Mekong River Commission

Weekly Dry Season Situation Report in the Lower Mekong River Basin

04-10 January 2022

Prepared by
The Regional Flood and Drought Management Centre
11 January 2022

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Key Messages

Key messages for this weekly report are presented below.

Rainfall and its forecast

- During 4-10 January 2022, rainfall was observed from Chiang Sean to Luang Prabang in the upper part, Mukdahan in the middle part and from Kompong Cham in Cambodia to Tan Chau and Chau Doc in Viet Nam, varied from 1.4 millimetres (mm) to 107 mm.
- There will be no rain for the next 7 days over the Mekong region from 11 to 17 January 2022 due to there is no any low-pressure line dominating the Mekong region.

Water level and its forecast

- The MRC's observed water level at Jinghong showed a decrease about 0.29 m from 535.54 metres (m) on 4 Jan to 535.25 on 10 Jan 2022 (recorded on 7:00 am), and stayed about 0.89 m lower than its two-year average (2020-2021) value. The outflow at Jinghong station was down from 1,012.93 m^3/s on 4 Jan to 820.21 m^3/s on 10 Jan 2022.
- Along with the slightly decreased outflow from Jinghong upstream, water level (WL) of monitoring station at Chiang Saen in Thailand also decreased about 0.03 m from 4 to 10 Jan 2022 and stayed about 0.31 m lower than its long-term average (LTA), considered critical. However, water level at Lao PDR's Luang Prabang increased about 0.08 m compared with last week and stayed close to its historical maximum value. WLs at the monitoring stations from Chiang Khan to Vientiane in Thailand and Lao PDR decreased about 0.25 m and stayed below their LTA value. The current WLs from Nong Khai in Thailand to Paksane in Lao PDR are lower than their historical minimum level, which considered very critical. WL from Thailand's Nakhon Phanom to Savannakhet in Lao PDR decreased about 0.25 m and continued staying below their LTA level. WL at Savannakhet in Lao PDR dropped and stayed close to its historical minimum level, which considered very critical. Water levels from the stretches of the river from Kratie, Kompong Cham in Cambodia, moreover, were decreasing due to less contributed rainfall from the upstream part (at Pakse and 3S area in Viet Nam).
- The water volume of the Tonle Sap Lake up to 10 Jan 2022 was lower than its LTA but higher than the levels in 2019, 2020 and 2021 during the same period from 4 to 10 January 2022, and still considered critical.
- Over the next seven days, the water levels across most monitoring stations are expected to go down and remain lower than their long-term average value in most stations.

Drought condition and its forecast

- Drought condition of the LMB from 02 to 08 January 2022 was normal all over the LMB except some moderate drought in north-eastern part due to severely dry soil moistures during the beginning of dry season. The region showed no significant threat except some moderate and severe dry soil moistures in the upper and middle parts of the LMB.
- For the upcoming three-month forecast, the LMB is likely to receive average rainfall and under normal conditions in January. In February the region is forecasted to get

some rain in the lower part of the LMB covering mainly Viet Nam. While, in March it is forecasted that the entire LMB will be much wetter than its long-term mean of March mainly over the central and lower parts of the region.

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 **04-10 January 2022**. 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 (January, February and March) and the weather maps issued by the Thai Meteorological Department (TMD) were used to verify weather conditions in the LMB.
Since the end of December 2021, the cold weather has come 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 bring cool 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 drop sharply as commonly chilly weather, specifically at the upper portion of the northern and north-eastern parts together with very cold weather in mountainous areas (within the Mekong region).

Figure 1 presents the weather map of 10 January 2022, showing no any line of low pressure of the Monsoon Trough crossing the upper Mekong region which means no rainfall is forecasted for the next few days over the LMB.

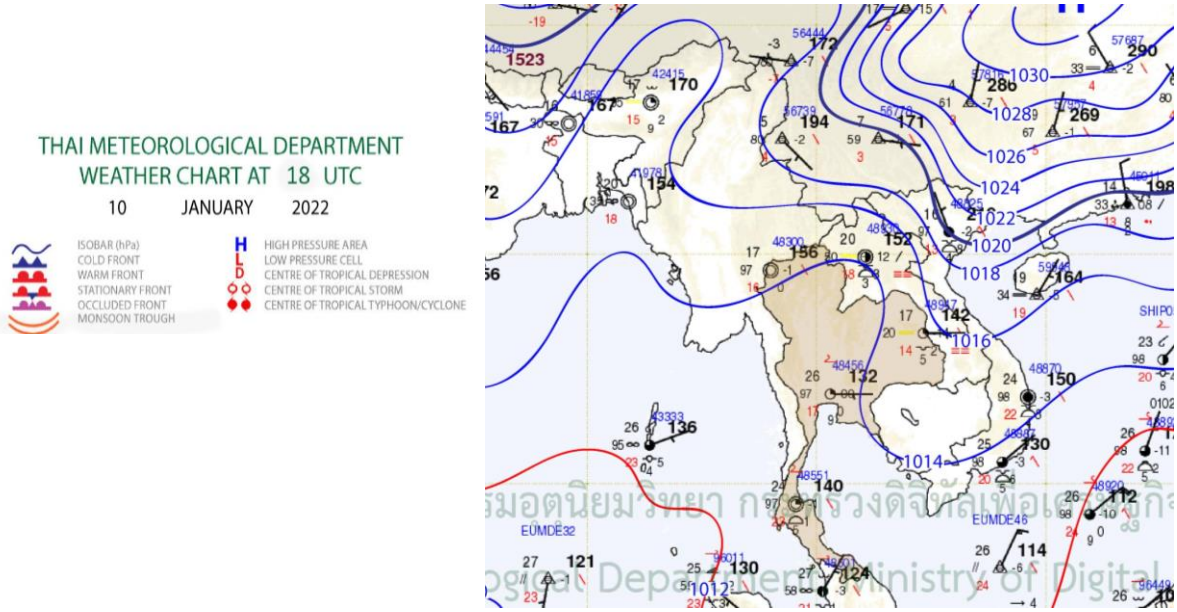


Figure 1: Summary of weather conditions over the LMB.

According to the ASEAN Specialised Meteorological Centre (ASMC), a highest probability of warm conditions is predicted over of the lower part of the Mekong region covering Lao PDR and Thailand from 10 to 23 January 2022, during the 1st and 3rd weeks of January. Moreover, the Mekong region is likely dominated by dry condition, which may bring warmer temperature in general to the Lower part of the LMB. **Figure 2** shows the outlook of weather condition from 10 to 23 January 2022 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

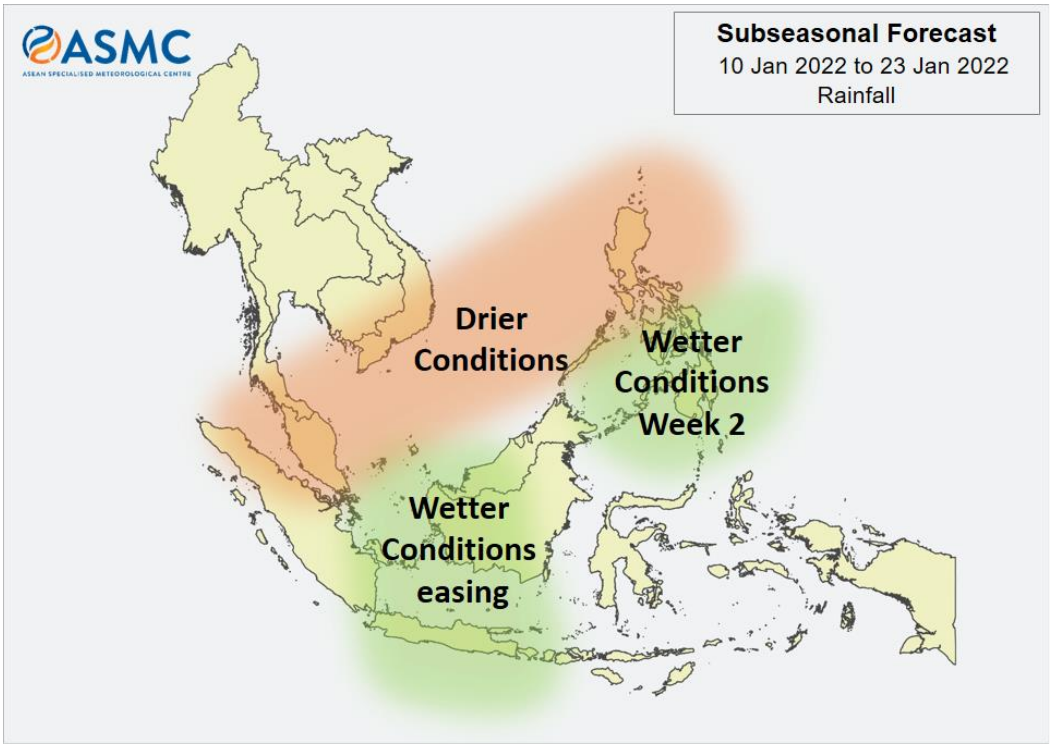


Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.

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

There was no tracking storm covering the LMB during 4-10 January 2022, which no rain in the next few days. No movement of storm was detected over Viet Nam, as displayed in Figure 3.

