Mekong River Commission

Weekly Dry Season Situation Report in the Lower Mekong River Basin

16-22 May 2023

Prepared by
The Regional Flood and Drought Management Centre
23 May 2023

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Key Messages

Key messages for this weekly report are presented below.

Rainfall and its forecast

- During May 16-22, rainfall was observed from Paksane to Pakse station and from Stung Treng to Tan Chau and Chau Doc along the Mekong River, which considered low.

- There will be moderate average rainfall for the next 7 days over the Mekong region from 23 to 29 May 2023.

Water level and its forecast

- The MRC's observed water level (WL) at Jinghong showed an increased level from 535.23 m to 536.32 during 16-22 May 2023. The outflow increased from 827.00 m^3/s to 1,610.00 m^3/s between 16 and 22 May 2023.
- Regardless the increased outflow at Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand went down about 0.07 m during the reporting period and stayed 0.84 m below its LTA, considered low. WLs at the monitoring stations at Chiang Khan in Thailand decreased about 0.07 m, staying 1.22 m below its LTA value, while at Vientiane in Lao PDR it increased about 0.43 m and stayed about 0.39 m below its LTA value. The current WL at Nong Khai in Thailand was about 1.47 m lower than its LTA value, while at Paksane in Lao PDR it was about 1.04 m lower than its LTA level, which considered low water level. WLs from Thailand's Nakhon Phanom to Savannakhet increased between 0.04 m and 0.37 m, while at Khong Chiam and Pakse decreased about 0.06 m. WLs at these stations are staying lower than their LTA value, considered low levels. Water levels from the stretches of the river at Stung Treng are remaining close with its LTA value, while at Kratie in Cambodia, moreover, is slightly lower than its LTA value due to contributed inflows and some rainfall from the upstream part (at Pakse and 3S area in Viet Nam). WL at Kompong Cham is about 1.21 m lower than its LTA value.
- The water volume of the Tonle Sap Lake was lower than its LTA (about 85%) during the same period from 16 to 22 May 2023, considered normal.
- The current water levels for most of the stations are below their LTA value, except at Luang Prabang. WLs at the 2 tidal stations at Tan Chau and Chau Doc fluctuated between their LTA and minimum values, during this monitoring period.
- Over the next seven days, the water levels across most monitoring stations are expected to go up and will stay close to their long-term average value in most stations.

Drought condition and its forecast

- During May 15-21, the LMB was facing some moderate and severe droughts mainly in the central area covering Loei, Nong Bua Lamphu, Udon Thani, Chaiyaphum, Khon Kaen, Maha Sarakham, Nakhon Ratchasima, Burirum, Surin, Nong Khai, Sakon Nakhon, Sakeo, and Nakhon Phanom in Thailand and Ordar Meanchey, Banteay Meanchey,

Battambang, and Pursat of Cambodia. The situation was similar to that of last week during May 8-14.

- In **May** the middle and lower parts of the LMB will likely receive below average rainfall with moderate drought condition. **June** is forecasted to be normal where the region receives average rainfall, in general. And lastly, the LMB is mostly like really wet in **July** forecast except slightly below average rainfall in southern Cambodia in the lower part.

1 Introduction

This Weekly Dry Season Situation Report presents a preliminary analysis of the weekly hydrological situation in the Lower Mekong River Basin (LMB) for **16-22 May 2023**. The trend and outlook for water levels are also presented.

This analysis is based on the daily hydro-meteorological data provided by the Mekong River Commission (MRC) Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – and on satellite data. Water level indicated in this report refers to an above zero gauge of each station.

The report covers the following topics that are updated weekly:

- General weather patterns, including rainfall patterns over the LMB
- Water levels in the LMB, including in the Tonle Sap
- Flash flood and drought situation in the LMB
- Weather, water level and flash flood forecast, and
- Possible implications.

Mekong River water levels are updated daily and can be accessed from:
http://ffw.mrcmekong.org/bulletin_wet.php.

Drought monitoring and forecasting information is available at:
http://droughtforecast.mrcmekong.org

Flash flood information is accessible at: http://ffw.mrcmekong.org/ffg.php

2 General Weather Patterns

The weather outlook bulletins for three months (May, June and July) and the weather maps issued by the Thai Meteorological Department (TMD) were used to verify weather conditions in the LMB.

Since the end of April 2022, the warm and hot weather has appeared because the influentially high-pressure air mass areas prevail over the LMB, with gradually decreasing water levels in both mainstream and tributaries. The data from the TMD predict that low pressure of air-mass will continue with warm weather condition in the upper part of Thailand, Lao PDR and Viet Nam. As a result, the temperature in the upper part of Thailand will rise sharply as commonly warm and hot weather, specifically at the upper portion of the northern and north-eastern parts together with very hot weather in mountainous areas (within the Mekong region).

Figure 1 presents the weather map during 15-17 May 2023, indicating that a high-pressure cell was active in the East-Sea of Viet Nam, but did not impact the LMB. Generally, the Mekong region was influenced by the southwest monsoon wind following the tropical storm activity in Bay of Bengal a week before, and there is also low-pressure cell active over southern China. Under this weather condition, there was moderate to heavy rainfall occurred locally over most part of Cambodia, Vientiane area of Lao PDR, and northern Viet Nam.

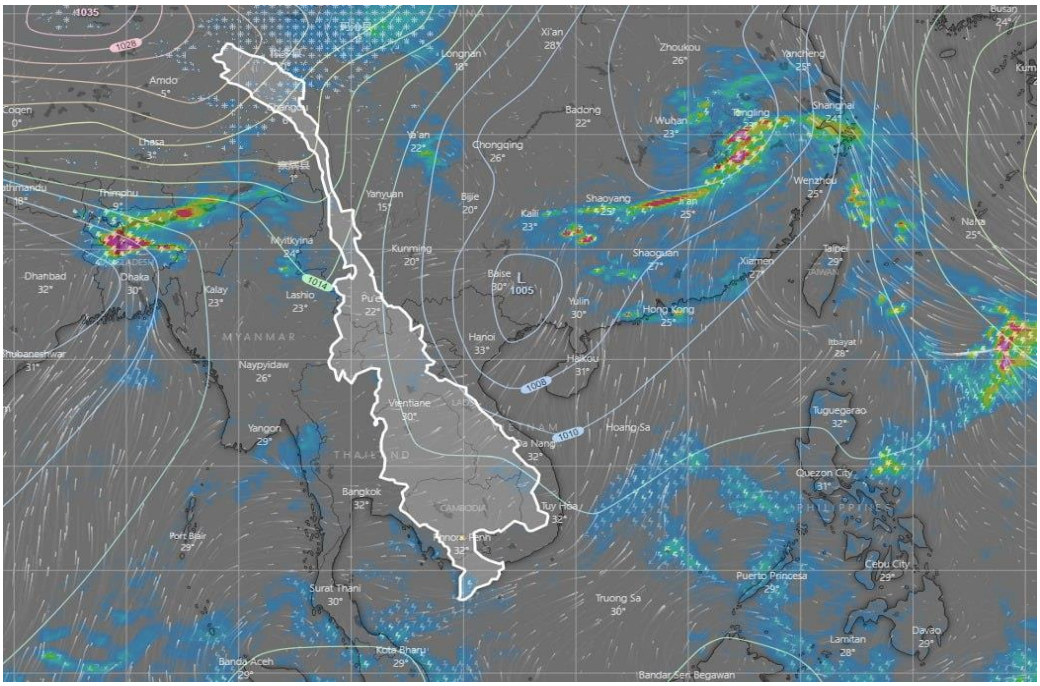


Figure 1: Summary of weather conditions over the LMB.

According to the ASEAN Specialised Meteorological Centre (ASMC), a highest probability of drier condition is predicted over the lower part of the Mekong region covering Lao PDR and Thailand from 15 to 28 May 2023. **Figure 2** shows the outlook of weather condition from 15 to 28 May 2023 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

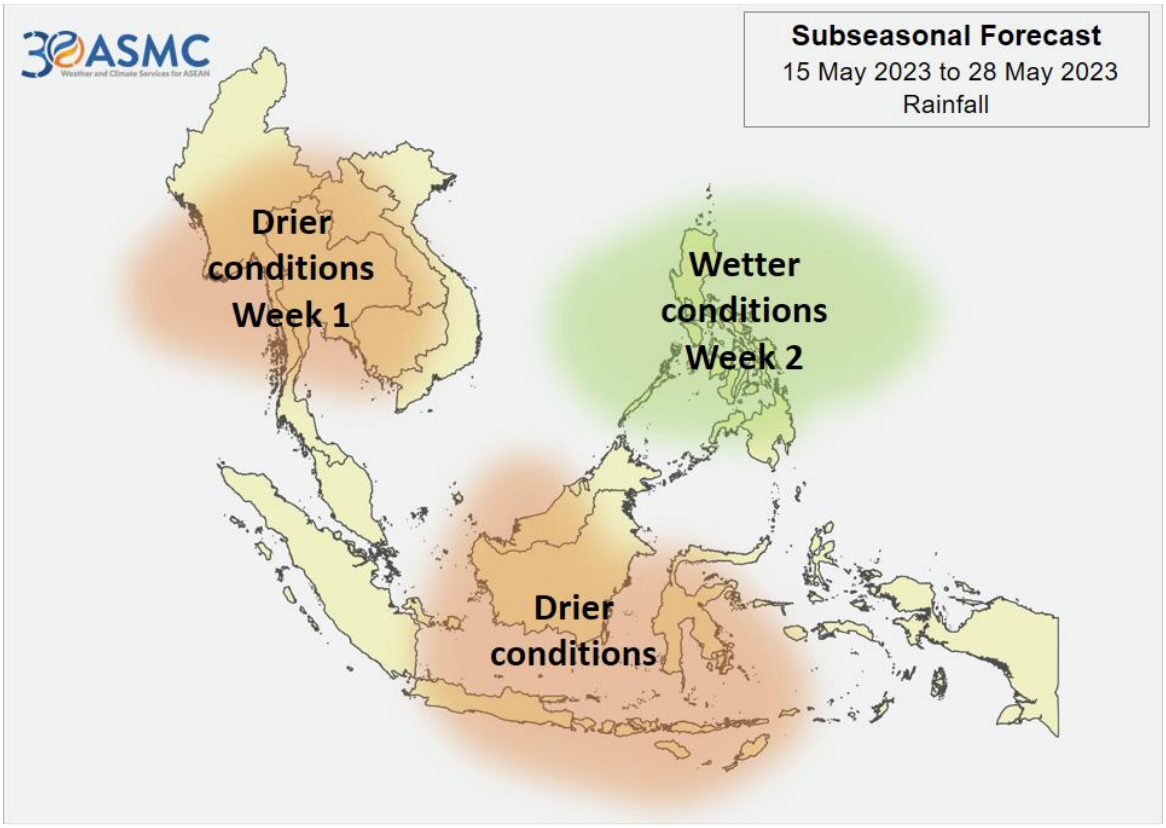


Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.

