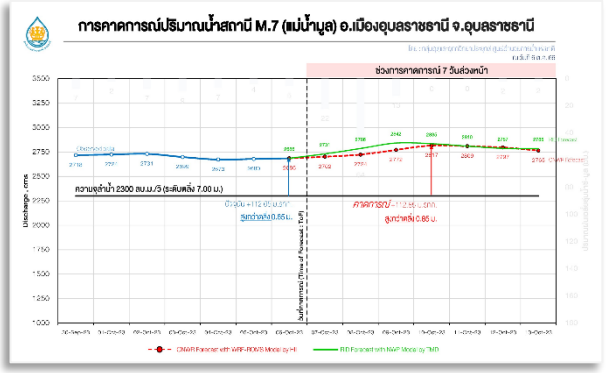
ONWR has developed central data platform. It linked to ONWR's data center which connected with related agencies databased. In order to develop dashboard for monitoring and publishing water situation on official websites called "https://national thaiwater.onwr.go.th". The website consists of weather conditions, water situations, water quality, and the coming storms. There is also an application called "National Thaiwater", it is aim to share water information to people and authorities to prepare and deal with water crisis. This can help to rise the efficiency of decision making for water crisis warning.

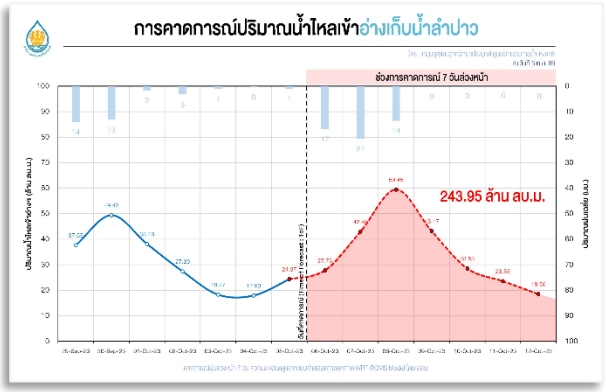


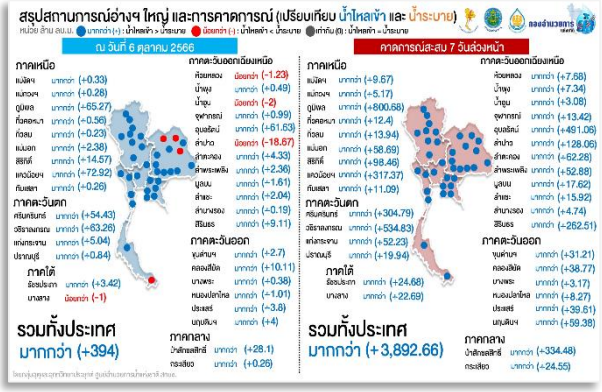
The website https://Nationalthaiwater.onwr.go.th and National Thaiwater Application

During the rainstorm-flood events, Thai Meteorological Department (TMD), ONWR, and Royal Irrigation Department (RID) took effective measures to enhance weather and flood forecasting and early warning for disaster prevention and mitigation, including (1) readiness preparation for support water pump, truck etc.; (2) improving the forecasting by using flood modelling and AI technology; (3) using internet and video conference for communication under COVID-19 pandemic; and (4) developing dashboard information for monitoring and publishing on official websites.





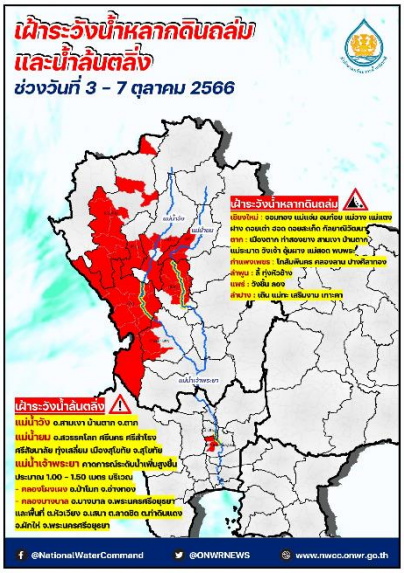




Using models to analyse and predict situation trends at the time of crisis. For example, there were

1) The monsoon cross over the Northern, North eastern and Central regions, together with low pressure areas covering Northeast between September 17 – 21, 2023.

2) A strong low-pressure have occurred at the central of South China Sea together with, the strong southwest monsoon between September 26 – 29, 2023. Therefore, a flood risk map has been prepared and warnings have been made for related agencies and people in risk areas in order to deal with the water crisis.



Identified opportunities/ challenges, if any, for further development or collaboration:

1. **Challenges**: ONWR collect data from many agencies and each agency has a large amount of data and various types of telemetry and standards.

2. **Opportunities**: Relevant agencies will be able to access essential information, real time data and forecast results on this website for monitoring water situation and warning for coming water crisis in a timely manner.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.

- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

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5. Knowledge enhancement for monitoring weather and developing water management plan for storm situations.

Main Text:
ONWR had developed potential on the prediction of climate change impacts, urbanization and other activities of humans, regarding vulnerabilities of flooding cause by storm. By promoting weather knowledge and application of meteorological data in order to evaluate, analyze, and predict the water situation. The participants in this training included representatives from related agencies such as RID, DWR, HII, EGAT, and DDPM. Supporting the knowledge by experts from Thai Meteorological Department.