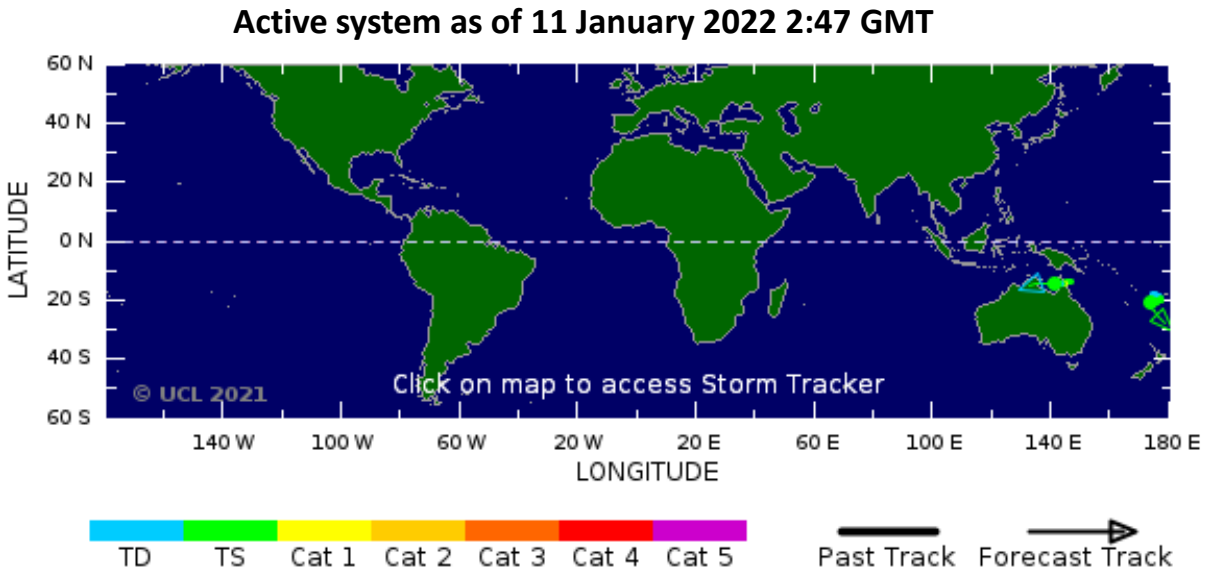


Figure 3: No tropical storm risk observed on 11 January.

Rainfall patterns over the LMB

This week, rainfall observed from Chiang Sean to Luang Prabang in the upper part, Mukdahan in the middle part and from Kompong Cham in Cambodia to Tan Chau and Chau Doc in Viet Nam, varied from 1.4 mm to 107. 00 mm. The rainfall from 4 to 10 January is shown in Figure 4.

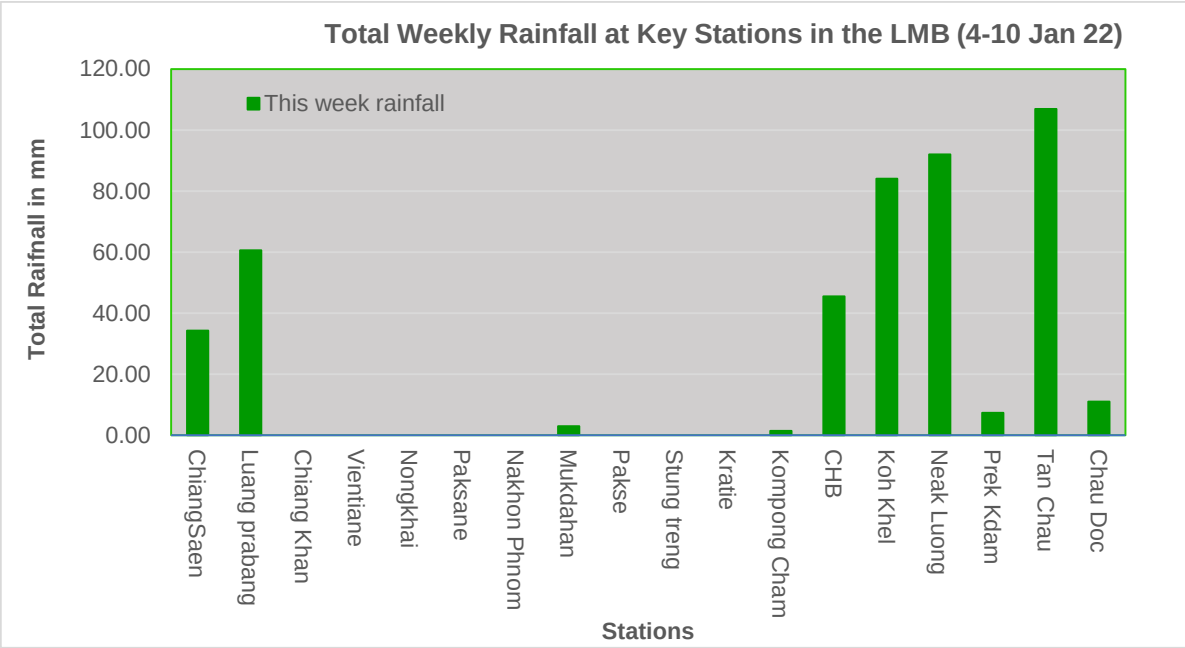


Figure 4: Weekly total rainfall at key stations in the LMB.

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 4 to 10 January 2022.

Absence of rain this week is an indication of the end of the rainy season in the LMB.

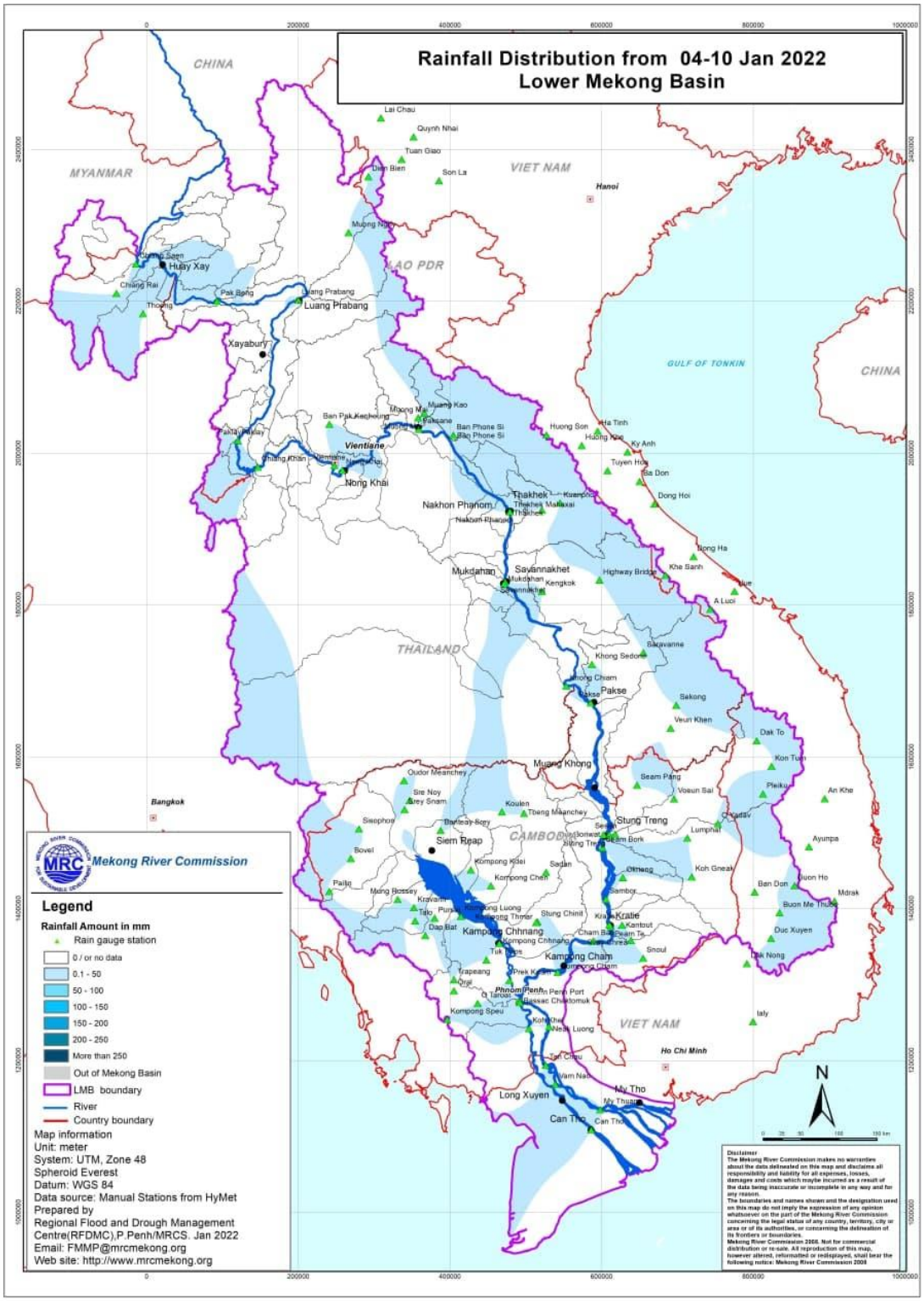


Figure 5: Weekly rainfall distribution over the LMB.

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**.