Tropical depressions (TD), tropical storms (TS) and typhoons (TY)

There was a tracking storm covering the LMB during 16-22 May 2023, showing no low-pressure line over the LMB. No movement of storm was detected over Viet Nam, as displayed in Figure 3.

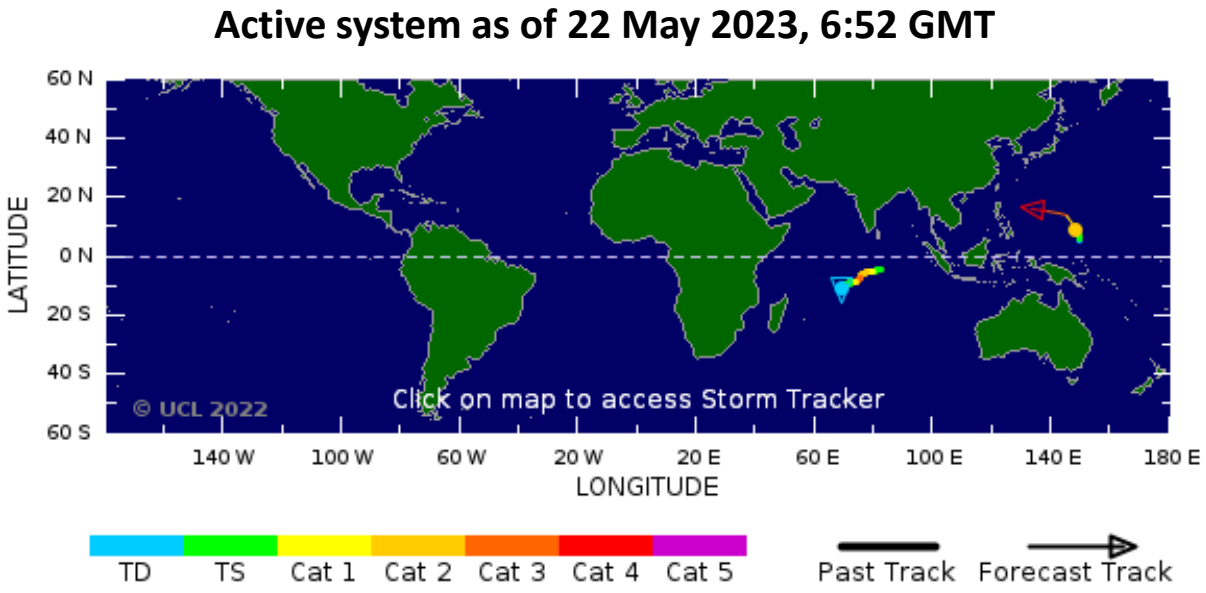


Figure 3: No tropical storm risk observed on 22 May 2023.

Rainfall patterns over the LMB

This week from 16 to 22 May 2023, rainfall was observed from Paksane to Pakse, and from Stung Treng in Cambodia to Tan Chau and Chau Doc in Viet Nam, along the Mekong River of the Lower Mekong Basin (LMB). The highest rainfall was about 29.30 mm at Chaktomuk in Cambodia. The total rainfall of this week report in the Mekong region compared with last week and its long-term-average (LTA) is showed in Figure 4.

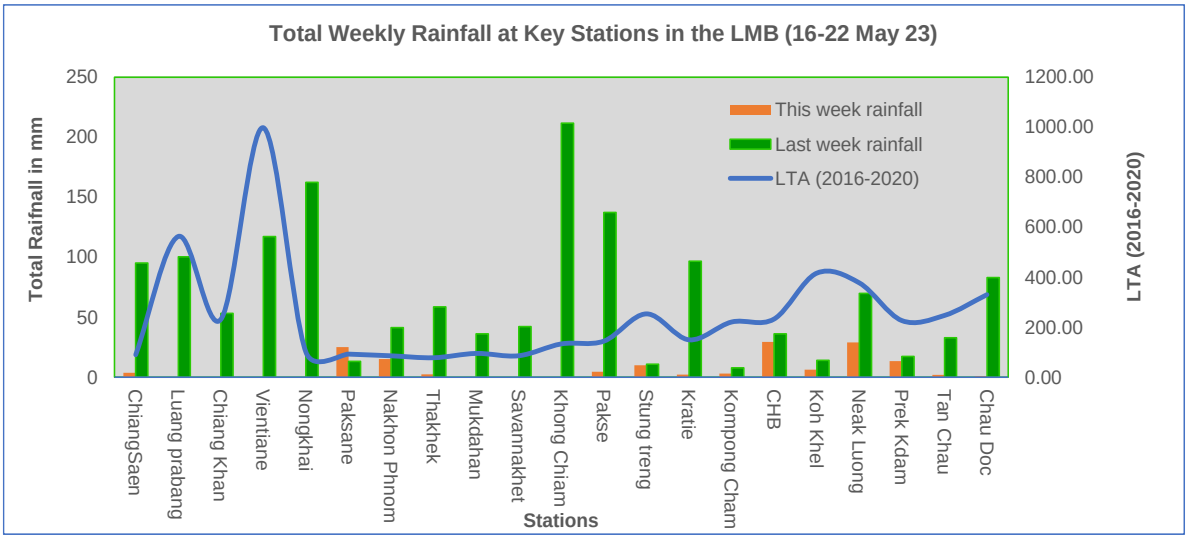


Figure 4: Weekly total rainfall at key stations in the LMB.

To verify area rainfall distribution, Figure 5 shows a map of the weekly accumulated rainfall based on the observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 16 to 22 May 2023.

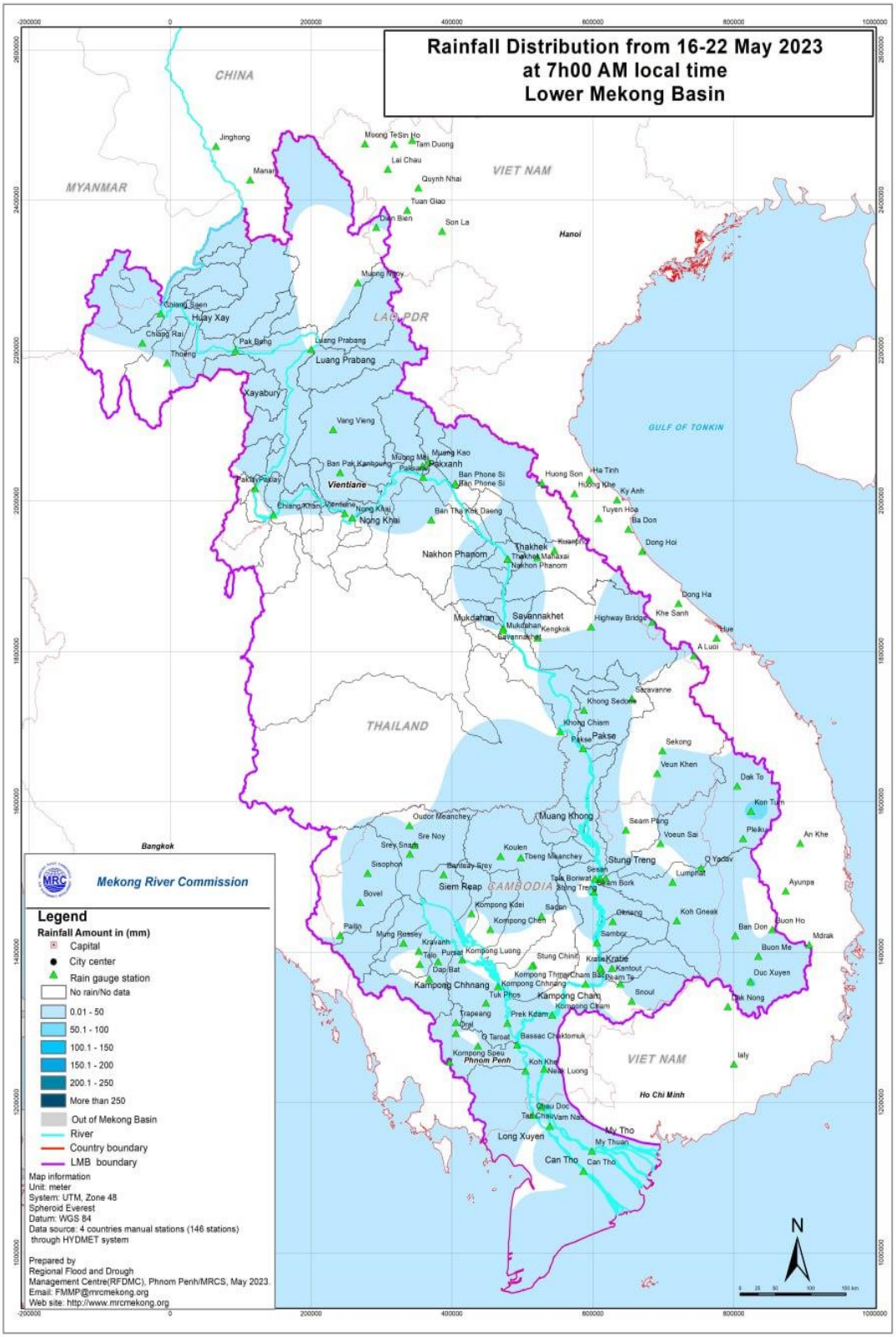


Figure 5: Weekly rainfall distribution over the LMB.

3 Water Levels in the Lower Mekong River

The hydrological regimes of the Mekong mainstream are illustrated by recorded water levels and flows at key mainstream stations: at Chiang Saen to capture mainstream flows entering from the Upper Mekong Basin (UMB); at Vientiane to present flows generated by climate conditions in the upper part of the LMB; at Pakse to investigate flows influenced by inflows from the larger Mekong tributaries; at Kratie in Cambodia to capture overall flows of the Mekong Basin; and at Viet Nam's Tan Chau and Chau Doc to monitor flows to the Delta.

The key stations along the LMB and their respective model application for River Flood Forecasting during the wet season from June to October and River Monitoring during the dry season from November to May are presented in Figure 6. The hydrograph for each key station is available from the MRC's River Flood Forecasting: http://ffw.mrcmekong.org/overview.php. The weekly water levels and rainfall at each key station are summarised in **Annex A**.

