



Mekong River Commission

Weekly Wet Season Situation Report in the Lower Mekong River Basin 8-14 June 2022

Prepared by
The Regional Flood and Drought Management Centre
14 June 2022

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Key Messages

Key messages for this weekly report are presented below.

Rainfall and its forecast

- Rainfall focused in the areas from Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam, including the middle and lower parts in Lao PDR and Cambodia, varying from 1.60 millimetres (mm) to 86.10 mm.
- There will be average rainfalls for the next 5 days over the Mekong region from 15 to 22 June 2022 because there will be a low-pressure dominating the Mekong region.

Water level and its forecast

- According to MRC's observed water level at Jinghong, it showed a significant decrease of about 1.35 m from 537.81 m to 536.69 m from 08 to 14 June 2022, staying about 0.08 m higher than its Long-Term-Average (2015-2021) value. The outflow at Jinghong station decreased from 2810.00 m³/s to 1830.00 m³/s from 08 to 14 June 2022.
- Water levels of monitoring station at Chiang Saen in Thailand decreased about 0.08 m from 08 to 14 June 2022, but still stayed about 0.46 m higher than its LTA level, which is considered normal.
- Water level (WL) from Chiang Khan in Thailand from 08 to 14 June 2022 increased by about 0.46 m (about 2.08 m higher than its LTA value), while water level at Vientiane increased about 0.14 m and still stayed about 2.21 m higher than its LTA level, which considered normal. Water levels at Nong Khai decreased 0.04 m and at Paksane decreased about 0.44 m, staying about 1.12 m and 0.24 m higher than their LTA value, respectively.
- Water levels from Nakhon Phanom in Thailand and Pakse in Lao PDR decreased between 0.15 m and 0.50 m. The current WLs at these stations were staying higher than their LTA value, considered **normal**. From the stretches of the river from Stung Treng to Kratie it decreased about 0.26 m and 0.57 m, staying 0.72 m and 1.61 m higher than their LTA level, respectively.
- Water levels from Kompong Cham down to Chaktomuk, Koh Khel and Phnom Penh Port to Prek Kdam in Cambodia decreased about 0.05 m and 0.50 m, staying between 0.20m and 0.85 m higher than their LTA level.
- The current water levels from Chiang Saen in Thailand to Kompong Cham in Cambodia are higher than their LTA value. WL at the 2 tidal stations at Tan Chau and Chau Doc are above their LTA value due to tidal effect during this monitoring period.
- Over the next five days, the water levels across most monitoring stations are expected to go up and stay higher than their long-term average value in most stations.

Drought condition and its forecast

- During June 5-11, **the LMB was facing some moderate and severe meteorological droughts in the north covering Chiang Rai, Xayaburi, Vientiane province, Vientiane Capital, Nong Khai, and Loei and moderate drought in the south covering Si Saket, Surin, Chanthaburi, Battambang, Stung Treng, Kampong Cham, Kandal, and Tay Ninh.** However, no significant agricultural drought threat was found during the monitoring week.
- For the upcoming three months' forecasts, the LMB is likely to receive below-average rainfall **in July and August** with equivalent from **moderate to severe meteorological droughts**. Below-average rainfall is also forecasted for the lower part of the region covering **Cambodia and Viet Nam during this coming September with moderate drought**. While in October and November the LMB is likely to receive more than average rainfall, meaning no drought threat is predicted for the LMB.

1 Introduction

This Weekly Wet Season Situation Report presents a preliminary analysis of the weekly hydrological and drought situation in the Lower Mekong River Basin (LMB) for the period from **08-14 June 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 (MCs) – Cambodia, Lao PDR, Thailand, and Viet Nam – and on satellite data. All the water levels indicated in this report refer 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 Lake
- 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 (June, July and August) and the weather maps issued by the Thai Meteorological Department (TMD) were used to verify weather conditions in the LMB.

Since end of May 2022, the wet weather has come because the influentially high-pressure air mass areas prevailed 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 reduce temperature and increased rainfall in LMB. From June to July, the low-pressure trough is going to prevail over the Mekong region bringing rainfalls for the start of rainy season period in 2022.

[Figure 1](#) presents the weather map of 14 June 2022, showing a low-pressure dominating the upper part of the Mekong region, which might have some rains for the next few days. The average rainfall is also predicted over the middle and lower parts of LMB, including northern Thailand, Lao PDR and Viet Nam and the 3S area (Sesan, Sre Pok, and Sekong) of Cambodia and Viet Nam.