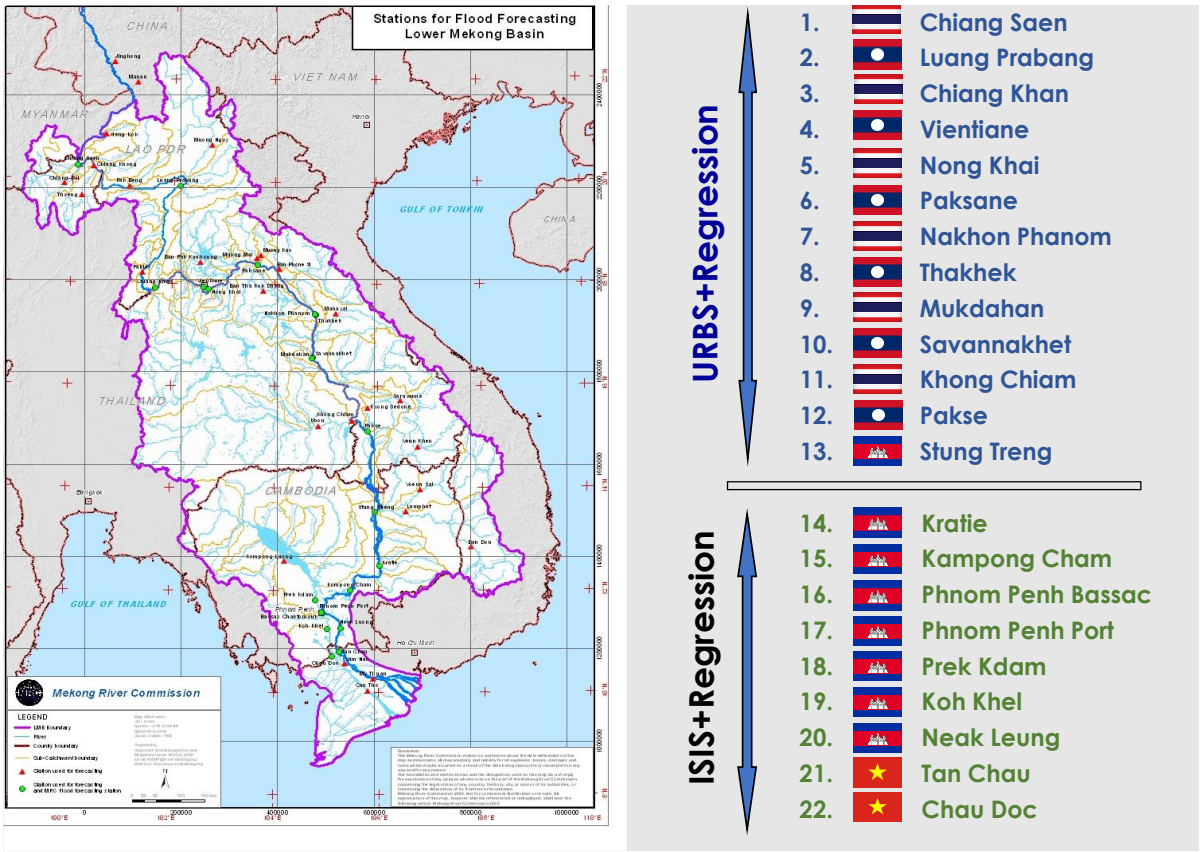


Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.

The MRC's observed water level at Jinghong showed a **decrease about 0.29 m from 535.54 m on 4 Jan to 535.25 on 10 Jan 2022 (recorded on 7:00 am)**, and stayed about 0.89 m lower than its two-year average (2020-2021) value. The Eyes on Earth (Mekong Dam Monitor) Natural Flow Model indicates that 39% of water is missing at the gauge in Chiang Saen, Thailand and just under 48% of water is missing at Vientiane, Lao PDR. Flow restrictions from dams over the course of the last month are the main driver of missing water throughout the mainstream. Three parts of the Mekong are extremely wet for this time of the year: the headwaters in Tibet, the 3S Basin and western Cambodia. The Tonle Sap basin and eastern part of Cambodia are much drier than average. Also, the Mekong Delta was much drier than normal last week. The outflow at Jinghong station was down from 1012.93 m^3/s on 4 Jan to 820.21 m^3/s on 10 Jan 2022.

Figure 7 below presents water level that increased at the Jinghong hydrological station[1], indicating the trend of fluctuating water level up to 10 January 2021.

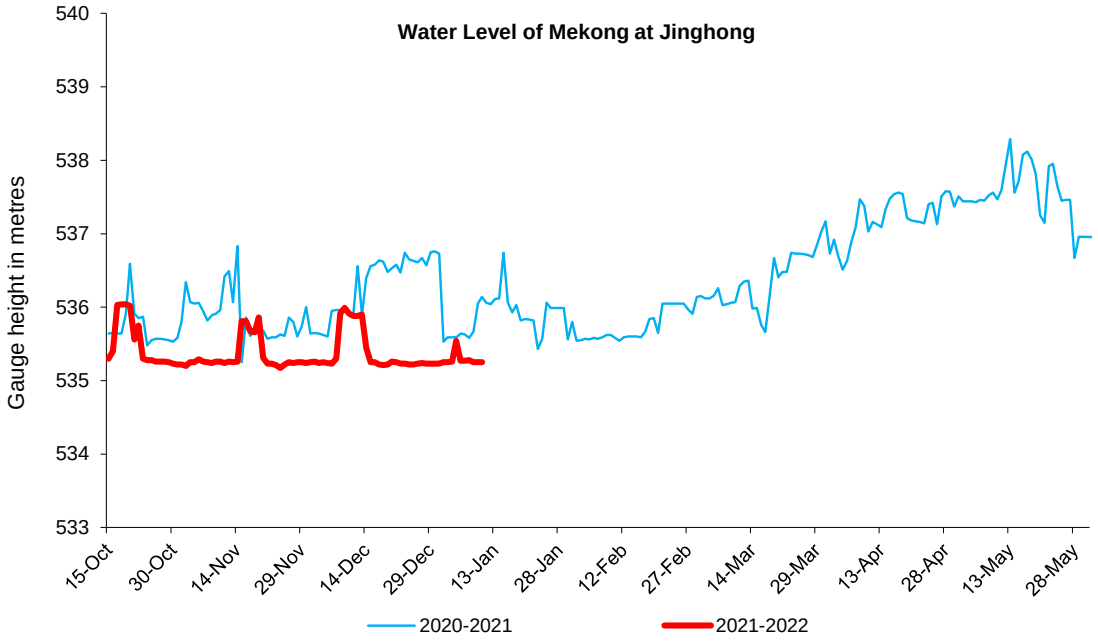


Figure 7. Water level at the Jinghong hydrological station during 15 Oct 2021 to 10 Jan 2022.

Along with the slightly decreased outflow from Jinghong upstream, water level of monitoring station at Chiang Saen in Thailand also decreased about 0.03 m from 4 to 10 Jan 2022 and stayed about 0.31 m lower than its long-term average (LTA), considered critical. However, water level at Lao PDR's Luang Prabang increased about 0.08 m compared with last week and stayed close to its historical maximum value. WLs at the monitoring stations from Chiang Khan in Thailand to Vientiane of Lao PDR decreased about 0.25 m and stayed below their LTA value. The current WLs from Nong Khai in Thailand to Paksane in Lao PDR are lower than their historical minimum level, which considered very critical. WL from Thailand's Nakhon Phanom to Savannakhet in Lao PDR decreased about 0.25 m and continued staying below their LTA level. WL at Savannakhet in Lao PDR dropped and stayed close to its historical minimum level, which considered very critical. Water levels from the stretches of the river from Kratie 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.

Kompong Cham in Cambodia, moreover, were decreasing due to less contributed rainfall from the upstream part (at Pakse and 3S area in Viet Nam).

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 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 Jan 4-10 at Thailand's Chiang Saen decreased from 1.78 m to 1.75 m and stayed about 0.31 m lower than its Long-Term-Average (LTA), which is considered critical. When compared to last week, this week's water level is relatively lower.

Water level at the Luang Prabang station in Lao PDR slightly increased from 8.70 m to 8.78 m, during the reporting period. Compared to last week, the figure shows slightly up by about 0.08 m. The water level at this station was 1.22 m lower than its 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**.

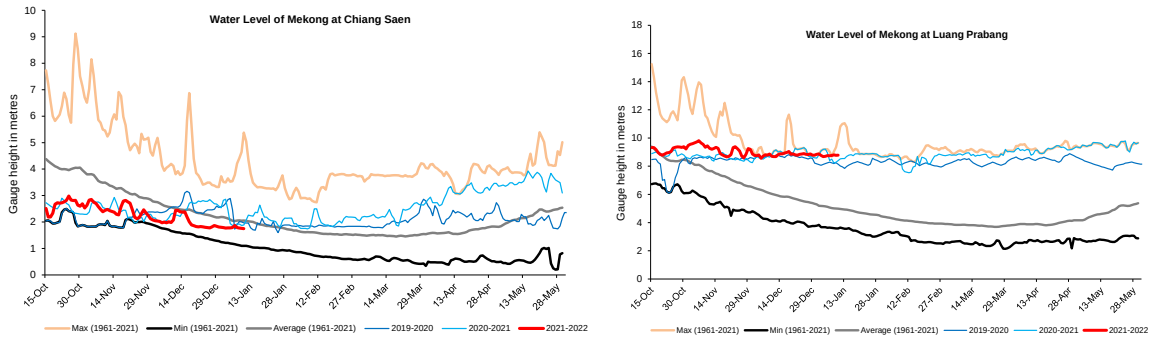


Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of the Xayaburi dam) decreased during the reporting week. It showed 0.76 m lower than its LTA. Furthermore, water level downstream at Vientiane in Lao PDR decreased from 1.93 m to 1.74 m and was about 0.04 m lower than its LTA during 4-10 Jan. At Nong Khai station in Thailand, the water level was also down during the reporting period. It decreased from 1.27 m to 1.04 m and showing 0.41 m lower than its historical minimum value, **which considered very critical**. At Paksane in Lao PDR, water levels decreased about 0.07 m, down from 2.07 m to 2.00 m. **The current water**

level at Paksane in Lao PDR is close to its historical minimum level, which considered very critical. The recently decreased water levels were obvious due to low inflow from upstream, less rainfall in the sub-catchment area and water released from upstream. The water levels at Nong Khai and Paksane are shown in Figure 9 below.