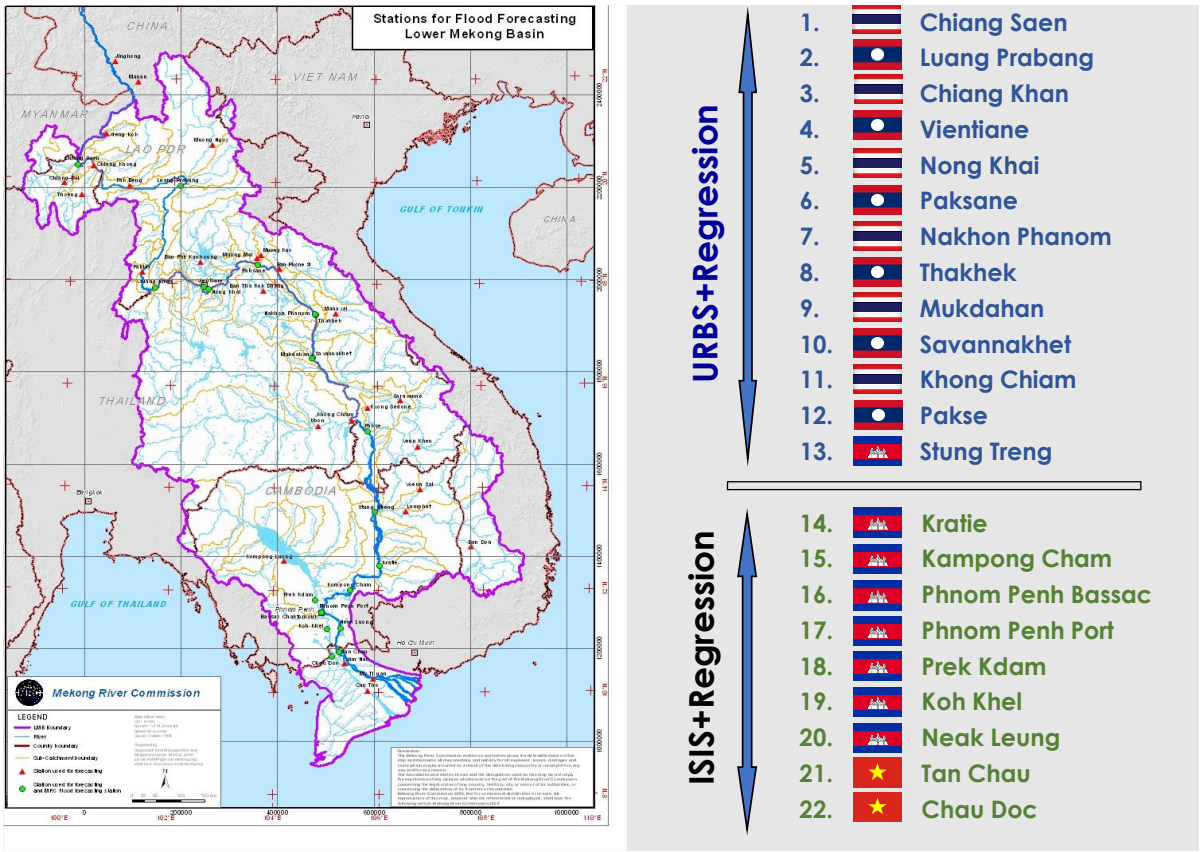


Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.

The MRC's observed water level (WL) at Jinghong showed significantly increased about 1.09 m from 535.23 m to 536.32 m from 16 to 22 May 2023 (recorded on 7:00 am). The outflow increased from 827.00 m^3/s to 1,610.00 m^3/s between 16 and 22 May 2023.

Figure 7 below presents water level that decreased at the Jinghong hydrological station[1], indicating the trend of fluctuating water level up to 22 May 2023.

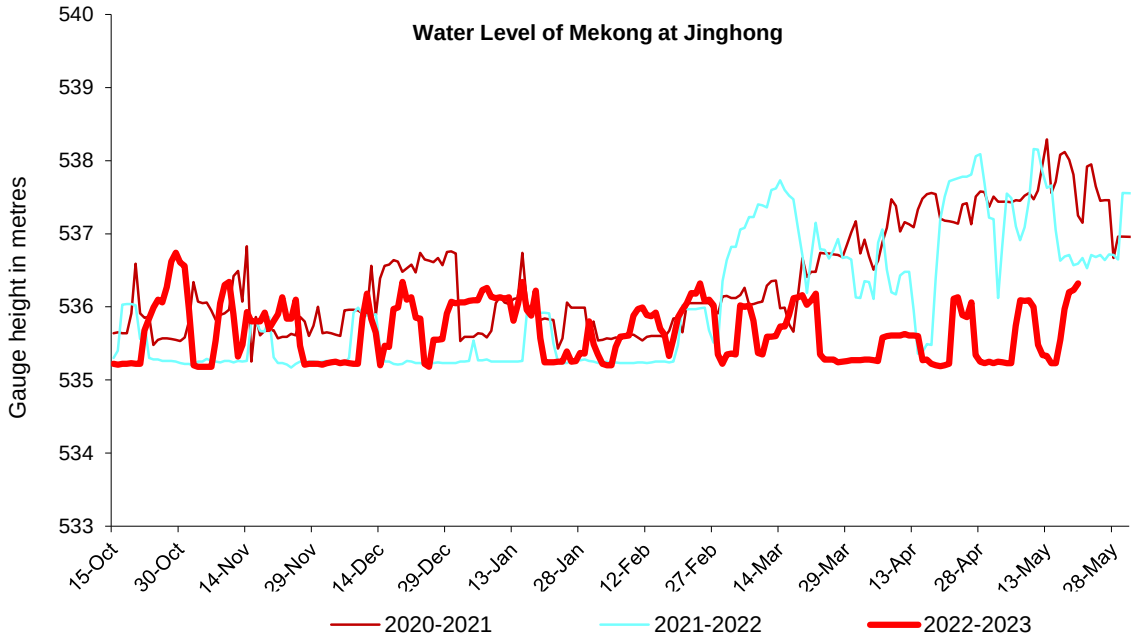


Figure 7. Water level at the Jinghong hydrological station during 16-22 May 2023.

Regardless the increased outflow from Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand decreased 0.03 m from 16 to 22 May 2023 and stayed about 0.84 m lower than its long-term average (LTA), which considered low level. WLs at the monitoring station at Chiang Khan in Thailand decreased about 0.07 m but stayed 1.22 m lower than its LTA, while at Vientiane in Lao PDR it increased about 0.43 m and stayed about 0.39 m below its LTA value, considered low water levels. The current WLs at Nong Khai in Thailand, moreover, increased 0.60 m but still stayed 1.47 m lower than its LTA, while at Paksane in Lao PDR it increased about 0.40 m and stayed 1.04 m lower than its LTA value. WLs at these stations were considered low. Water levels from Nakhon Phanom in Thailand to Savannakhet increased between 0.04 m and 0.37 m, while WLs at Khong Chiam in Thailand and Pakse in Lao PDR decreased about 0.05 m. WLs at these stations are staying below their LTA value, considered low levels. Water levels from the stretches of the river from Stung Treng to Kratie in Cambodia were decreasing by 0.11 m and 0.29 m respectively. The water levels at Kompong Cham increased about 0.02 m due to inflow and some rainfall from the upstream part. WLs at Stung Treng stayed about 0.44 m lower than its LTA value and at Kratie it was 0.63 m lower than its LTA value. WL at Kompong Cham was about 1.21 m lower than its LTA value.

Based on hydrological phenomenon, the contribution of inflow water from the upstream of Lancang-Mekong in China to the Mekong mainstream is about 16% in total during the wet season from June to October and about 25% in total during the dry season from November to

[1] Near-real time data of hydro-meteorological monitoring at the Jinghong hydrological station is available at https://portal.mrcmekong.org/monitoring/river-monitoring-telemetry.

May. The whole inflow of water into the LMB is influenced by rainfall at the Mekong mainstream and its tributaries during the wet season.

Chiang Saen and Luang Prabang

Water level during 16-22 May 2023 at Thailand's Chiang Saen decreased from 2.29 m to 2.26 m, staying about 0.84 m lower than its Long-Term-Average (LTA), which is considered low level. When compared to last week, this week's water level is relatively lower.

Water level at the Luang Prabang station in Lao PDR decreased from 9.20 m to 9.00 m, during the reporting period. Compared to last week, the figure shows it is down about 0.20 m. The water level at this station was 2.72 m higher than its LTA value and staying about 0.71 m below its historical maximum value. The water levels at Chiang Saen and Luang Prabang are shown in Figure 8 below.

Being situated between the upstream (Nam Beng, Nam Ou, Nam Suong, and Nam Khan) and downstream (Xayaburi) hydropower dams, the Luang Prabang station has a unique characteristic as it is influenced by the operations of all its surrounding dams. **Thus, the water level at this station can possibly change very rapidly during the early dry season**.

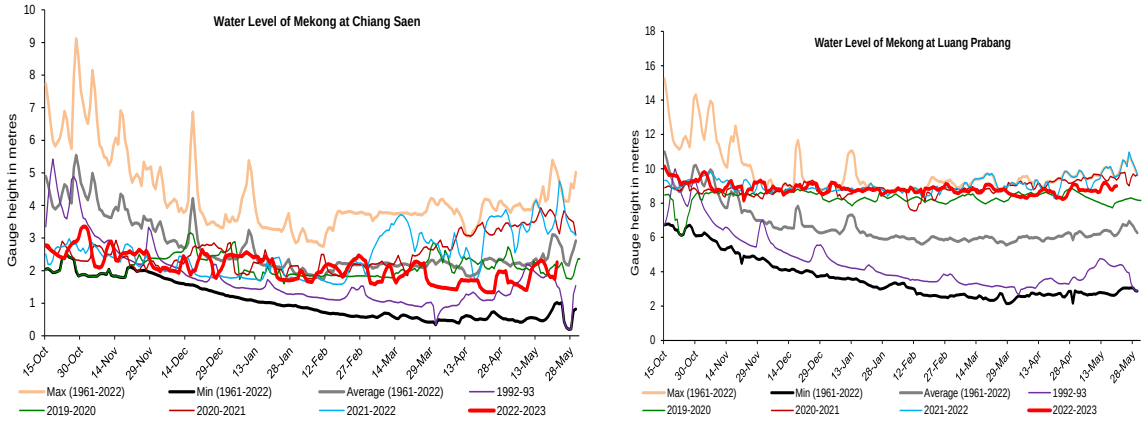


Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of the Xayaburi dam) decreased about 0.07 m, during the reporting week. It still showed 1.22 m below its LTA. However, the water level downstream at Vientiane in Lao PDR still increased from 1.87 m to 2.30 m and stayed about 0.39 m lower than its LTA during 16-22 May 2023. At Nong Khai station in Thailand, the water level increased about 0.60 m during the reporting period. It showed 1.47 m lower than its LTA value, which still considered low water level. At Paksane in Lao PDR, water level increased about 0.41 m staying about 1.04 m lower than its LTA value. The recently increased and decreased water levels were obviously due to rainfall and inflow from upstream and water operation from upstream in the sub-catchment area. The water levels at Vientiane and Paksane are shown in Figure 9 below.