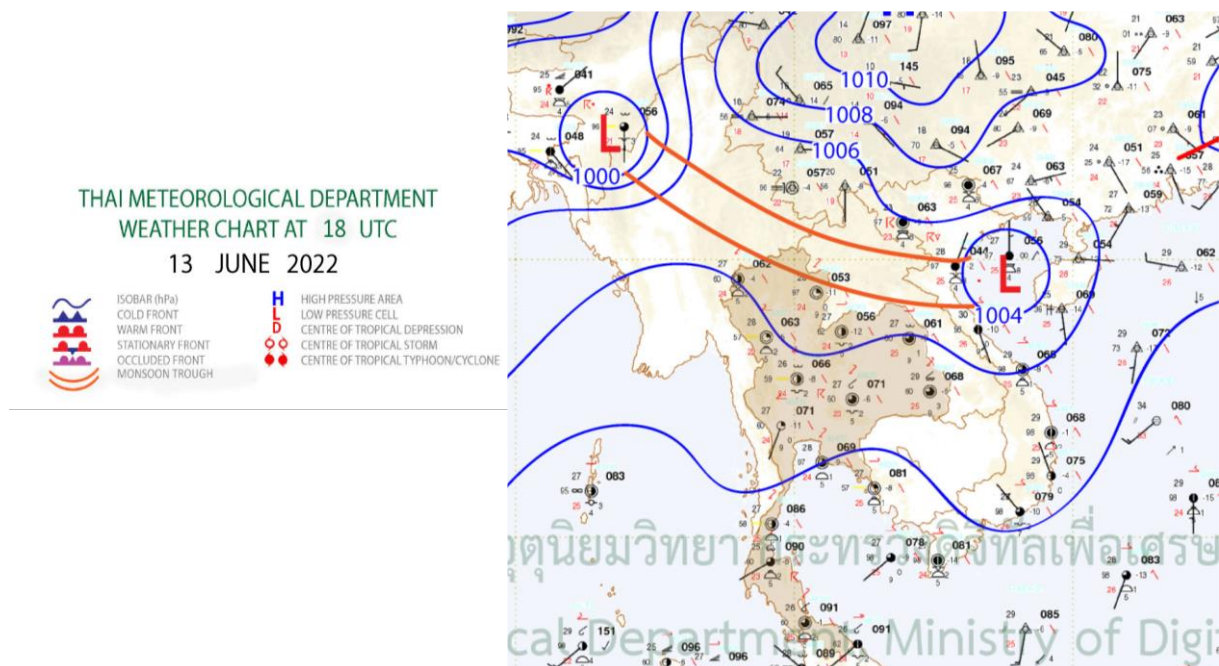


Figure 1. Summary of weather conditions over the LMB.

According to the ASEAN Specialised Meteorological Centre (ASMC), the highest probability of warm and wet conditions is predicted over the lower part of the Mekong region from 13 to 26 June 2022. Moreover, the Mekong region is likely dominated by warm condition, which may bring rainfall and warm temperatures in general to the lower part of the LMB. **Figure 2** shows the outlook of weather condition from 13 to 26 June 2022 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