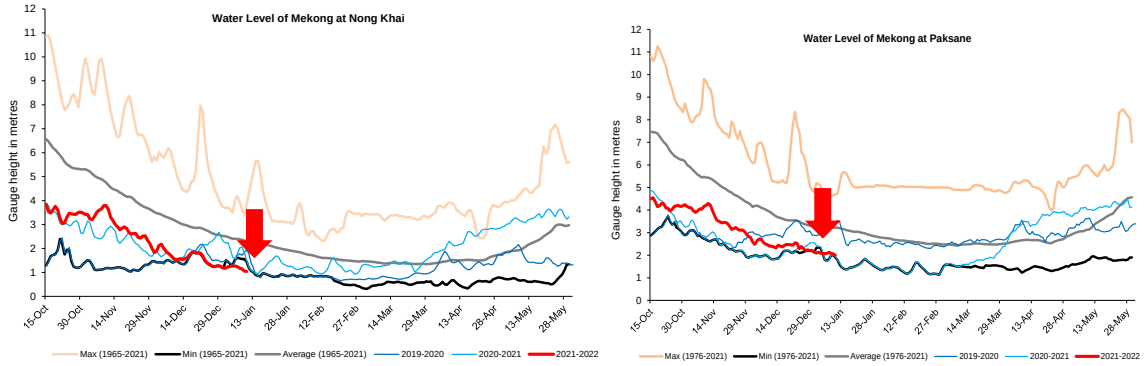


Figure 9. Water levels Nong Khai and Paksane in Thailand and Lao PDR.

Nakhon Phanom to Pakse

Similarly, water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR slightly increased in between 0.02 m and 0.19 metres, during the reporting period. **Water levels at these stations were staying below their LTA level**. The current WL at Savannakhet in Lao PDR is **close to its historical minimum level, which considered very critical**. Figure 10 shows the water levels at Nakhon Phanom and Savannakhet stations.

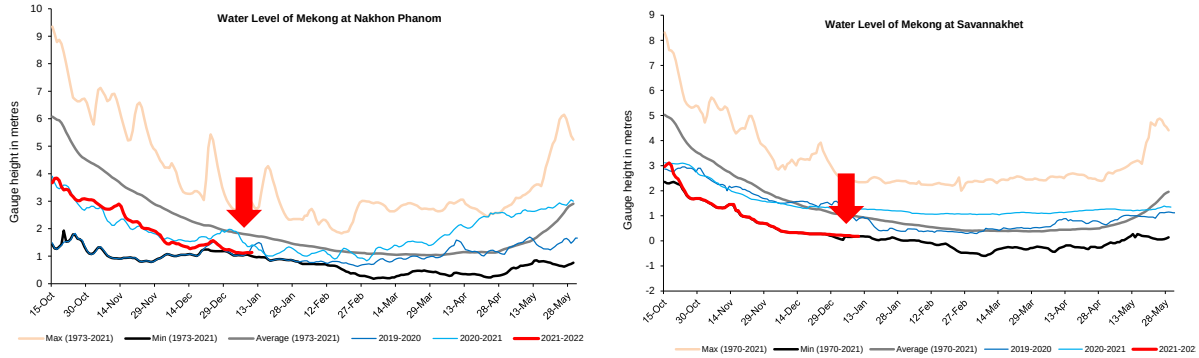


Figure 10: Water levels at Nakhon Phanom and Savannakhet of Thailand and Lao PDR.

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

Due to some rainfall from the upstream part of the Mekong River and the 3S river (Sekong, Se San, and Sre Pok), the water levels from Stung Treng to Kratie in Cambodia were slightly increasing during 4-10 January 2022. This week water level from Stung Treng to Kratie increased about 0.02 m. Water levels at Stung Treng is higher than its LTA about 0.08 m, while at Kratie it is staying about 0.09 m lower than its LTA value. Water level at Kompong Cham was about 1.10 m below their LTA (as showed in Figure 11).

This week, the Water levels at Stung Treng and Kratie were lower than their LTA, which considered critical.

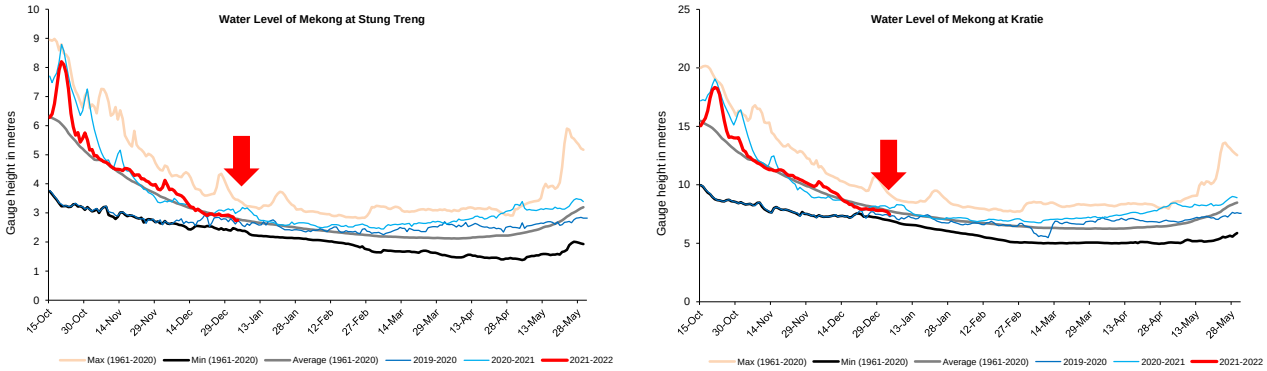


Figure 11: Water levels at Stung Treng and Kratie on the Mekong River.

At Chaktomuk on the Bassac River, due to less contributed flows from upstream catchment, the water level was down by about 0.21 m and stayed 1.01 m lower than its LTA value; while at Koh Khel, water level decreased about 0.07 m, staying 0.44 m lower than its LTA value. The water level at Prek Kdam on the Tonle Sap Lake decreased about 0.41 m and was about 0.81 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 decreased water level was due to low rainfall 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 staying below their LTA level, which still considered critical**.

Tidal stations at Tan Chau and Chau Doc

Like last week, the water levels from 4 to 10 January 2022 at Viet Nam's Tan Chau and Chau Doc were fluctuating in between their Minimum and maximum values due to daily tidal effects from the sea. The fluctuation levels were between 0.68 m and 1.93 m, which is still **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 into the Mekong River and then to the Delta. This phenomenon normally takes place from end of September to October. Based on flow observation at Prek Kdam, the outflow of the Tonle Sap Lake was taking place since 10 October 2021.

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 2019 and 2020, and their LTA level (1997-2020). Up to January 10 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 2019,

2020 and 2021 outflow conditions. However, the outflow of 2022 is still lower than its LTA (1997-2020). For next week, no rainfall is forecasted for the Tonle Sap area; thus, the outflow into the Tonle Sap Lake is likely continuing to decrease from the current level.

Figure 13 shows seasonal changes in monthly flow volumes up to 10 January 2022 for the Lake compared with the volumes in 2019, 2020, 2021 and their LTA, and the fluctuation levels (1997–2021). It shows that up to January 10, **the water volume of the Tonle Sap Lake was lower than its LTA but higher than 2019, 2020, 2021 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 critical***.

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.

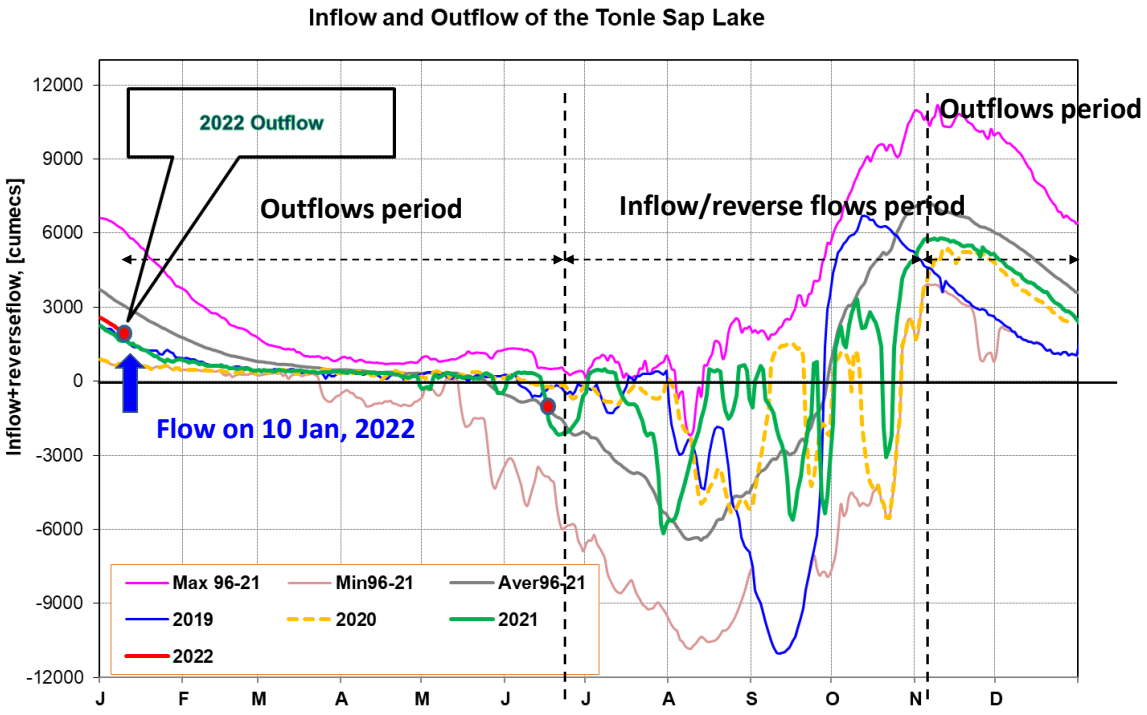


Figure 12: Seasonal change of inflows and outflows of Tonle Sap Lake.