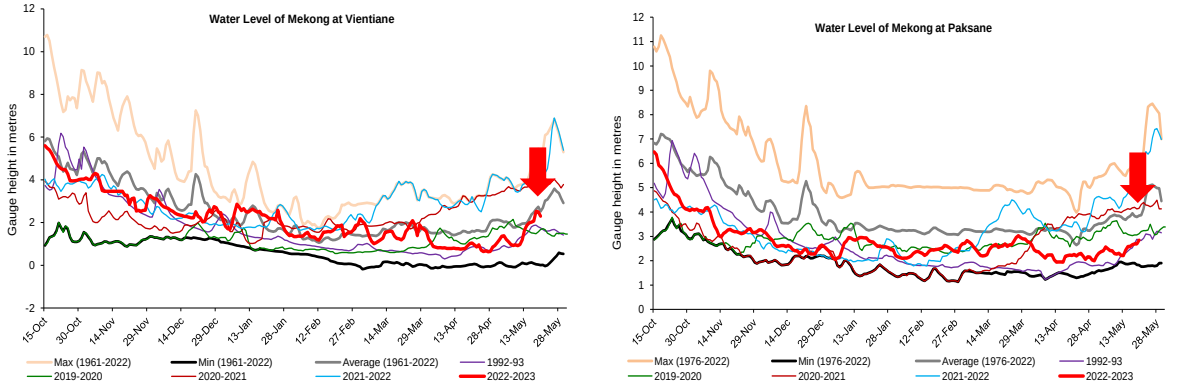


Figure 9. Water levels Vientiane and Paksane in Thailand and Lao PDR.

Nakhon Phanom to Pakse

Moreover, water levels from Nakhon Phanom in Thailand to Savannakhet in Lao PDR increased between 0.04 and 0.37 m, while at Khong Chiam in Thailand and Pakse in Lao PDR decreased about 0.05 m. Water levels for most of the stations are staying lower to their LTA levels which considered low water levels. Figure 10 shows the water levels at Nakhon Phanom and Pakse stations.

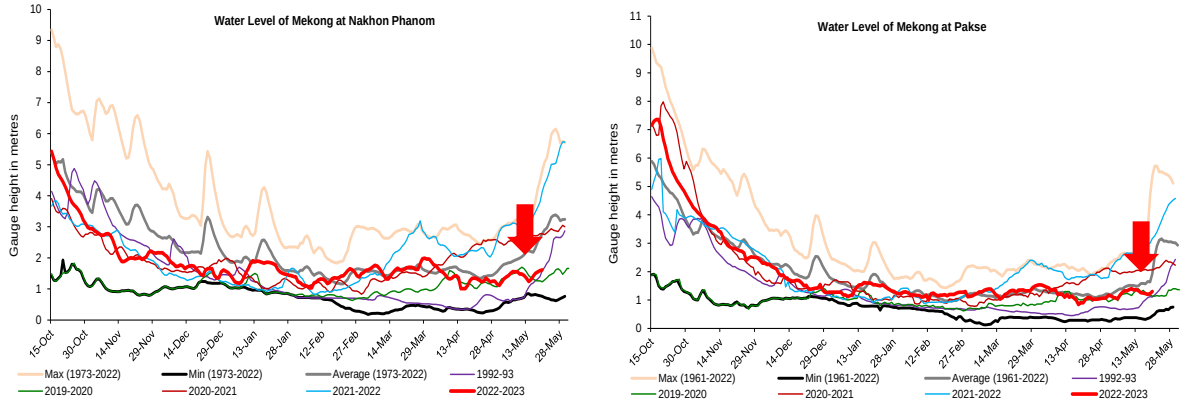


Figure 10: Water levels at Nakhon Phanom and Savannakhet of Thailand and Lao PDR.

Stung Treng to Kompong Cham/Phnom Penh to Koh Khel/Neak Luong

Due to the fact that there was influence from the upstream's rainfall of the Mekong River and the 3S river (Sekong, Se San, and Sre Pok), the water levels from Stung Treng to Kratie in Cambodia kept decreasing during 16-22 May 2023, respectively. The water level at Stung Treng decreased about 0.11 m, while at Kratie it decreased about 0.29 m. Water levels at Stung Treng is staying about 0.41 m lower than its LTA value and at Kratie is about 0.63 m lower than its LTA value. Water levels at these two stations were considered low at the end of May in the dry season 2023 (as showed in Figure 11).

This week, the water levels at Kompong Cham were up about 0.02 m and stayed 1.21 m below its LTA value, which considered low.

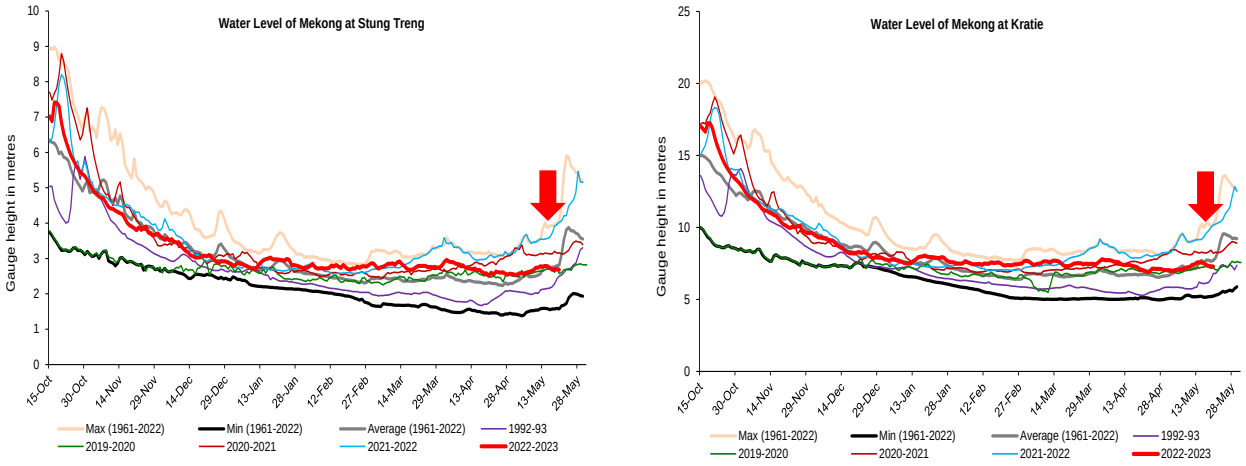


Figure 11: Water levels at Stung Treng and Kratie on the Mekong River.

At Chaktomuk on the Bassac River, the water level was down by about 0.11 m and stayed 0.76 m lower than its LTA value; while at Koh Khel, water level increased about 0.04 m, staying 0.67 m lower than its LTA value. It was observed that the WLs at Koh Khel and Neak Luong were affected by tidal from downstream stations of Tan Chau and Chau Doc in Viet Nam, during the dry season period. However, water level at Prek Kdam on the Tonle Sap Lake increased about 0.13 m and stayed 0.56 m lower than its LTA value. The water level at the Tonle Sap Lake (observed at Kompong Luong) was similar to Prek Kdam station's water level. The recently increased water level was due to some rain and inflow contributed from upstream of the Tonle Sap Lake area during the reporting period. The water level at the Tonle Sap Lake (observed at Kompong Luong) followed the same trend of Prek Kdam station's water level. **Water levels at these stations were mostly staying lower than their LTA level, which still considered low water level**.

Tidal stations at Tan Chau and Chau Doc

Like last week, the water levels from 16 to 22 May 2023 at Viet Nam's Tan Chau and Chau Doc were fluctuating between their LTA and minimum values due to daily tidal effects from the sea. The fluctuated levels were between -0.20 m and 0.78 m, which were lower than their LTA level. In Tan Chau and Chau Doc, the fluctuation of water levels at these stations were lower than their minimum level, which **considered critical**.

The Tonle Sap Flow

At the end of the wet season, when water levels along the Mekong River subside, the outflows of the Tonle Sap Lake return to the Mekong River and then to the Delta. This phenomenon normally takes place between September and October. Based on flow observation at Prek Kdam, the outflow of the Tonle Sap Lake took place since 29 October 2022.
The flows of the Tonle Sap Lake were calculated based on a formula of rating-curves using by different water levels at Kompong Luong and Phnom Penh Port for slop and Prek Kdam as cross-section of the Lake. The formula of flows at the Tonle Sap Lake is as follows:

Flows = (WL at Prek Kdam)^1.2*SQRT (WL difference between PP port and Kampong Luong)

Where, WL is water level in m (msl).

Figure 12 shows the seasonal changes of the inflow/reverse flow and the outflow of the TSL at Prek Kdam in comparison with the flows of 2020, 2021 and 2022, and their LTA level (1997-2022). Up to May 22 of this reporting period, **it was observed that the main outflow to Tonle Sap Lake decreased due to less rainfall and inflows from upstream**. This decreased outflow of Tonle Sap Lake was most likely caused by less inflows and rainfall from the catchment area. Up to this date, the outflow from the Tonle Sap Lake condition in 2022 is higher than 2020, 2021 and 2022 outflow conditions. It is noted that the outflow of dry season in 2023 is still slightly lower than its LTA. For next week, rainfall is forecasted for the Tonle Sap area; thus, the outflow into the Tonle Sap Lake is likely to slightly increase from the current level.

Figure 13 shows seasonal changes in monthly flow volumes up to 22 May 2023 for the Lake compared with the volumes in 2020, 2021, 2022 and their LTA, and the fluctuation levels (1997–2021). It shows that up to 22 May 2023, **the water volume of the Tonle Sap Lake was staying slightly lower than its LTA (about 85 %) and higher than 2020, 2021, 2022 during the same period**. The figure is displayed in Table 1, which indicates that the Tonle Sap Lake has been affected by water levels from the Mekong River, the tributaries, and rainfall in the surrounding sub-catchments and ***considered normal***.

This demonstrates the influence of the relationships between the reverse flows, water levels of the Mekong River, inflows from tributaries, and the flow direction in the complex hydraulic environment of the Tonle Sap Lake during the wet and dry seasons. The data show that about half of the annual inflow volume into the Tonle Sap Lake has originated from the Mekong mainstream. Thus, flow alterations in the mainstream could have direct impact on the Tonle Sap Lake water levels and on its hydrology.