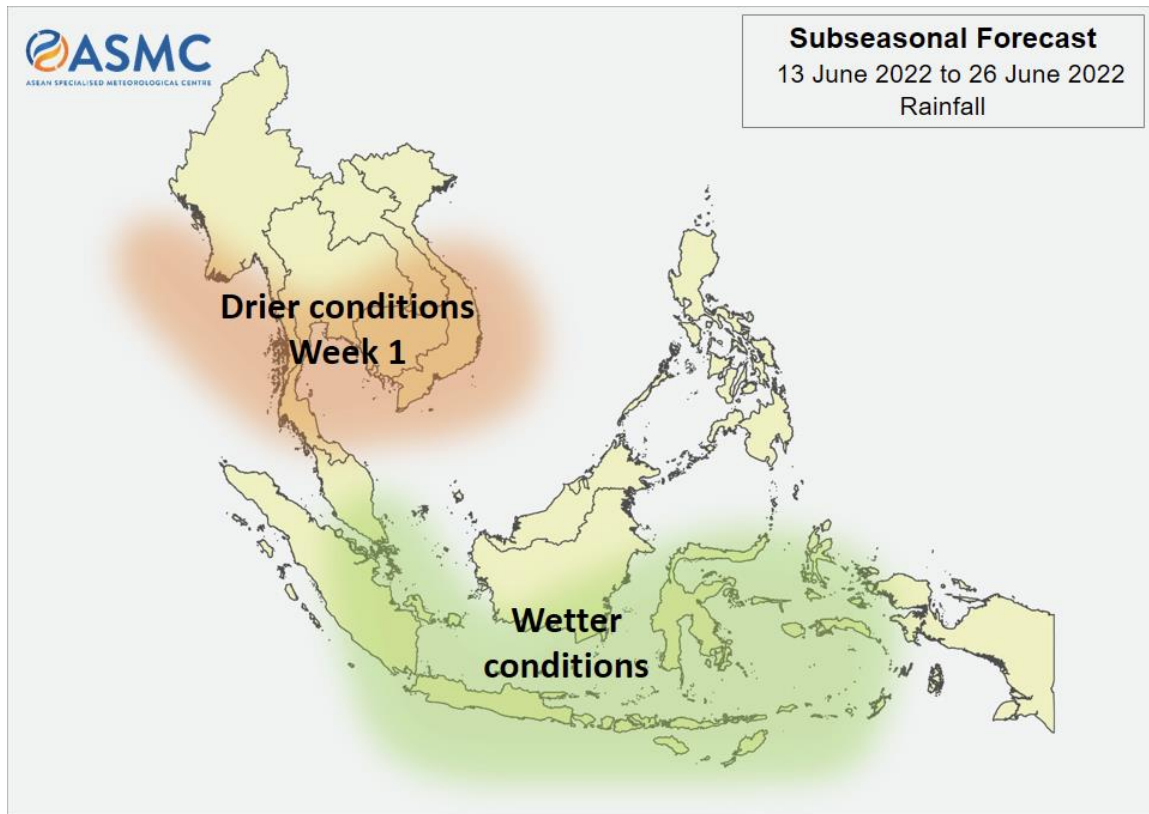


Figure 2. Outlook of wet and dry conditions over the Asian countries by ASMC.

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

There is no sign of Tropical Storm moving from the Sea to the LMB between 08 and 14 June 2022, a low- pressure line is still presenting as shown in [Figure 1](#). No storms movement detected on 14 June in the LMB, as displayed in [Figure 3](#).

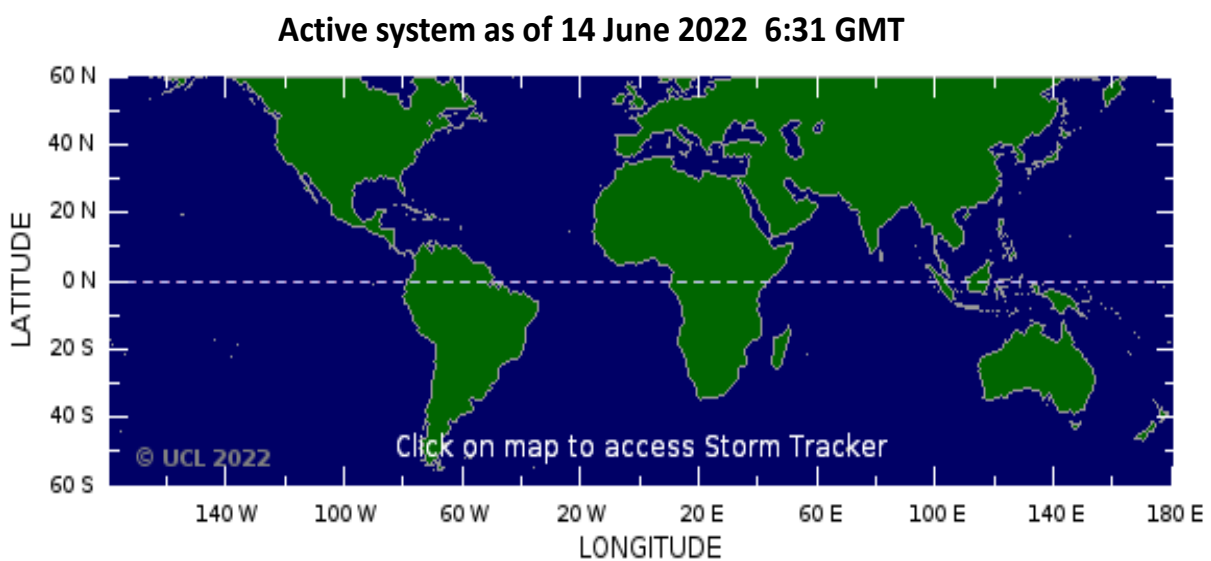


Figure 3. A tropical depression risk observed on 14 June 2022.

2.2 Rainfall patterns over the LMB

This week from 08 to 14 June 2022, rainfall was observed from the upper to lower part starting from Chiang Kham in Thailand to Tan Chau and Chau Doc in Viet Nam of the Lower Mekong Basin, varied from 1.60 mm to 86.10 mm. The highest rainfall of this week report concentrated at Thakhek in Lao PDR and Chaktomuk in Cambodia, which reached up to 186.10 mm. The total rainfall this week was smaller, compared with last week rainfall occurred in the Mekong region. (See shown in [Figure 4](#)).