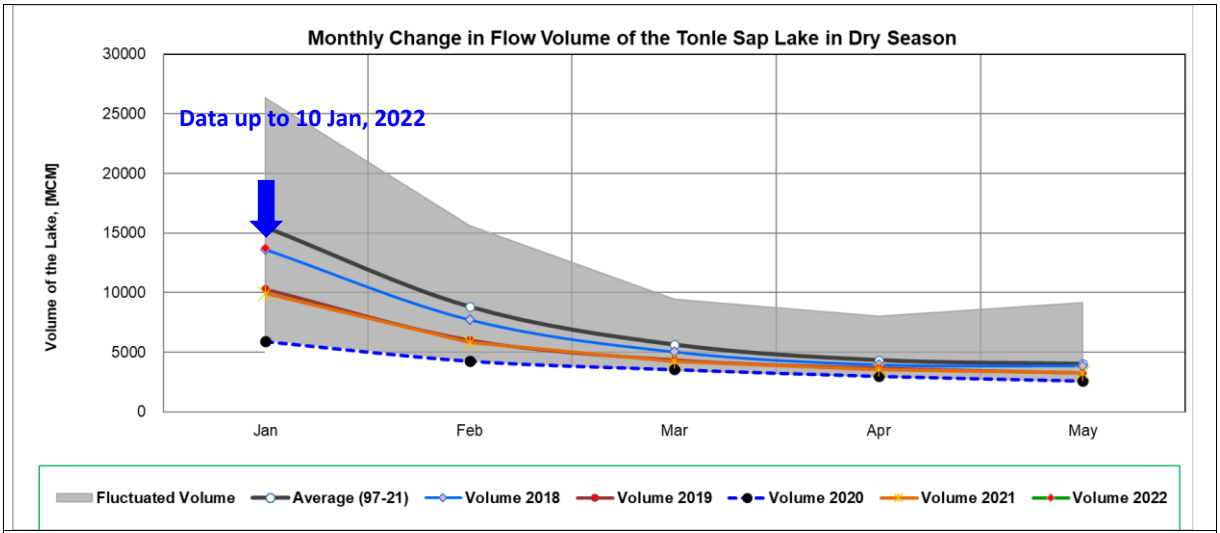


Figure 13. The seasonal change in monthly flow volume of Tonle Sap Lake.

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

Month	Average Volume (97-21) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2018 [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]	Volume 2022 [MCM]
Jan	15523.23	26357.53	5906.80	13633.41	10285.31	5906.80	9923.80	13740.74
Feb	8837.89	15596.22	4198.60	7729.72	6019.30	4264.19	5832.97	
Mar	5654.18	9438.24	3347.07	5037.06	4354.62	3553.99	4264.88	
Apr	4346.65	8009.14	2866.91	3956.47	3667.47	2992.61	3556.68	
May	4030.23	9176.93	2417.81	3864.00	3266.43	2594.92	3240.78	
Jun	5708.30	13635.01	2468.70	5919.18	3517.06	2641.88	3798.29	
Jul	11493.25	28599.56	2925.86	12024.96	4001.99	2925.86	5346.73	
Aug	24666.69	39015.12	4433.46	22399.65	7622.71	5941.07	10547.80	
Sep	39634.03	65632.35	12105.31	53639.54	24194.19	12105.31	16382.34	
Oct	46873.44	73757.23	19705.50	48193.08	30358.38	20799.13	27318.21	
Nov	37823.16	60367.33	18534.61	31036.07	19112.65	27546.80	28982.93	
Dec	25126.11	38888.95	10563.49	18469.21	10577.29	18251.65	20170.76	
	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)								

4 Flash Flood in the Lower Mekong Basin

During January 4-10, the LMB was affected by two main weather factors. These include (i) The active high pressure covered upper and middle parts of the region during the weekend and (ii) the active northeast monsoon prevailed over the Gulf of Thailand. These conditions caused generally cool weather in the northern and north-eastern parts while the central and eastern parts had cool weather in several areas particularly during the week.

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 02 to 08 January 2022

Drought monitoring data for 2022 are available from Sunday to Saturday every week; thus, the reporting period is normally delayed by two days 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 January 2 to 8, as shown in Figure 11, was normal in most parts of the region. Weekly SPI map shows that the LMB received average rainfall in most parts of the region.

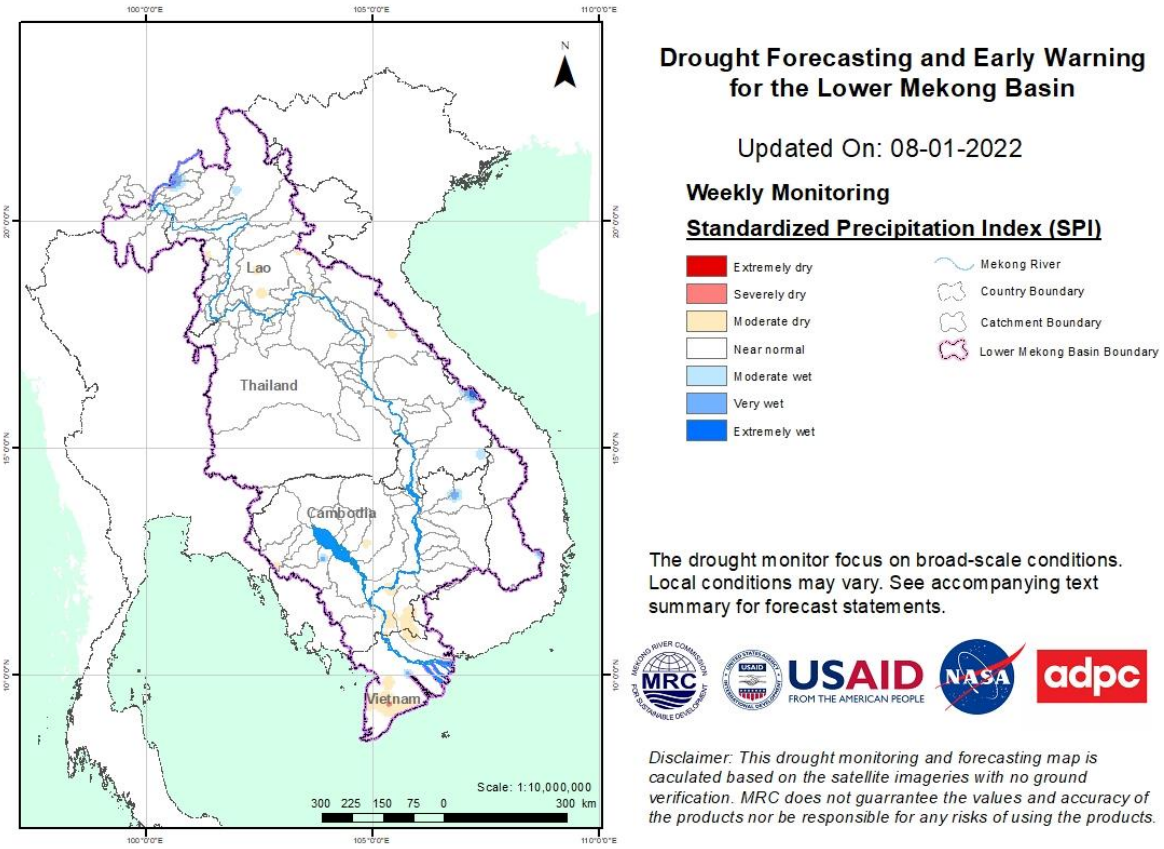


Figure 14: Weekly standardised precipitation index from Jan 2 to 8.

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

With much less rainfall in the northern and middle parts of the region, soil moisture conditions from Jan 2 to 8, as displayed in Figure 12, were severely and extremely dry in most areas of the LMB especially the north and middle part.

Note: The index of soil water fraction presents the current soil water fraction conditions compared with normal month; therefore, it normally shows extremely dry during dry season which is completely different from SPI that is standardized to its specific month of the years. However, this does not mean that the areas are threatened by agricultural drought as generally during transition period of wet and dry seasons and dry season only the irrigated areas are used for agricultural plantation.