Knowledge enhancement

Identified opportunities/ challenges, if any, for further development or collaboration:

1. Thai Meteorological Department shared weather and storm situations. To enhance the agency to have a basic understanding of meteorology, to use in monitoring, evaluating, analyzing, targeting risk areas. Also used to notify related agencies and people in risk areas for advance preparation.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Meteorology

- Enhance training activities with TRCG, WGH, and WGDRR in accordance with Typhoon Committee forecast competency, knowledge sharing, and exchange of latest development and new techniques.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.

DRR

- Enhance Members' disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

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6. Installation of telemeters to collect air quality and weather data

Main Text:
Department of Disaster Prevention and Mitigation (DDPM), Thailand has installed instruments for measuring and recording weather data or "telemeters" at 555 points in risk-prone areas of Thailand in order to enhance the capability of weather monitoring and to collect data for pre-assessment of flood situation for analysing and warning of disasters to the people through various channels of DDPM Thailand accurately, quickly and comprehensively. The related agencies responsible for disaster prevention and mitigation and people can follow weather information in areas where telemeters are installed through the application called "DPM Alert" and can share information received from telemeters to government agencies that also need the information. The installed telemeters can collect air quality and weather data as follows:

1. Able to measure small dust particles including PM 2.5 and PM 10
2. Able to display information including air pressure, relative humidity, rainfall, temperature, wind speed and wind direction.

Examples of installed telemeters

Identified opportunities/ challenges, if any, for further development or collaboration:

1. The purpose of installing telemeters by DDPM Thailand is to fulfil gaps or areas where telemeters have not been installed yet by other related agencies. This can benefit both government agencies and people in terms of more accurate and faster information they can get especially an early warning of disasters such as flooding.

2. Sometimes, it takes time to get required information in case that if it is not available in the open sources such as official websites. Or even it is available, it is sometimes quite hard to find the information we need. Thus, all the information holders should cooperate or do the agreements/MOUs on the information sharing.

Priority Areas Addressed:

<u>Integrated</u>

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Strengthen cross-cutting activities among working groups in the Committee.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.
- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

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7. Development of information system to support analysis and decision making or the Decision Support System (DSS)

Main Text:
Department of Disaster Prevention and Mitigation (DDPM), Thailand has developed the information system to support analysis and decision making or the Decision Support System (DSS) consisting of a large data warehouse to support a decision making on early warnings in Thailand. By improving the model of disaster forecast analysis system to cover DDPM Thailand's missions with accuracy, precision and speed at the local level, this can be used as supporting information for early warnings and management decisions. DDPM Thailand is now working on monitoring, analysing, predicting and managing of disaster warnings according to the open government data guidelines.

Meeting to develop a “Decision Support System (DSS)”

Identified opportunities/ challenges, if any, for further development or collaboration:

1. The DSS is based on a machine-learning system, so it takes time for collecting data (at least a year) to improve the accuracy, precision and speed of the DSS.

2. At this time, the system is under development. Then, the result is still not as accurate as expected which leads to a lack of confident among operating officers. Therefore, when the system is more stable and reliable which can be fully implemented. It is a challenge to persuade operating officers to use the system.

Priority Areas Addressed:

<u>Integrated</u>

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

<u>Hydrology</u>

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.

- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.

DRR
- Enhance Members' disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

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8. Implementation of the Cell Broadcast System (CBS) to enhance the warning capacity to the public

Main Text:
Department of Disaster Prevention and Mitigation (DDPM), Thailand has been implementing the Cell Broadcast System (CBS) to increase the efficiency of the disaster warning system. The CBS is a system that allows for widespread disaster warning through the mobile phone networks in a specific area in just seconds. It uses a special channel separated from a normal channel which ensures stable signal and no congestion in network signal and data transmission. People do not need to download any applications and no additional fees will be charged. Moreover, it is also secure and maintains the privacy of its users. At present, DDPM Thailand has coordinated with Office of The National Broadcasting and Telecommunications Commission (NBTC), related public and private sectors such as Thai Meteorological Department (TMD), National Hydroinformatics Data Center (NHC), Royal Irrigation Department (RID), Office of the National Water Resources (ONWR), National Telecom Public Company Limited (NT) and leading mobile network service providers in order to jointly determine the guidelines for using the CBS as another channel for disaster warning to

the public and enhancing Thailand's disaster warning system to be unified and standardized.

Meeting with True Corporation Public Company Limited, Thailand's leading mobile network service provider regarding an implementation of the CBS

Identified opportunities/ challenges, if any, for further development or collaboration:

1. The most important challenge is to determine the Standard Operating Procedure (SOP) for disaster warning to a public. In other words, how to make the public believe and act on the advice given.

2. The hardest job is to create the awareness and right perspective of people when they get the messages about disaster warning which advise or instruct them to act something such as a preparedness for evacuation. In case that the situation is not happened as forecasted. The people should think that it is good or better than if the situation is actually happened, not to accuse the government of providing false or wrong information.

Priority Areas Addressed:

<u>Integrated</u>

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Strengthen cross-cutting activities among working groups in the Committee.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Increase capacity in utilization of advanced science and technology for typhoon-related flood forecasting, early warning, and management.

DRR

- Enhance Members' disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

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