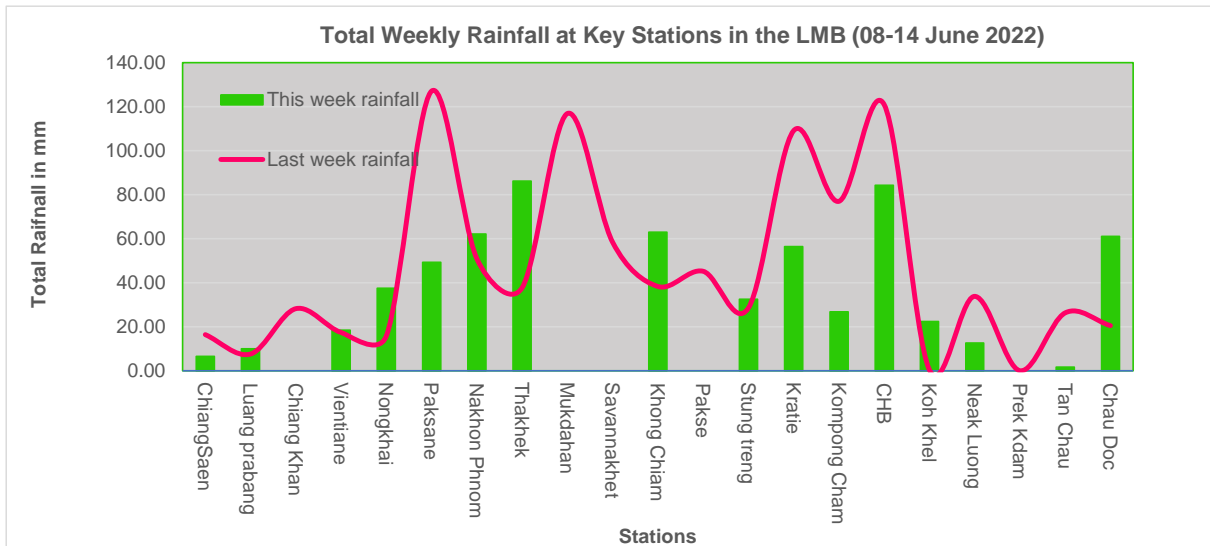


Figure 4. Weekly total rainfall at key stations in the LMB during 08-14 June 2022.

To verify area rainfall distribution, [Figure 5](#) shows a map of the weekly accumulated rainfall based on observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 08 to 13 June 2022.