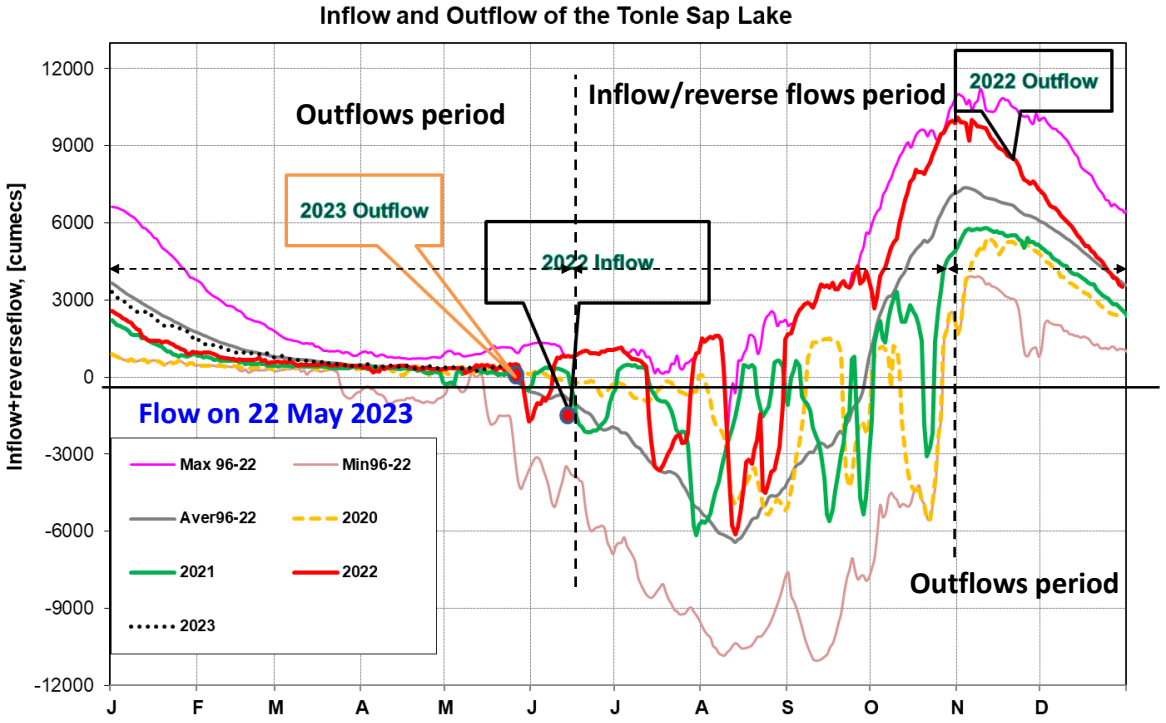


Figure 12: Seasonal change of inflows and outflows of Tonle Sap Lake.

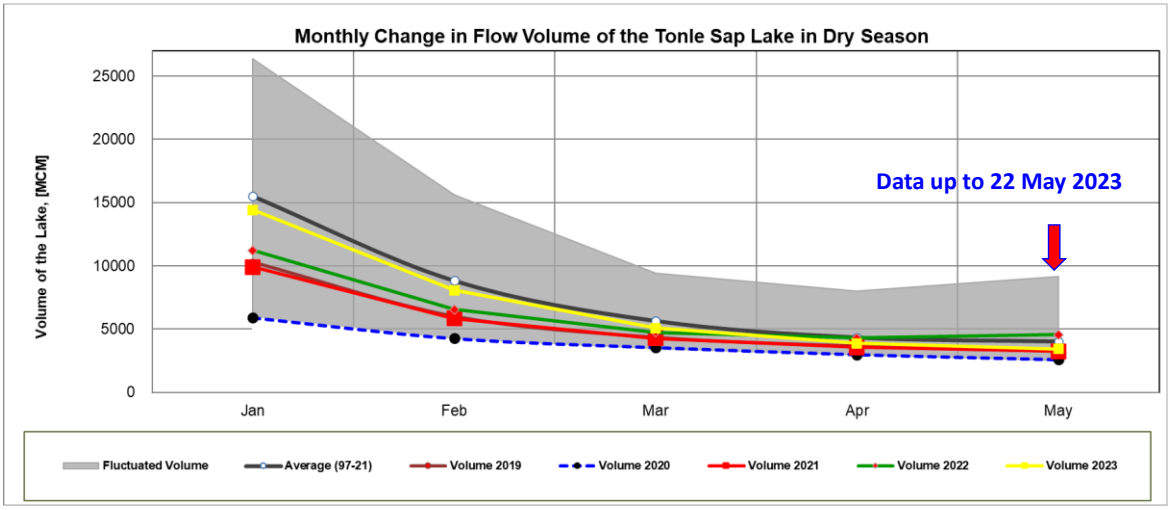


Figure 13. The seasonal change in monthly flow volume of Tonle Sap Lake.

Table 1. The monthly change in the flow volume of Tonle Sap Lake.

Month	LTA (97-22) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]	Volume 2022 [MCM]	Volume 2023 [MCM]	Volume in 2023 [%], compared with its LTA
Jan	15523.23	26357.53	5906.80	10285.31	5906.80	9923.80	11214.32	14422.11	92.91
Feb	8837.89	15596.22	4198.60	6019.30	4264.19	5832.97	6558.79	8069.29	91.30
Mar	5654.18	9438.24	3347.07	4354.62	3553.99	4264.88	4736.52	5080.64	89.86
Apr	4346.65	8009.14	2866.91	3667.47	2992.61	3556.68	4288.31	3884.16	89.36
May	4030.23	9176.93	2417.81	3266.43	2594.92	3240.78	4556.83	3422.03	84.91
Jun	5708.30	13635.01	2468.70	3517.06	2641.88	3798.29	7489.04		
Jul	11493.25	28599.56	2925.86	4001.99	2925.86	5346.73	9703.79		
Aug	24666.69	39015.12	4433.46	7622.71	5941.07	10547.80	19554.70		
Sep	39634.03	65632.35	12105.31	24194.19	12105.31	16382.34	32860.34		
Oct	46873.44	73757.23	19705.50	30358.38	20799.13	27318.21	48199.12		
Nov	37823.16	60367.33	18534.61	19112.65	27546.80	28982.93	39452.53		
Dec	25126.11	38888.95	10563.49	10577.29	18251.65	20170.76	25346.65		
	Critical situation, comapred with historical Min values								
	Normal condition, compared with LTA (Long term average)								
	Low volume situation, comapred with LTA values								
Unit: Million Cubic Meter (1 MCM= 0.001 Km^3)					LTA: Long-Term-Average				

4 Flash Flood in the Lower Mekong Basin

During the weekly monitoring period from May 09 to 15, the LMB was affected by two main weather factors being (1) the heat low-pressure system which affected the LMB and (2) the southwest monsoon prevailed over the Gulf of Thailand and the lower part of LMB. These conditions caused light to heavy rain and isolated thundershowers in some areas of the LMB.

According to the MRC-Flash Flood Guidance System (MRC-FFGS) and analysis, flash flood events were not detected during the reporting period over the LMB.

5 Drought Monitoring in the Lower Mekong Basin

Weekly drought monitoring from 15 to 21 May 2023

Drought monitoring data for 2023 are available from Monday to Sunday every week; thus, the reporting period is normally delayed by one day compared to Flood and Flash Flood reports. We adopt the Index of Soil Water Fraction (ISWF) data obtained from FFGS to represent soil moisture of agricultural indicator for both dry and wet seasons.

- **Weekly Standardised Precipitation Index (SPI1)**

Meteorological drought condition of the LMB from May 15 to 21, as shown in Figure 11, was relatively dry in the central area due to much below average rainfall during the monitoring week. The map shows that the LMB was covered by moderate and severe droughts in some areas of the upper, most areas of the central, and some areas of the lower parts of the region. Those droughts covered Phongsaly, Oudomxay, Xayaburi, Vientiane, Loei, Nong Bue Lamphu, Udon Thani, Nong Khai, Sakon Nakhon, Nakhon Phanom, Khammuane, Mukdahan, Savannakhet, Kalasin, Khon Kaen, Chaiyaphum, Nakhon Ratchasima, Burirum, Surin, Maha Sarakham, Roi Et, Yasothon, Amnat Charoen, Saravane, Ubon Ratchathani, Si Saket, Otdar Meanchey, Banteay Meanchey, Sakeo, Battambang, Pursat, Kampong Thom, Kampong Chhnang, Kampong Speu, Preah Vihear, Stung Treng, Kampong Cham, Kratie, Raranakiri, Kampot, Ca Mau, Dak Lak, and Attapeu.

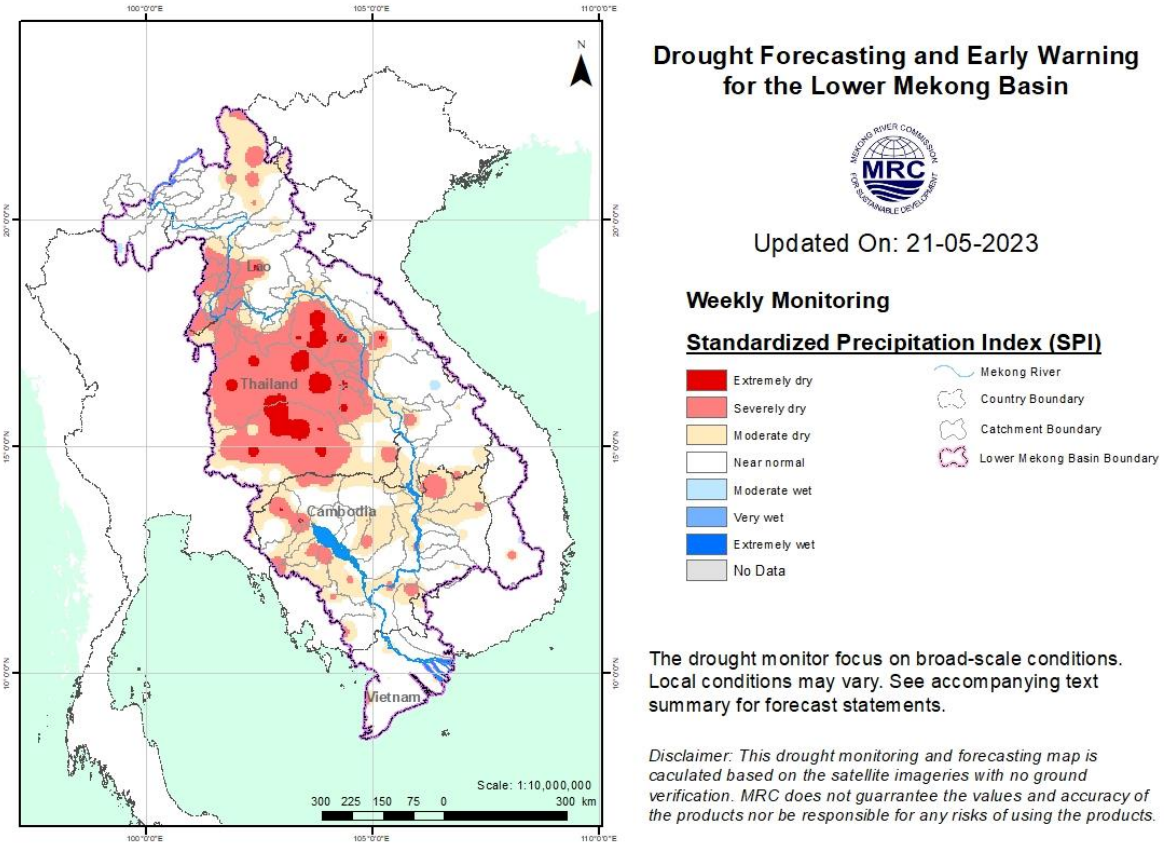


Figure 14: Weekly standardised precipitation index from May 15 to 21.