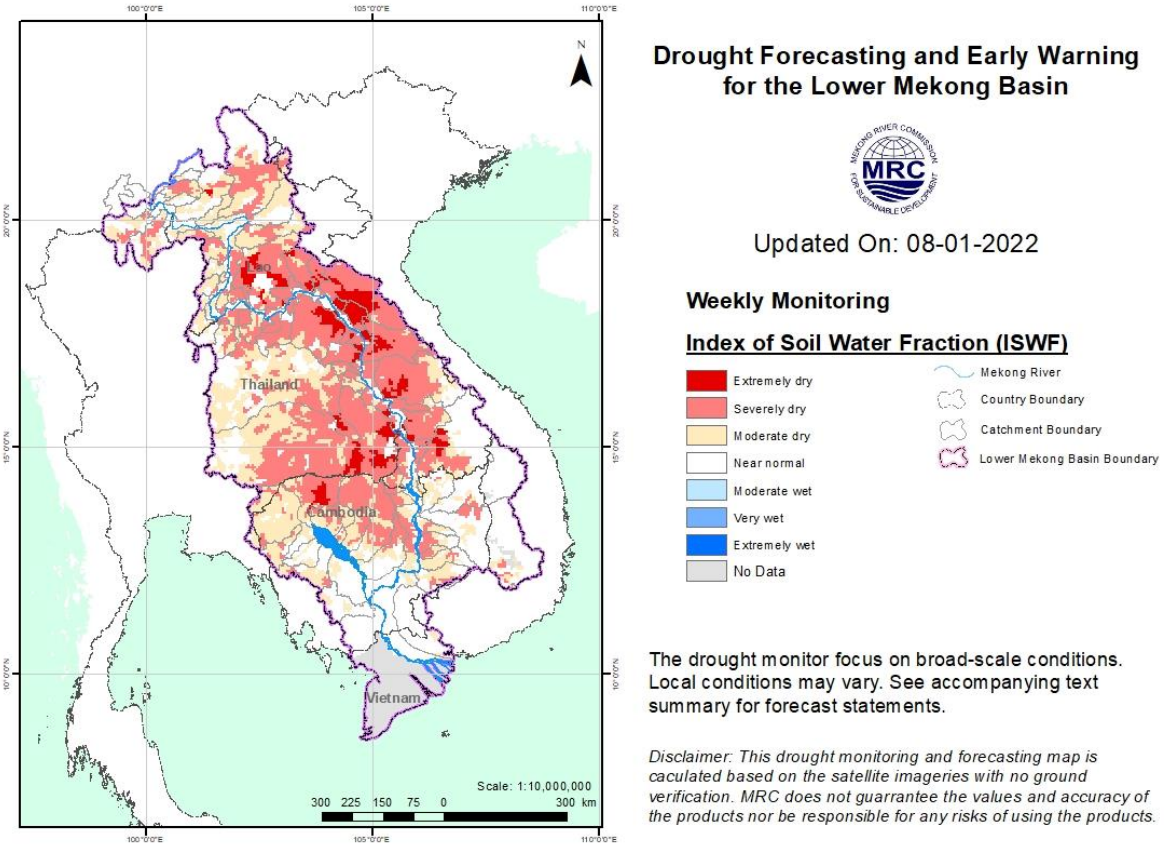


Figure 15: Weekly Index of Soil Water Fraction from Jan 2 to 8.

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

The combined drought indicator, as displayed in Figure 13, reveals that during 02-08 Jan 2022 the LMB was facing some moderate and severe droughts mainly in the northeast of the LMB covering Xayaburi, Vientiane, Xaysomboun, Xiengkhuang, Borikhamxay, Khammuane, Nong Khai, Nakhon Phanom, Sakon Nakhon, and Savannakhet due to severely dry soil moisture as described above. The other areas, however, were normal during the reporting week. No serious drought risk was detected during the reporting week.

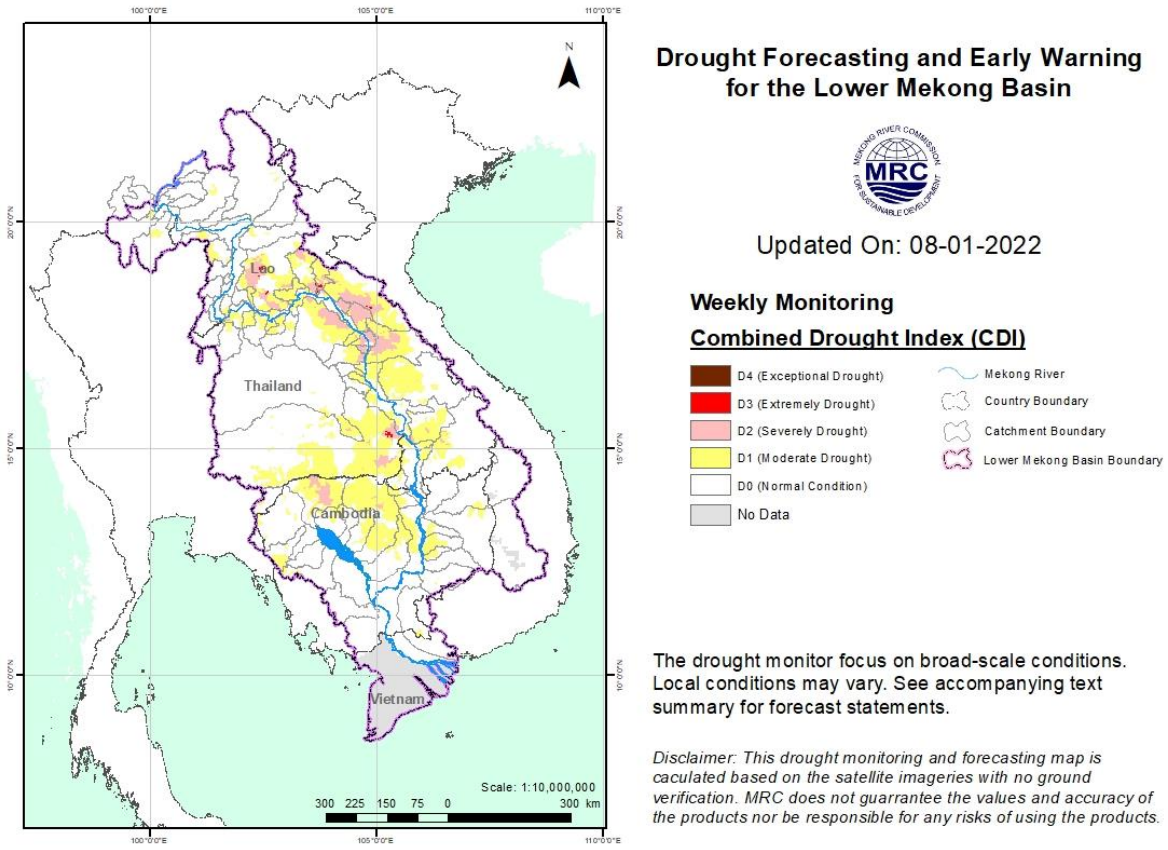


Figure 16: Weekly Combined Drought Index during Jan 2-8.

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.

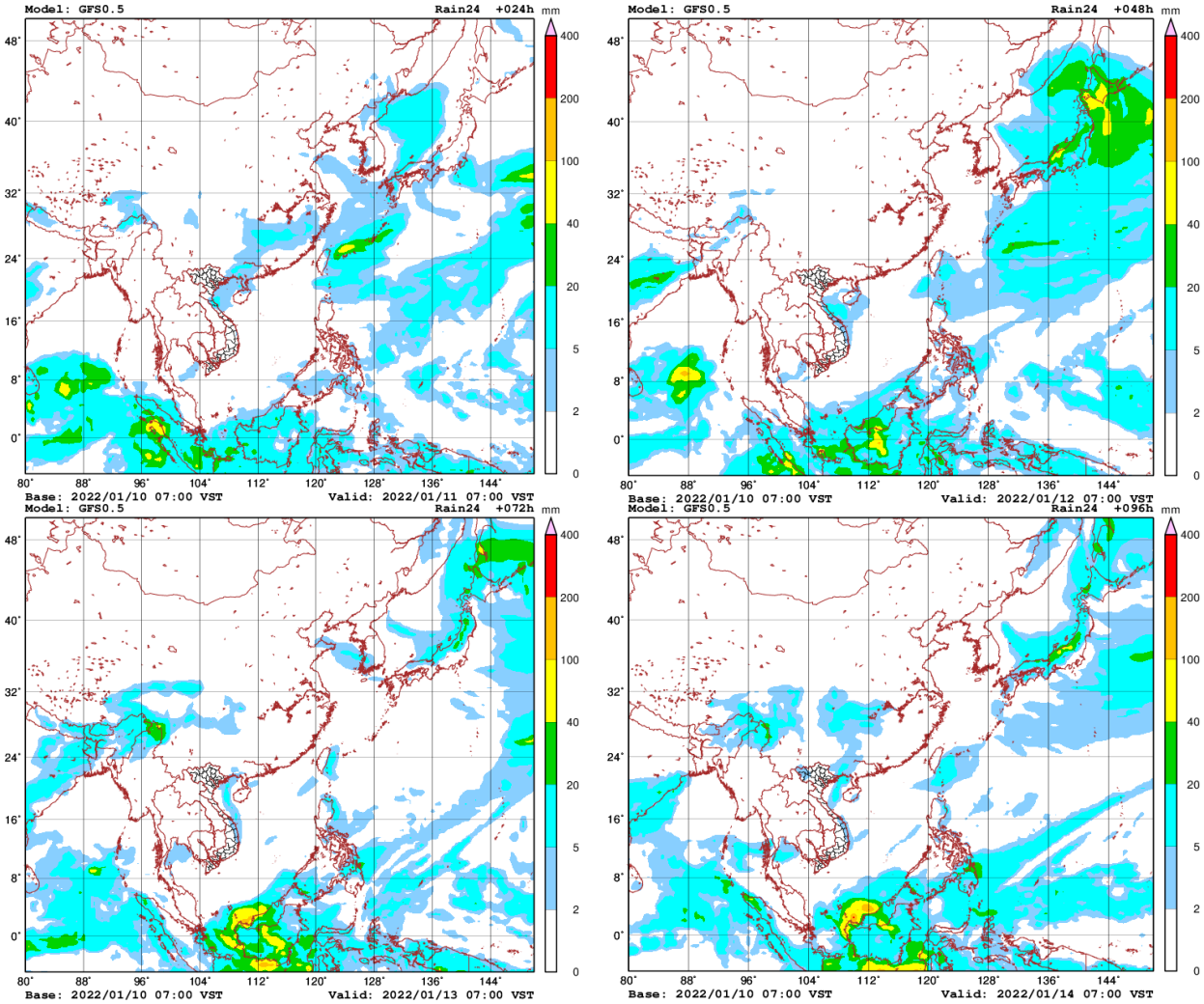
6 Weather and Water Level Forecast and Flash Flood Information

6.1 Weather and rainfall forecast

Based on the analysis of the synoptic meteorological information and result from the Global Forecast System (GFS) Model, in the coming week, two main factors might affect the LMB. They include (i) High pressure from China in the upper part and (ii) the on-going prevailing Southwest Monsoon from the Gulf of Thailand to the lower part of the LMB.