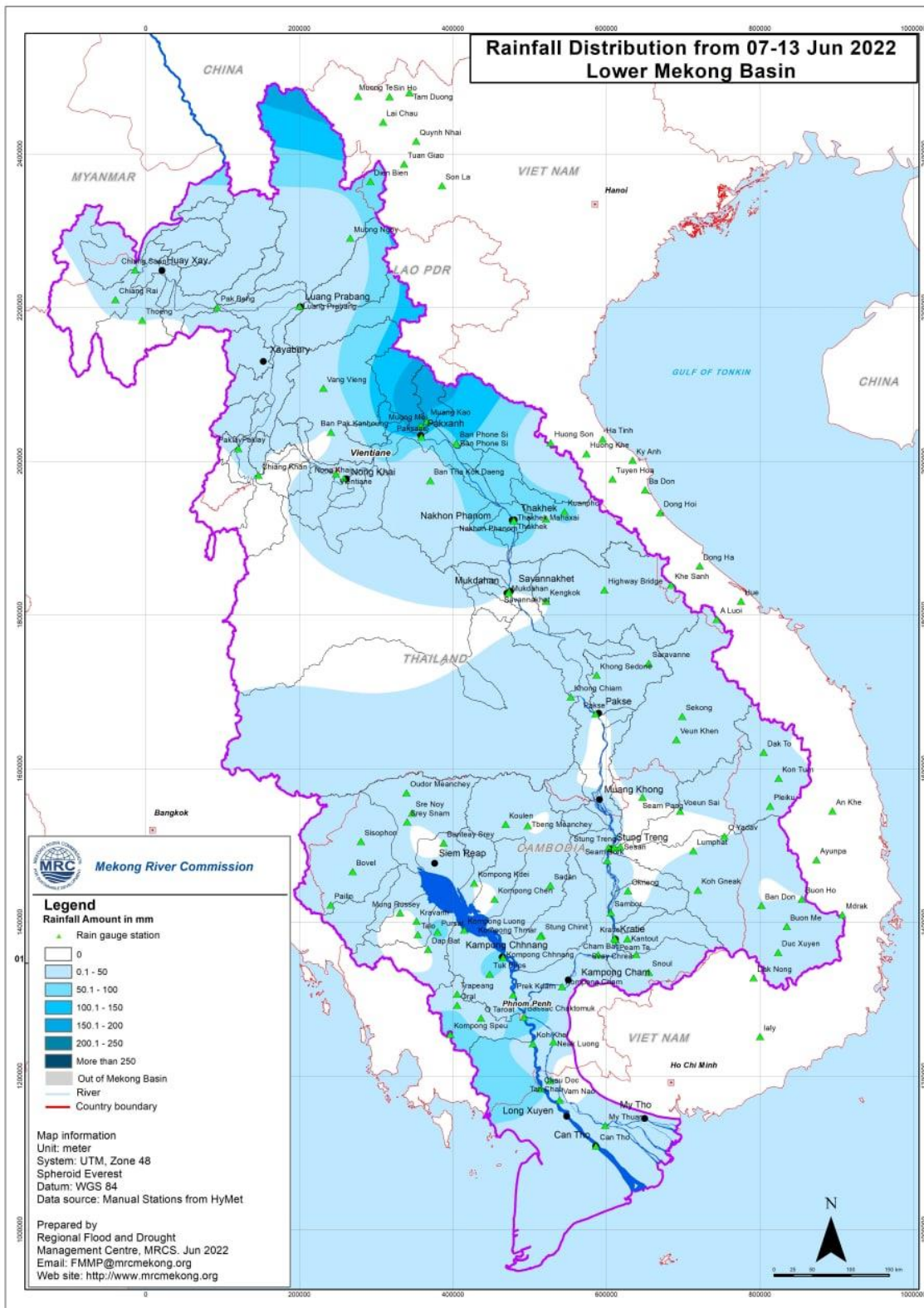


Figure 5. Weekly rainfall distribution over the LMB during 07-13 June 2022.

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 in Thailand to capture mainstream flows entering from the Upper Mekong Basin (UMB); at Vientiane in Lao PDR to present flows generated by climate conditions in the upper part of the LMB; at Pakse in Lao PDR 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](#).

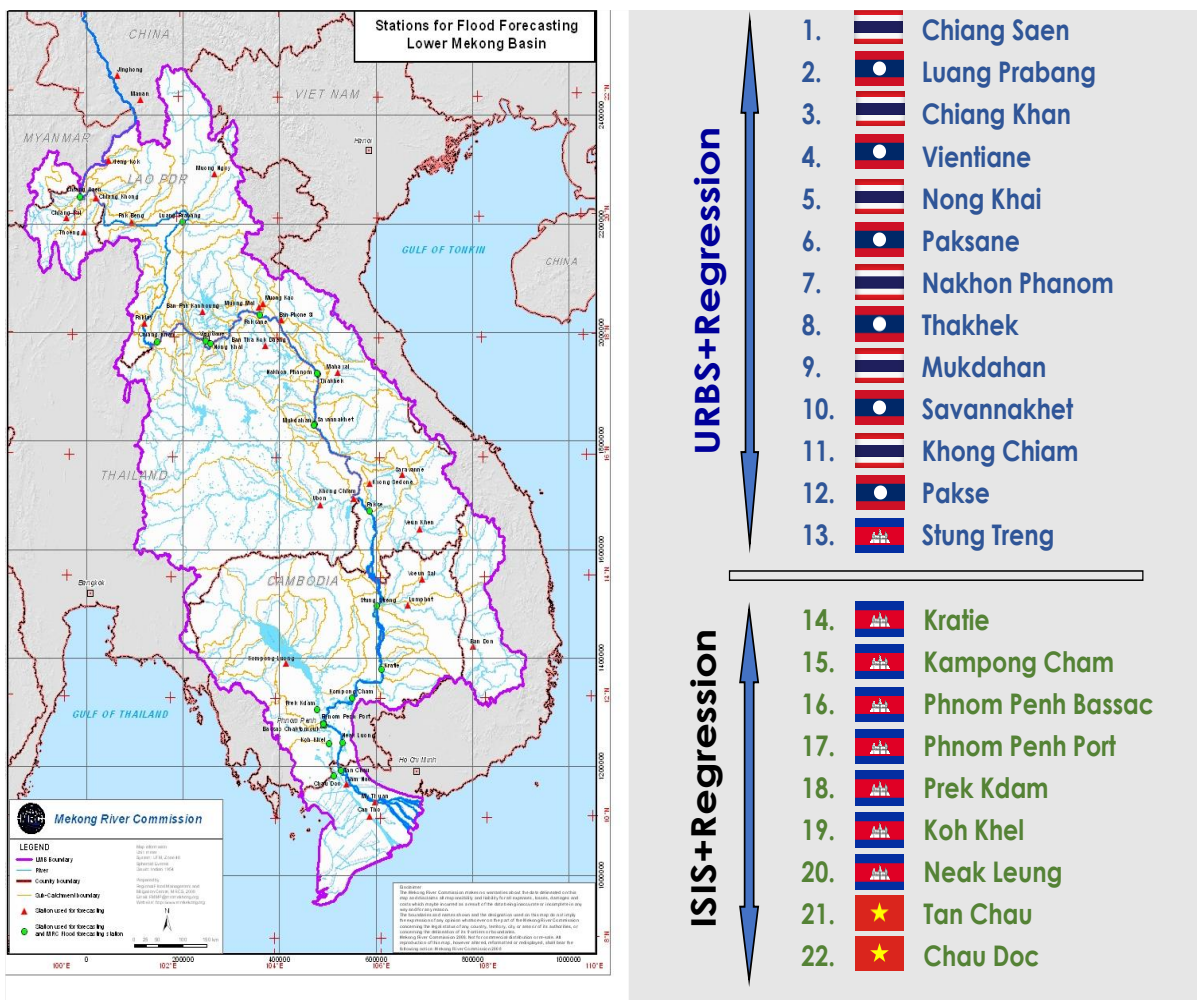


Figure 6. Key stations and model application for River Monitoring and Flood Forecasting.