- **Weekly Index of Soil Water Fraction (ISWF)**

Soil moisture condition from May 15 to 21, as displayed in Figure 12, were normal in most parts of the LMB except moderately and severely dry in some areas in the middle part which covered Burirum, Surin, Otdar Meanchey, Banteay Meanchey, Battambang, and Sakeo. The situation was much better than the previous weeks.

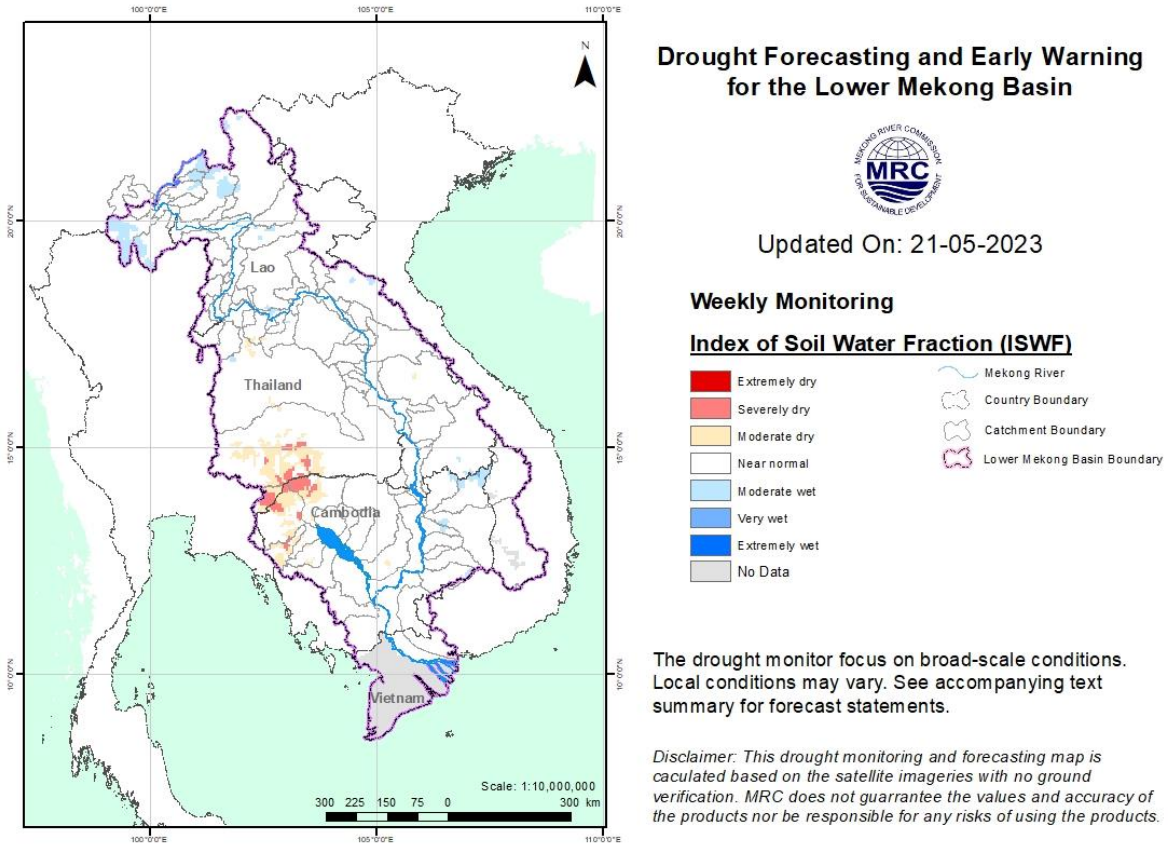


Figure 15: Weekly Index of Soil Water Fraction from May 15 to 21.

- **Weekly Combined Drought Index (CDI)**

With a wetter condition of soil moisture during May 15-21, the combined drought indicator in Figure 13 shows that the LMB was facing some moderate and severe droughts mainly in the central area covering Loei, Nong Bua Lamphu, Udon Thani, Chaiyaphum, Khon Kaen, Maha Sarakham, Nakhon Ratchasima, Burirum, Surin, Nong Khai, Sakon Nakhon, Sakeo, and Nakhon Phanom in Thailand and Ordar Meanchey, Banteay Meanchey, Battambang, and Pursat of Cambodia. The situation was similar to that of last week during May 8-14.

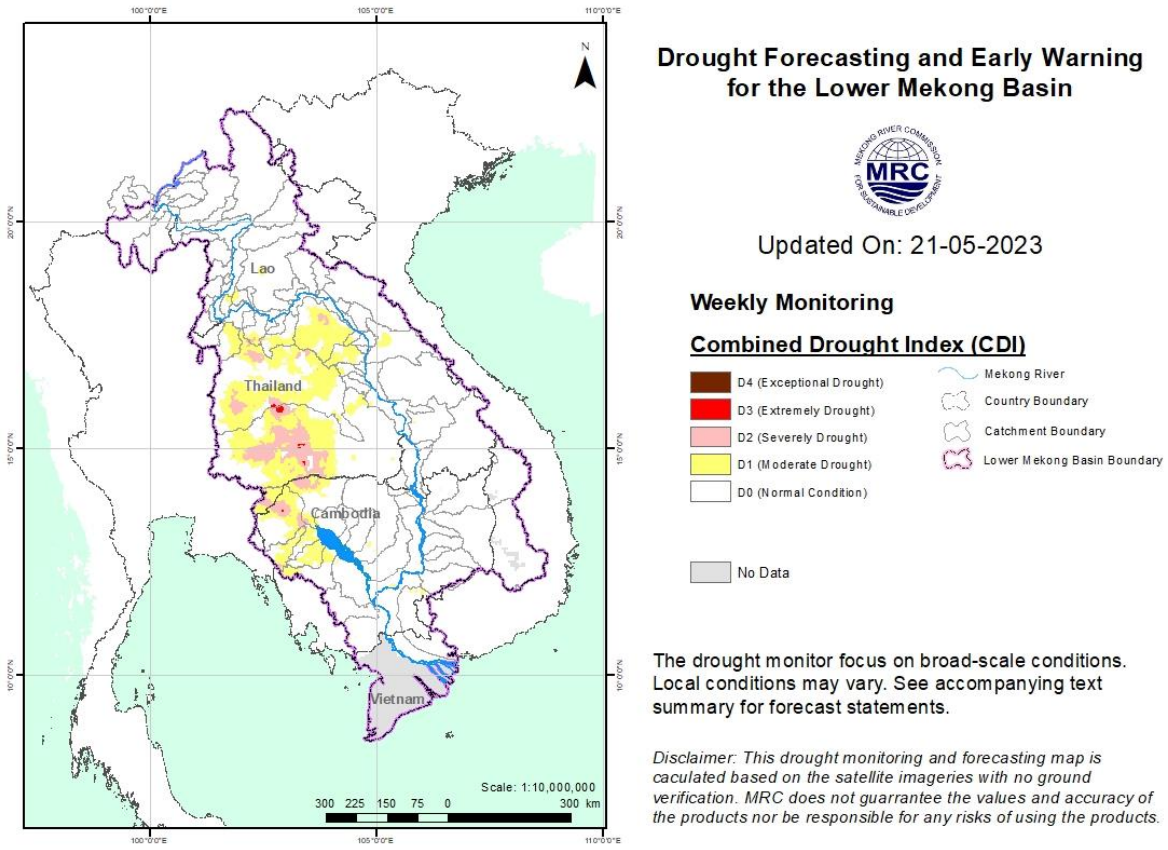


Figure 16: Weekly Combined Drought Index duing May 15-21.

More information on Drought Forecasting and Early Warning (DFEW) as well as the explanation is available here: http://droughtforecast.mrcmekong.org/templates/view/our-product. DFEW provides not only weekly monitoring and forecasting information but also a three-month forecast of drought indicators with seasonal outlook which are updated every month based on international weather forecast models. Details on drought forecast are described in section 6.4 of this report.

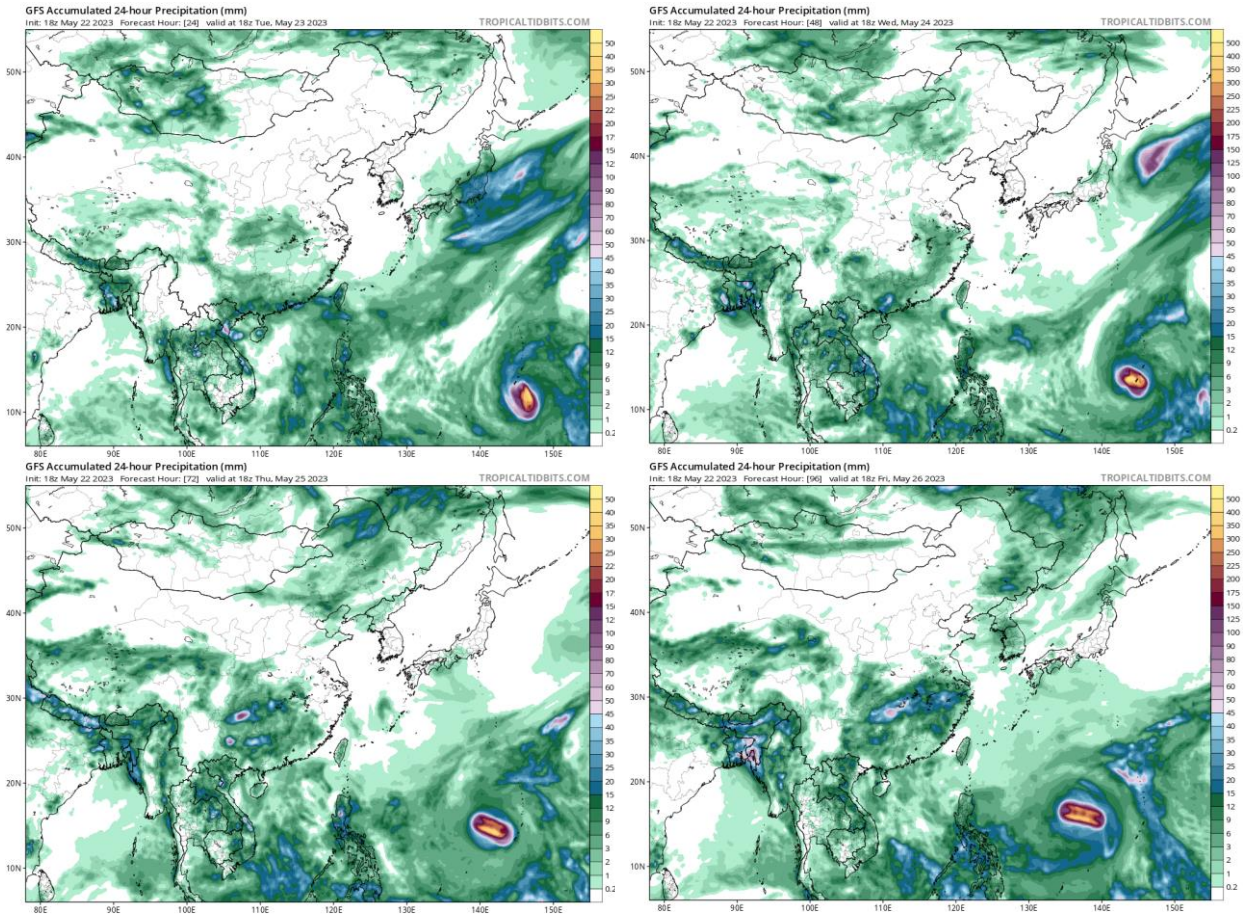
6 Weather and Water Level Forecast and Flash Flood Information

6.1 Weather and rainfall forecast

Based on the result of the Global Forecast System (GFS) model, the heat low-pressure system is likely covering almost the entire LMB from May 23 to 29. In particularly, the southwest monsoon is likely strengthening together with the low-pressure cell over the East Sea and prevailing over the middle and lower parts of LMB from May 27 to 29.