During January 11-17, small rainfall (5-20 mm/24h) or no rain may occur in some areas of the LMB.

Figure 14 shows accumulated rainfall forecast (24hrs) of the GFS model during January 11-17.



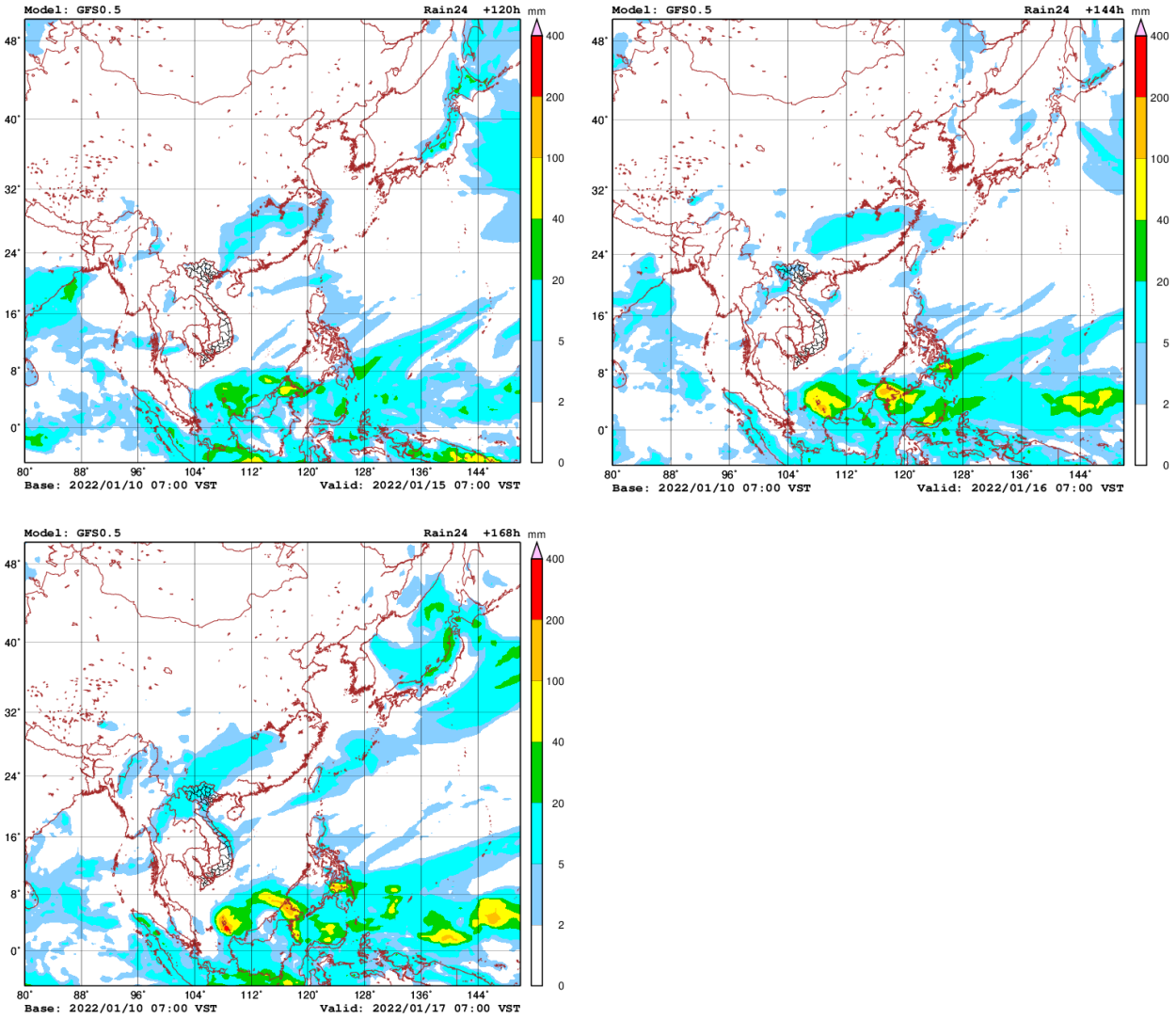


Figure 17: Accumulated rainfall forecast (24 hrs) of model GFS.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on January 10's weekly river monitoring bulletin, the weekly forecast water level at Chiang Saen in Thailand is expected to slightly increase from 1.75 m to 1.96 m in the next seven days. The trend of water levels at these stations will continue staying below their LTA.

For Luang Prabang in Lao PDR, the water level is likely to increase, staying between 8.78 m and 9.00 m during the same period. The current water levels are lower than their maximum value.

Chiang Khan, Vientiane-Nong Khai and Paksane

Water level at Chiang Khan station in Thailand is forecasted to be up about 0.28 m for the next seven days. Also, from Vientiane in Lao PDR and Nong Khai in Thailand WLs will increase of about 0.28 m in the next seven days. At Paksane in Lao PDR, water level will increase about

0.13 m due to less inflow from the upper catchments. No rainfall is forecasted in the area. The water levels here will remain lower than their LTA.

Nakhon Phanom to Pakse

Water levels from Nakhon Phanom to Mukdahan in Thailand will slightly increase between 0.06 m and 0.21 m in the next seven days. Also, water levels from Khong Chiam in Thailand to Pakse in Lao PDR will increase about 0.33 m. Water levels at these stations will stay lower than their LTA level. Next week no precipitation is forecasted in the area.

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

From Stung Treng to Kompong Cham along the Mekong River in Cambodia, the water levels will go up between 0.05 m and 0.15 m over the next seven days. No 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 decrease about 0.15 m over the next seven days.

Water levels at most of the stations will continue to stay lower than their LTA value, particularly in the lower part of the region from the Bassac at Phnom Penh to Koh Khel as well as from Tonle Sap at Prek Kdam to Phnom Penh Port, including the Tonle Sap Lake. No 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 and down in between their Minimum and Maximum values following daily tidal effects from the sea.

Table 3 shows the weekly River Monitoring Bulletin issued on January 10. Results of the started weekly river monitoring bulletin are also available at http://ffw.mrcmekong.org/bulletin_wet.php.

6.3 Flash Flood Information

Flash flood events are not likely to happen in the LMB. 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 on the upcoming months until March 2022. The MRC's DFEWS adopts an ensemble model called the North America Multi-Model Ensemble (NMME), which averages all scenarios.

The global scale of rainfall prediction is used to see how the rain distribution looks like for the coming months. Figure 15 shows the ensemble mean of daily average precipitation (mm/day) each month from January to March 2022 produced by the NMME.

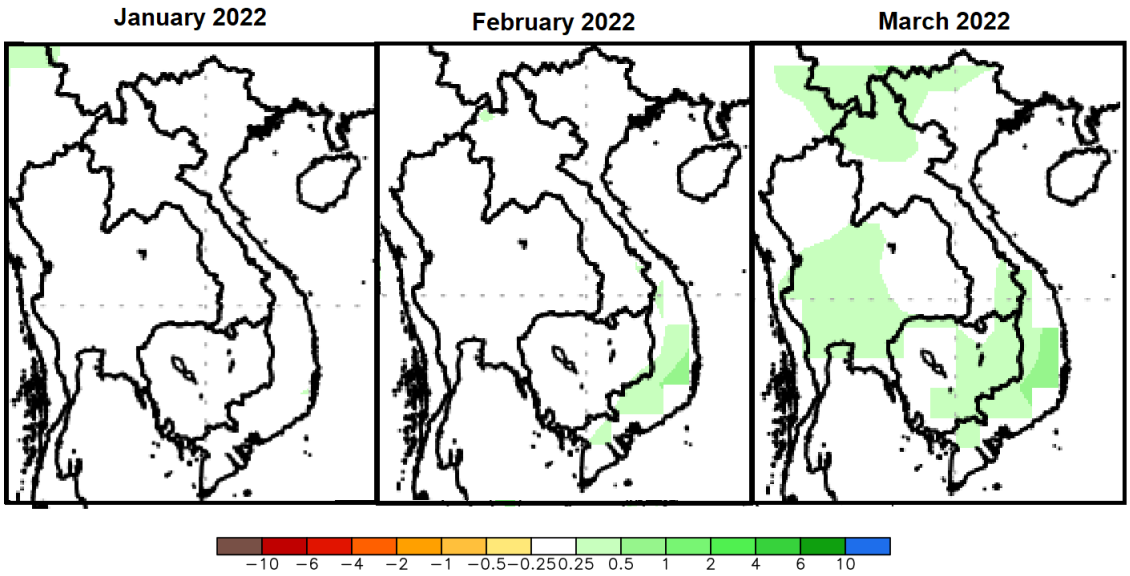


Figure 18. Daily average of monthly rainfall anomaly forecast from January to March 2022.