According to MRC’s observed water level at Jinghong, it showed a significant **decrease of about 1.35 m from 537.81 m to 536.69 m from 08 to 14 June 2022 (recorded on 7:00 am)**, staying about 0.08 m higher than its Long-Term-Average (LTA: 2015-2021) value. The outflow at Jinghong station decreased from 2810.00 m³/s to 1830.00 m³/s from 08 to 14 June 2022. [Figure 7](#) below presents water level that increased at the Jinghong hydrological station¹, indicating the trend of fluctuating water level up to 14 June 2022

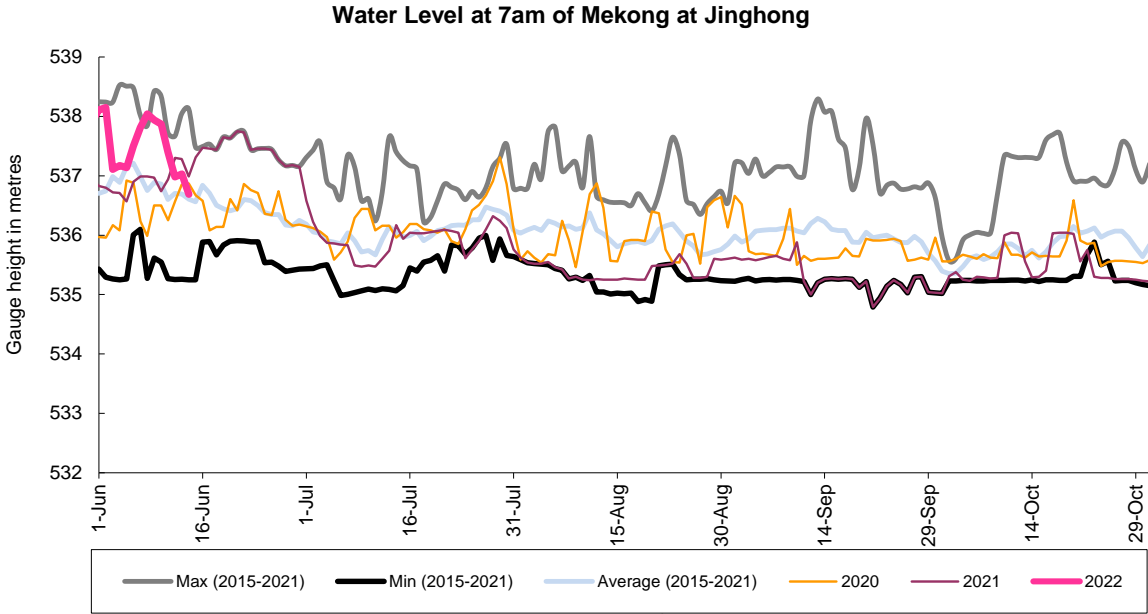


Figure 7. Water level at the Jinghong hydrological station during 8-14 June 2022.

Water levels of monitoring stations at Chiang Saen in Thailand decreased about 0.08 m from 08 to 14 June 2022, and still stayed about 0.46 m higher than its LTA level, **which is considered normal**.

Moreover, water level at Chiang Khan in Thailand from 08 to 14 June 2022 increased by about 0.46 m (about 2.08 m higher than its LTA value), while water level at Vientiane increased about 0.14 m and still stayed about 2.21 m higher than its LTA level, which **considered normal**. Water levels at Nong Khai decreased 0.04 m and at Paksane decreased about 0.44 m, staying about 1.12 m and 0.24 m higher than their LTA value, respectively.

Water levels from Nakhon Phanom in Thailand and Pakse in Lao PDR decreased between 0.20 m and 0.50 m. The current WLS at Khong Chaim to Pakse were staying about 0.50 m and 0.85 m higher than their maximum level, considering **normal**. From the stretches of the river from Stung Treng to Kratie, water level decreased from 0.26 m to 0.57 m, staying 0.72 m and 1.61 m higher than their LTA level, respectively.

Water levels from Kompong Cham down to Chaktomuk, Koh Khel and Phnom Penh Port to Prek Kdam in Cambodia decreased between 0.20 m and 0.50 m, staying between 0.05m and 0.70 m higher than their LTA level.

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>.

The current water levels from Chiang Saen in Thailand to Kompong Cham in Cambodia are higher than their LTA value, except the 2 tidal stations at Tan Chau and Chau Doc which are below their LTA value due to tidal effect during this monitoring period.