Under the weather forecast patterns for the next coming week, light to moderate rain (5-40 mm/24h) and isolated thundershowers are likely taking place in some areas of the LMB. Especially, heavy rain (40-65mm/24h) will occur in some areas of the lower part of LMB during May 27-29.

Figure 17 shows accumulated rainfall forecast (24hrs) of the GFS model during May 23-29, 2023.



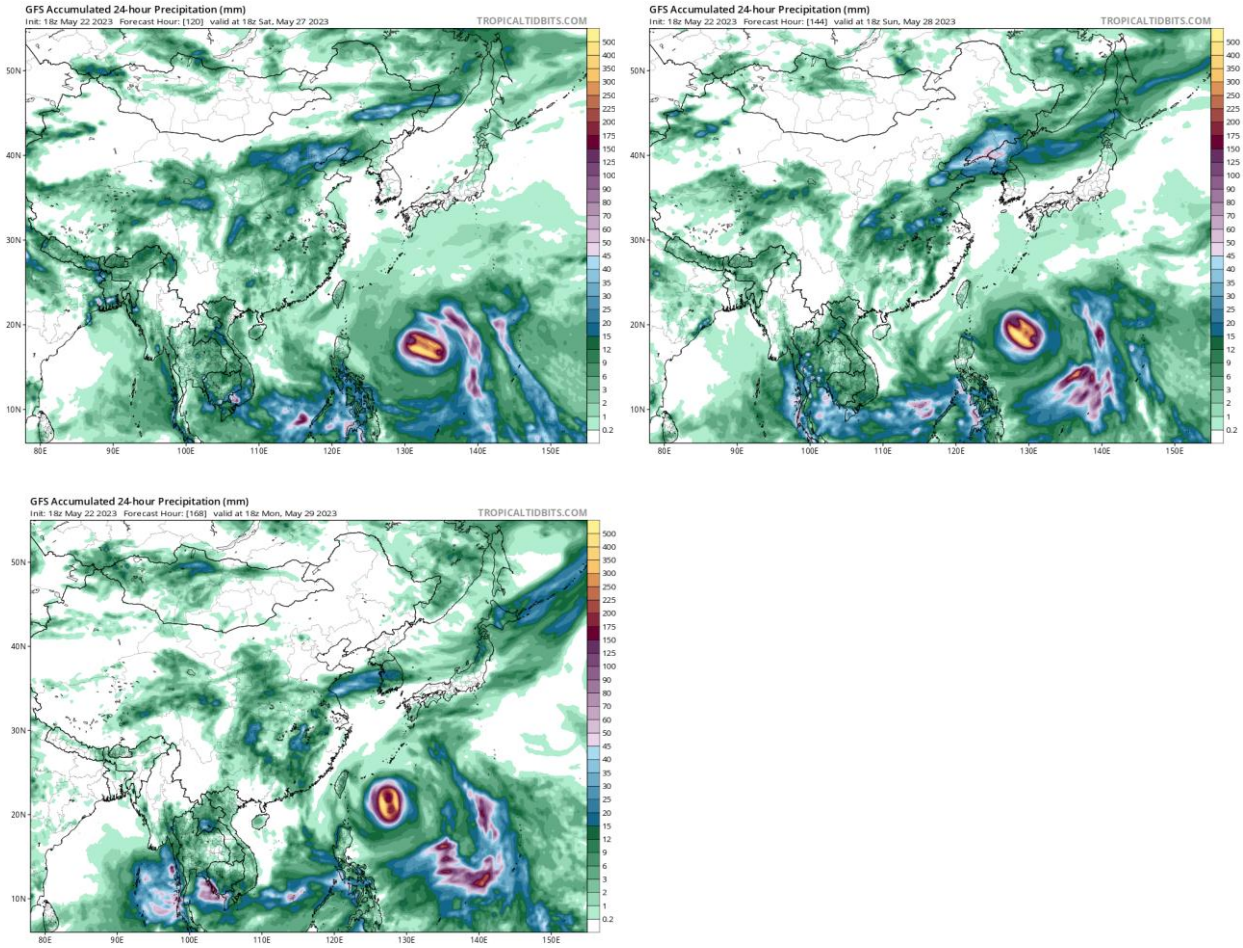


Figure 17: Accumulated rainfall forecast (24 hrs) of model GFS.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on May 22's weekly river monitoring bulletin, the weekly forecast water level at Chiang Saen in Thailand is expected to decrease from 2.26 m to 2.22 m in the next seven days. The trend of water levels at these stations will continue staying below its LTA. Next week some precipitation is forecasted in the area.

For Luang Prabang in Lao PDR, the water level is likely increasing about 0.40 m during the same period. The current water level is about 2.72 m higher than its LTA and staying about 0.71 m lower than its historical maximum value. Next week some precipitation is forecasted in the area.

Chiang Khan, Vientiane-Nong Khai and Paksane

Water level at Chiang Khan station in Thailand is forecasted to be stable at 4.20 m for the next seven days. At Vientiane in Lao PDR and Nong Khai in Thailand WLs will be down by about 0.10 m in the next seven days. At Paksane in Lao PDR, water level will increase about 0.10 m due to some effect of inflows from the upper catchments. Rainfalls are forecasted in the area due

to air pressure dominating in the upper sub-catchments. The water levels here will remain lower than their LTA.

Nakhon Phanom to Pakse

Water levels from Nakhon Phanom in Thailand to Savannakhet in Lao PDR will increase between 0.03 and 0.32 m, and from Khong Chiam in Thailand to Pakse in Lao PDR will decrease about 0.15 m. Water levels at these stations will stay lower than their LTA level. Next week some precipitation is forecasted in the area.

Stung Treng to Kompong Cham/Phnom Penh to Koh Khel/Neak Luong

From Stung Treng on the Mekong River in Cambodia, the water level will likely go up about 0.03 m, while at Kratie it will be up about 0.06 m over the next seven days. For Kompong Cham, the WL will be up about 0.05 m and stay below than its LTA. Some rainfall is forecasted for the area between Stung Treng and Kompong Cham during next week.

The water levels of the Tonle Sap Lake at Prek Kdam and Phnom Penh Port as well as at Phnom Penh's Chaktomuk on the Bassac River will up between 0.05 m and 0.22 m over the next seven days.

Water levels at more than half of the stations will continue to stay lower than their LTA value, particularly in the lower part of the region from the Bassac in Phnom Penh to Koh Khel as well as from Tonle Sap in Prek Kdam to Phnom Penh Port, including the Tonle Sap Lake. Rainfall is forecasted for the low-lying area of Cambodia next week.

Tidal stations at Tan Chau and Chau Doc

For Viet Nam's Tan Chau on the Mekong River and Chau Doc on the Bassac River, water levels will be moving up between their LTA and maximum values following daily tidal effects from the sea.

Table 3 shows the weekly River Monitoring Bulletin issued on May 22. Results of the started weekly river monitoring bulletin are also available at http://ffw.mrcmekong.org/bulletin_wet.php. Tables for weekly updated water levels and rainfall at the Key Stations are presented in **Annex A**.

6.3 Flash Flood Information

Flash flood events are not likely to happen in the LMB next week. However, local heavy rain in a short period of time might still be possible with unexpected short flash floods. During the dry season if extreme weather occurs, the information on flash flood guidance for the next one, three, and six hours is updated at http://ffw.mrcmekong.org/ffg.php.

Further detailed information on Flash Flood Information Warning, as well as on its explanation, is available for download here.

6.4 Drought forecast

There are several climate-prediction models with different scenarios in the upcoming months. The MRC's DFEWS adopts an ensemble model called the North America Multi-Model Ensemble (NMME).

Figure 18 below shows the global NMME forecast of rainfall for May, June and July 2023 over the LMB area.

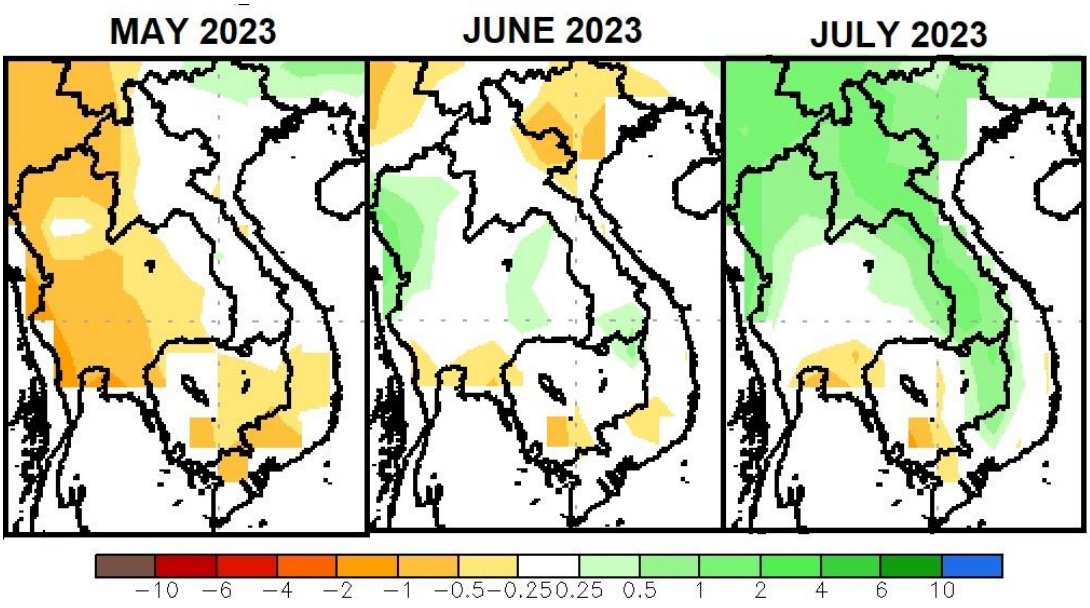


Figure 18. Monthly forecast of SPI for Mar, Apr, and May 2023.