The ensemble prediction model based on the initial conditions in December 2021 reveals that the LMB is likely to receive average rainfall and under normal conditions in January. In February the region is forecasted to get some rain in the lower part of the LMB covering mainly Viet Nam. While, in March it is forecasted that the entire LMB will be much wetter than its long-term mean of March mainly over the central and lower parts of the region.

The 2021 dry season is relatively wetter than that of 2020 and the monsoon rain in the 2021 wet season has arrived earlier than it did in 2019 and 2020 especially over the upper and central parts of the LMB.

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: 11 January to 17 January 2022

Date: 10 January 2022

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)						
		09-Jan			09-Jan	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan
Jinhong		0.0	-	-	535.25	535.25							
Chiang Saen		0.0	357.110	0.00	1.76	1.75	1.73	1.74	1.80	1.85	1.88	1.92	1.96
Luang Prabang		0.0	267.195	2.53	8.77	8.78	8.80	8.81	8.82	8.84	8.90	8.96	9.00
Chiang Khan		0.0	194.118	1.91	3.83	3.86	3.91	3.95	4.00	4.04	4.06	4.10	4.14
Vientiane		0.0	158.040	-0.28	1.73	1.74	1.78	1.83	1.87	1.92	1.96	1.98	2.02
Nongkhai		0.0	153.648	0.33	1.06	1.04	1.07	1.12	1.17	1.22	1.26	1.29	1.33
Paksane		0.0	142.125	0.10	2.06	2.00	1.99	2.01	2.04	2.07	2.10	2.12	2.13
Nakhon Phanom		0.0	130.961	0.18	1.12	1.14	1.11	1.10	1.12	1.14	1.16	1.18	1.20
Thakhek		0.0	129.629	1.38	2.42	2.42	2.40	2.38	2.41	2.44	2.46	2.49	2.52
Mukdahan		0.0	124.219	0.72	1.71	1.79	1.85	1.87	1.89	1.92	1.95	1.98	2.00
Savannakhet		0.0	125.410	-0.65	0.18	0.18	0.21	0.23	0.24	0.26	0.28	0.30	0.31
Khong Chiam		0.0	89.030	1.02	2.10	2.10	2.17	2.24	2.27	2.30	2.35	2.39	2.43
Pakse		0.0	86.490	0.03	1.14	1.12	1.16	1.19	1.22	1.25	1.29	1.31	1.34
Stung Treng		nr	36.790	0.32	2.73	2.77	2.77	2.79	2.82	2.84	2.86	2.89	2.91
Kratie		nr	-1.080	3.06	7.50	7.43	7.45	7.46	7.49	7.52	7.55	7.57	7.60
Kompong Cham		nr	-0.930	0.65	3.20	3.08	2.98	2.96	2.97	2.99	3.02	3.04	3.07
Phnom Penh (Bassac)		nr	-1.020	1.58	2.75	2.67	2.61	2.60	2.60	2.60	2.61	2.61	2.62
Phnom Penh Port		-	0.000	0.14	1.77	1.69	1.60	1.57	1.56	1.55	1.54	1.53	1.52
Koh Khel		nr	-1.000	1.52	2.80	2.83	2.85	2.87	2.89	2.86	2.82	2.80	2.78
Neak Luong		nr	-0.330	0.81	2.00	2.10	2.13	2.15	2.17	2.13	2.08	2.04	2.00
Prek Kdam		nr	0.080	0.58	2.27	2.13	2.05	2.00	1.96	1.93	1.90	1.86	1.82
Tan Chau		0.0	0.000	-0.37	0.69	0.68	0.73	0.85	1.02	1.20	1.26	1.30	1.33
Chau Doc		nr	0.000	-0.60	0.75	0.76	0.82	0.97	1.17	1.34	1.40	1.45	1.48

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 the upper to lower parts of the Mekong region. Rainfall in the upper was observed at Chaing Sean and Luang Prabang, Mukdahan at the middle parts and lower part from Kompong Cham to Tan Chau and Chau Doc of the Mekong region, during this reporting week. Compared with last week's amount, the rainfall this week was considered higher in the lower part of the Mekong region.

Based on the forecasted rainfall from satellite using GFS data, rainfall is likely to take place in the areas from the lower part of Cambodia, the 3S area and Mekong Delta in Viet Nam during January 11-17, varying from 0.05 mm to 50 mm. This indicates that the dry season has started for the LMB.

7.2 Water level and its forecast

The MRC's observed water level at Jinghong showed a decrease about 0.29 m from 535.54 m on 4 Jan to 535.25 on 10 Jan 2022 (recorded on 7:00 am), and stayed 0.89 m lower than its two-year average (2020-2021) value. The outflow at Jinghong station was down from 1,012.93 m^3/s on 4 Jan to 820.21 m^3/s on 10 Jan 2022.

Water levels in the lower part of the monitoring locations in the LMB during this reporting week were slightly increasing from Chiang Khan in Thailand to Pakse in Lao PDR. Water levels at Nong Khai, Paksane and Savannakhet were staying close to their historical minimum level, considered very critical. In Cambodia, water level at Stung Treng is higher than its LTA, while at Kratie and Kompong Cham, water levels dropped lower than their LTA level. Water levels at Neak Luong, Bassac at Phnom Penh, and Prek Kdam in Cambodia were also lower than their LTA level. The low level was due to low inflows from upstream and less rainfall in the region from 4 to 10 January 2022. Generally, this week's water levels were relatively lower than those of last week from the upper to the lower part of the LMB.

The flow volume of the Tonle Sap Lake is lower than its LTA. From next week, the flow is expected to continue decreasing due to less rainfall forecasted in the inflow catchments of the Tonle Sap Lake.

From Stung Treng to Kratie water levels will go up, but from Kompong Cham to Chaktomuk in Phnom Penh, the water levels will go down. The water levels – at Neak Luong on the Mekong River, from Prek Kdam to Phnom Penh Port on the Tonle Sap, and Koh Khel on the Bassac – are forecasted to continue staying below their LTA.

The situation in Tan Chau on the Mekong River and Chau Doc on the Bassac River is expected to remain fluctuting. The fluctuation of water level was in between their Minimum and Maximum levels, which considered critical.

Since the fourth week of October 2021, water levels across most monitoring stations in the LMB have significantly dropped to the level lower than their LTA (from upper to lower stretches within the LMB). For a more complete preliminary analysis of the hydrological conditions in the LMB over July–December 2020, November 2020 to May 2021 and June to October 2021 see this Situation Report.

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

Drought conditions of the LMB from 2 to 8 January 2022 were normal all over the LMB except some moderate drought in northeastern part due to severely dry soil moistures during the beginning of dry season. The region showed no significant threat except some moderate and severe dry soil moistures in the upper and middle parts of the LMB.

For the upcoming three-month forecast, the LMB is likely to receive average rainfall and under normal conditions in January. In February the region is forecasted to get some rain in the lower part of the LMB covering mainly Viet Nam. While, in March it is forecasted that the entire LMB will be much wetter than its long-term mean of March mainly over the central and lower parts of the region.

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

Table A1: Weekly observed water levels

2021	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
02-11-2021	535.20	2.63	9.56	6.46	3.82	3.42	4.11	3.03	3.18	3.92	5.18	12.96	8.47	6.53	6.00	4.82	6.03	2.54	2.43
03-11-2021	535.25	2.83	9.60	6.35	3.61	3.23	4.10	2.95	3.13	3.86	4.96	12.83	8.20	6.36	5.87	4.70	5.92	2.56	2.50
04-11-2021	535.25	2.85	9.66	6.56	3.69	3.20	3.96	2.89	3.07	3.82	4.97	12.43	7.99	6.24	5.73	4.60	5.85	2.56	2.51
05-11-2021	535.29	2.75	9.72	6.72	3.87	3.34	3.90	2.83	3.03	3.76	4.86	12.35	7.79	6.11	5.64	4.50	5.76	2.56	2.51
06-11-2021	535.26	2.70	9.81	6.78	4.01	3.52	3.96	2.77	2.98	3.72	4.82	12.12	7.66	6.07	5.56	4.44	5.72	2.42	2.45
07-11-2021	535.25	2.58	9.65	6.82	4.08	3.60	4.05	2.72	2.92	3.60	4.76	12.01	7.51	5.96	5.50	4.39	5.63	2.33	2.29
08-11-2021	535.24	2.48	9.55	6.98	4.12	3.65	4.04	2.71	2.90	3.60	4.74	11.87	7.40	5.88	5.45	4.34	5.58	2.21	2.13

Table A2: Weekly observed rainfall

2021	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
02-11-2021	0.5	0	29.8	0	0	0	0	0	0	0	0	0	0	1.5	36.5	15.3	0	83.7	10
03-11-2021	0	11.5	30.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	0
04-11-2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
05-11-2021	0	22.3	0	0	0	0	0	0	0	0	0	0	1.4	5	7.2	51.4	0	0	0
06-11-2021	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	7.4	0	0	0
07-11-2021	0	0	0	0	0	0	0	0	0	0	0	0	0	30.5	1.7	0	7.3	1.3	0
08-11-2021	0	0	0	0	0	0	0	0	2.9	0	0	0	0	8.5	31.7	17.9	0	21.3	1

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