Based on hydrological phenomenon, the contribution of inflow water from the upstream of Lancang-Mekong in China to the Mekong mainstream is from 16% to 18% in total during the wet season from June to October. 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

The water level from 08 to 14 June 2022 at Thailand’s Chiang Saen decreased from 3.73 m to 3.65 m, showing 0.46 m higher than its Long-Term-Average (LTA) value, which considered normal. The water level at Luang Prabang station in Lao PDR significantly increased from 9.98 m to 10.80 m during the reporting period. This level shows 0.66 m higher than its long-term-maximum value (about 4.26 m higher than its LTA value). The trend – sometimes higher or lower to its historical maximum and LTA values – has been observed since early 2022. The phenomenon was potentially caused by upstream dam operations, downstream Xayaburi dam, and heavy rainfall in the surrounding areas. 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 of wet and dry season.**

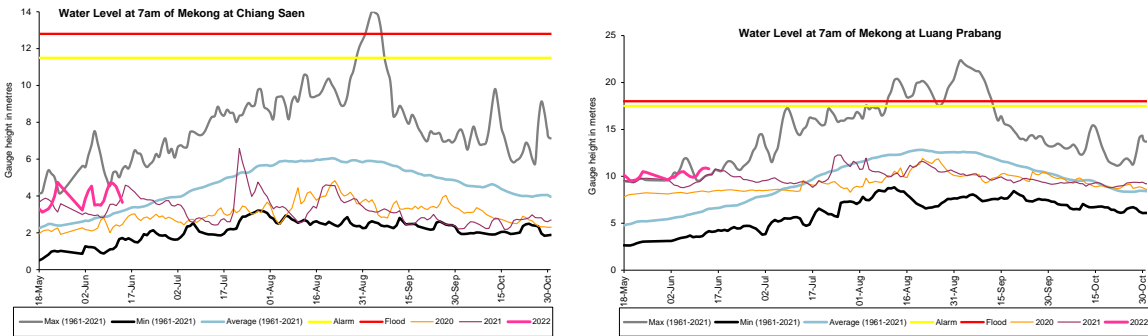


Figure 8. Water levels at Chiang Saen in Thailand and Luang Prabang in Lao PDR.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand (downstream of the Xayaburi dam) increased from 7.92 m to 8.38 m during the reporting week. It showed 2.08 m higher than its LTA value. The water level downstream at Vientiane in Lao PDR followed the upstream trend. It also increased from 5.28 m to 5.42 m and was about 2.21 m higher than its LTA during 07-14 June 2022. At Nong Khai station in Thailand, the water level was down during the reporting period. It decreased about 0.04 m from 5.06 m to 5.02 m and showing 1.12 m higher than its LTA. At Paksane in Lao PDR, water levels decreased about 0.44 m, dropping from 6.30 m to 5.86 m. The water levels at these stations were still about 1.12 m and 0.24 m higher than its LTA respectively. The recently decreased water levels were obviously due to the low rainfall in the

sub-catchment area, amid the inflows and water storing from upstream. The water levels at Vientiane and Paksane are shown in [Figure 9](#) below.

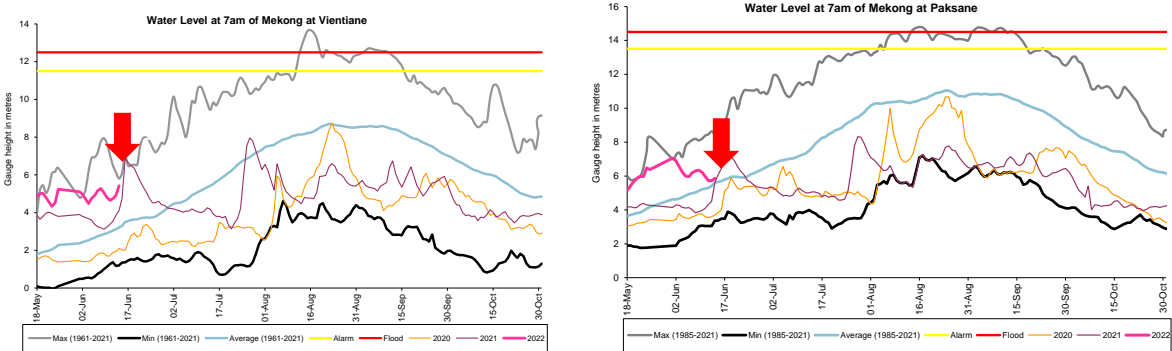


Figure 9. Water levels Veintiane and Paksane in Lao PDR.

Nakhon Phanom to Pakse

The water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR were decreasing between 0.20 m and 0.55 m due to less rainfall and inflow from upstream. **Water levels at these stations are still staying higher than their LTA level, which considered normal.** [Figure 10](#) shows the water levels at Nakhon Phanom and Pakse stations.