Figure 18 above shows that in **May** the middle and lower parts of the LMB will receive below average rainfall with moderate drought condition. **June** is forecasted to be normal where the region receives average rainfall, in general. And lastly, the LMB is mostly like really wet in **July** forecast except slightly below average rainfall in southern Cambodia in the lower part.

Table 2. Weekly River Monitoring Bulletin.

Mekong Bulletin

Mekong River Commission Secretariat (MRCS)
Regional Flood and Drought Management Centre (RFDMC)
P.O. Box 623 #576, National Road #2, Chak Angre Krom, Meanchey, Phnom Penh, Cambodia
Tel: (855-23) 425353, Fax: (855-23) 425363, Email: floodforecast@mrcmekong.org

Forecast period from: 23 May to 29 May 2023

Date: 22 May 2023

LOCATION	Country	Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Min water level against zero gauge (m)	Observed W. level against zero gauge (m)		Forecasted Water Levels (m)						
		21-May			21-May	22-May	23-May	24-May	25-May	26-May	27-May	28-May	29-May
Jinhong		-	-	-	536.23	536.32							
Chiang Saen		0.0	357.110	0.00	1.74	2.26	2.31	2.40	2.45	2.50	2.42	2.32	2.22
Luang Prabang		0.0	267.195	2.53	8.96	9.00	8.94	9.38	9.42	9.47	9.50	9.53	9.40
Chiang Khan		0.0	194.118	1.91	4.60	4.20	4.00	3.85	4.05	4.10	4.15	4.17	4.20
Vientiane		0.0	158.040	-0.28	2.50	2.30	2.00	1.85	1.73	1.97	2.04	2.12	2.16
Nongkhai		0.0	153.648	0.33	2.00	1.88	1.63	1.53	1.44	1.64	1.70	1.77	1.80
Paksane		0.0	142.125	0.10	2.69	2.84	2.90	2.80	2.73	2.67	2.85	2.89	2.93
Nakhon Phanom		0.0	130.961	0.18	1.59	1.61	1.79	1.87	1.80	1.75	1.70	1.89	1.93
Thakhek		0.0	129.629	1.38	3.26	2.92	2.85	2.91	2.80	2.74	2.67	2.88	2.94
Mukdahan		0.0	124.219	0.72	1.87	1.88	1.80	1.76	1.80	1.75	1.70	1.67	1.89
Savannakhet		0.0	125.410	-0.65	1.47	1.47	1.42	1.40	1.42	1.40	1.37	1.35	1.50
Khong Chiam		0.0	89.030	1.02	2.17	2.20	2.23	2.15	2.11	2.16	2.10	2.04	2.00
Pakse		0.0	86.490	0.03	1.23	1.30	1.33	1.32	1.30	1.33	1.30	1.27	1.25
Stung Treng		nr	36.790	0.32	2.70	2.68	2.73	2.75	2.74	2.72	2.75	2.73	2.70
Kratie		nr	-1.080	3.06	7.29	7.28	7.25	7.30	7.34	7.35	7.32	7.35	7.32
Kompong Cham		nr	-0.930	0.65	2.58	2.56	2.55	2.53	2.57	2.60	2.61	2.59	2.61
Phnom Penh (Bassac)		nr	-1.020	1.58	1.67	1.73	1.76	1.77	1.79	1.81	1.83	1.85	1.87
Phnom Penh Port		-	0.000	0.14	0.32	0.71	0.76	0.78	0.81	0.85	0.87	0.91	0.95
Koh Khel		nr	-1.000	1.52	1.62	1.72	1.75	1.78	1.81	1.83	1.85	1.88	1.90
Neak Luong		nr	-0.330	0.81	0.94	0.95	0.99	1.02	1.04	1.05	1.08	1.10	1.14
Prek Kdam		13.4	0.080	0.58	0.86	0.95	0.98	1.01	1.04	1.07	1.10	1.13	1.16
Tan Chau		nr	0.000	-0.37	0.32	0.00	-0.20	-0.35	-0.40	-0.47	-0.38	-0.19	0.06
Chau Doc		0.9	0.000	-0.60	0.60	-0.20	-0.68	-0.75	-0.80	-0.69	-0.43	-0.20	0.05

REMARKS:

-: not available.
*: reference stations without forecast.
nr: no rain.

River Flood Forecaster

KHEM Sothea

NOTE: Discharge at Luang Prabang may be influenced by hydropower operations (at both upstream and downstream).
For more info, please refer to this link:
http://www.mrcmekong.org/; http://ffw.mrcmekong.org/bulletin_wet.php; http://ffw.mrcmekong.org/reportflood.php

7 Summary and Possible Implications

7.1 Rainfall and its forecast

This week, rainfall was observed from Paksane to Pakse station and from Stung Treng to Tan Chau and Chau Doc along the Mekong River. Compared with last week's amount, the rainfall this week was considered low in the Mekong region.

Based on the forecasted rainfall from satellite using GFS data, some amount of rainfall is forecasted to cover the areas of the lower part from Cambodia to the 3S area and Mekong Delta in Viet Nam from 23 to 31 May 2023. There will be from moderate to extreme rainfall occurring from the central to the southern part of LMB (especially, over Cambodia), central and southern Lao PDR, and Central Viet Nam.

7.2 Water level and its forecast

The MRC's observed water level (WL) at Jinghong showed an increased level from 535.23 m to 536.32 m between 16 and 22 May 2023 (recorded on 7:00 am) while the outflow increased from 827.00 m^3/s to 1,610.00 m^3/s between 16 and 22 May 2023.

Mekong water levels this week remain as normal condition—with 1 out of 22 stations have water levels above their long-term average. In general, this hydrological condition is influenced by the inflows from the upper Mekong River in China and dam operations in the tributaries of the Lower Mekong River Basin.

Stay updated with our river monitoring and forecasting to better prepare for flood and drought events. Find more details at https://www.mrcmekong.org/.

The flow volume of the Tonle Sap Lake is lower than its LTA (about 85%). From next week, the flow is expected to be increasing due to some rainfall is forecasted in the inflow catchments of the Tonle Sap Lake.

From Stung Treng to Kratie, the water levels will most likely go up, while at Kompong Cham they will also go up. The water levels – at Neak Luong on the Mekong River, from Prek Kdam to Phnom Penh Port on the Tonle Sap, and from Chaktomuk to Koh Khel on the Bassac – are forecasted to stay close with their LTA.

The situation in Tan Chau on the Mekong River and Chau Doc on the Bassac River is expected to remain fluctuating. In Tan Chau and Chau Doc, the fluctuation of water levels will move higher than their LTA value during the monitoring period, which would be **considered normal.**

Since the third week of September 2022, water levels across most monitoring stations in the LMB have increased due to the above-average rainfall but still staying lower than their LTA value (from middle to lower stretches within the LMB). The preliminary analysis of the

hydrological conditions in the LMB over July–December 2020 and from November 2020 to May 2021 was done as Situation Report, which can be used as reference for the trend of water level and flows of the Mekong River Basin.

The contribution to the Mekong River's flow from the UMB in China (Yunnan component) is about 16% by the time the river discharges through the Mekong Delta into the Sea. By far the major contribution comes from the two major 'left-bank' (Eastern) tributaries between Vientiane – Nakhon Phanom and Pakse – Stung Treng, which together contribute more than 40% of the flows.

7.3 Flash flood and its trends

With the predicted of rainfall for the coming week as mentioned earlier in section 6.1, major flash floods are not likely to happen in the LMB.

7.4 Drought condition and its forecast

During May 15-21, the LMB was facing some moderate and severe droughts mainly in the central area covering Loei, Nong Bua Lamphu, Udon Thani, Chaiyaphum, Khon Kaen, Maha Sarakham, Nakhon Ratchasima, Burirum, Surin, Nong Khai, Sakon Nakhon, Sakeo, and Nakhon Phanom in Thailand and Ordar Meanchey, Banteay Meanchey, Battambang, and Pursat of Cambodia. The situation was similar to that of last week during May 8-14.

In this **May** the middle and lower parts of the LMB will likely receive below average rainfall with moderate drought conditions. **June** is forecasted to be normal where the region receives average rainfall, in general. And lastly, the LMB is mostly like really wet in **July** forecast except slightly below average rainfall in southern Cambodia in the lower part.

Annex A: Tables for weekly updated water levels and rainfall at the Key Stations

Table A1: Weekly observed water levels

2023	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
16/05/2023	535.23	2.29	9.20	4.27	1.87	1.28	2.43	1.24	2.60	1.69	1.43	2.20	1.33	2.79	7.57	2.54	1.84	0.80	1.68	1.76	0.82	0.63	0.78
17/05/2023	535.23	2.16	9.16	4.36	1.98	1.45	2.58	1.30	2.73	1.63	1.39	2.15	1.26	2.78	7.56	2.60	1.72	0.68	1.65	1.74	0.82	0.94	1.09
18/05/2023	535.55	1.92	9.02	4.81	2.02	1.50	2.59	1.41	2.84	1.68	1.43	2.08	1.25	2.73	7.51	2.62	1.71	0.66	1.66	1.46	0.86	0.96	1.08
19/05/2023	535.97	1.80	8.80	5.13	2.07	1.66	2.66	1.50	3.02	1.77	1.43	2.07	1.23	2.68	7.41	2.62	1.65	0.61	1.65	1.22	0.84	0.80	0.96
20/05/2023	536.20	1.82	8.76	4.92	2.52	1.95	2.69	1.55	2.85	1.84	1.47	2.13	1.20	2.69	7.31	2.60	1.61	0.58	1.65	0.86	0.82	0.64	0.82
21/05/2023	536.23	1.74	8.96	4.60	2.50	2.00	2.69	1.59	3.26	1.87	1.47	2.17	1.23	2.70	7.29	2.58	1.67	0.32	1.62	0.94	0.86	0.32	0.60
22/05/2023	536.32	2.26	9.00	4.20	2.30	1.88	2.84	1.61	2.92	1.88	1.47	2.20	1.30	2.68	7.28	2.56	1.73	0.71	1.72	0.95	0.95	0.00	-0.20

Table A2: Weekly observed rainfall

2023	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
16/05/2023	0	3.7	0	0	0	0	24.2	15.1	2.4	0	0	0	0	5	0	0	0	0	0	0	0	0	0
17/05/2023	0	0	0	0	0	0	0.8	0	0	0	0	0	0	5	2.1	0	0	0	0	0	0	0	0
18/05/2023	0	0	0	0	0	0	0	0	0	0	0	0	4.5	0	0	3	9.8	0	0	0	0	2	0
19/05/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0
20/05/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.2	0	0	0	0
21/05/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19.5	0	0	0	0	0	0
22/05/2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13.4	0	0.9
Sum	0.0	3.7	0.0	0.0	0.0	0.0	25.0	15.1	2.4	0.0	0.0	0.0	4.5	10.0	2.1	3.0	29.3		6.2	29.0	13.4	2.0	0.9

Mekong River Commission Secretariat

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