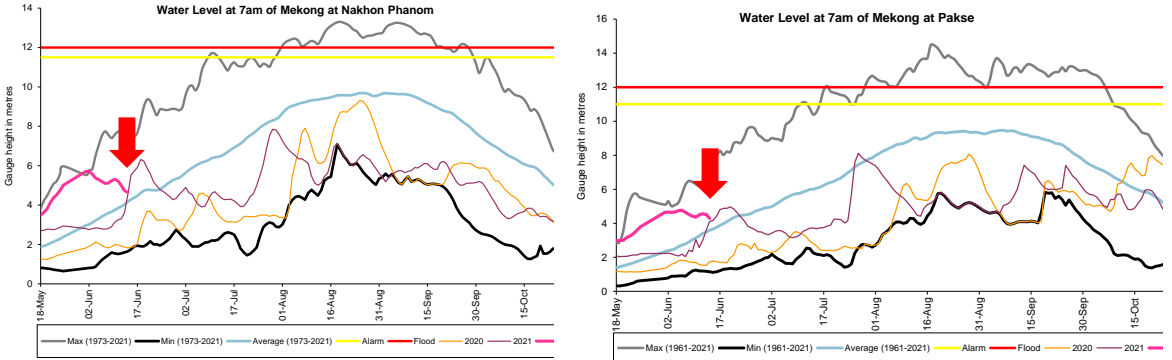


Figure 10. Weekly water levels at Nakhon Phanom in Thailand and Pakse in Lao PDR

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

Following the same trend 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 down, during 08-14 June 2022. This week water level at Stung Treng and Kratie decreased about 0.26 m and 0.57 m, respectively, remaining about 0.72 m and 1.61 m above their LTA (as showed in [Figure 11](#)). The water level at Kompong Cham decreased about 0.52 m and was about 0.75 m higher than its LTA. Generally, the **Water levels at these stations were higher than their LTA, which considered normal.**

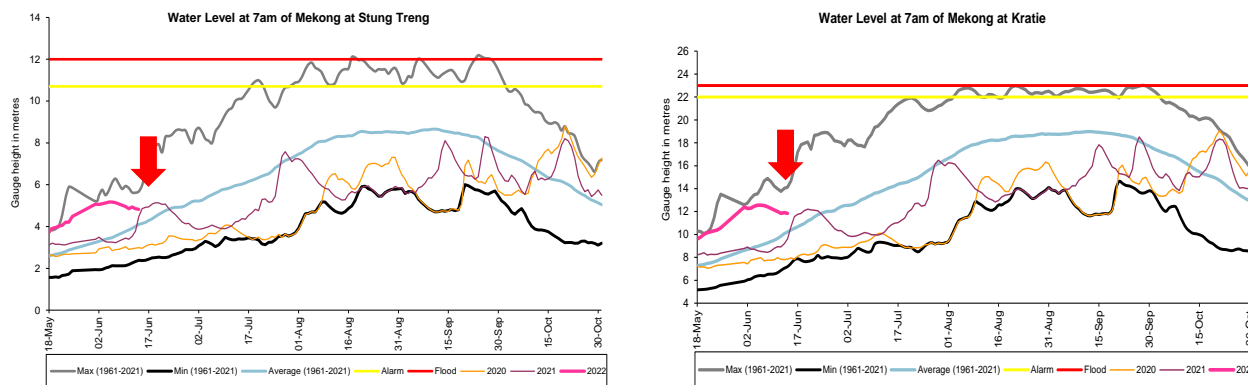


Figure 11. Water levels at Stung Treng and Kratie on the Mekong River.

However, at Chaktomuk on the Bassac River, due to less rainfall and contributed flows from upstream catchment, the water level was down by about 0.22 m and stayed 0.24 m higher than its LTA value; while at Koh Khel, water level decreased about 0.19 m, staying 0.67 m higher than its LTA value. The water level at Prek Kdam on the Tonle Sap Lake decreased about 0.22 m and was about 0.41 m higher than its LTA value. The water level at the Tonle Sap Lake (observed at Kampong Luong) was similar to Prek Kdam station's water level. The recently decreased water level was because of less rainfall and low inflow contributed from upstream of the Tonle Sap Lake area during the reporting period. The water level at the Tonle Sap Lake (observed at Kampong Luong) followed the same trend of Prek Kdam station's water level. **Water levels at these stations were staying higher than their LTA level, which still considered normal.**

Tidal stations at Tan Chau and Chau Doc

Like last week, the water levels from 7 to 14 June 2022 at Viet Nam's Tan Chau and Chau Doc were fluctuating due to daily tidal effects from the sea. The fluctuation levels were between 0.30 m and 1.50 m; they were in between the range of their LTA and historical minimum levels and **considered critical**. The current water level at Chau Doc is slightly higher than its maximum level up to 14 June 2022.

The Tonle Sap Flow

At the end of the dry season, when water levels along the Mekong River rise and the inflows of the Mekong River return into the Tonle Sap Lake. This phenomenon normally takes place from end of May to July. Based on flow observation at Prek Kdam, the inflow of the Tonle Sap Lake took place since 29 May 2022.

[Figure 12](#) shows the seasonal changes of the inflow/reverse flow and the inflow of the TSL at Prek Kdam in comparison with the flows of 2019 and 2020, and their LTA level (1997-2020). Up to June 14 of this reporting period, **it was observed that the main inflow into Tonle Sap Lake decreased due to less rainfall and inflows from upstream**. This decreased inflow into the Tonle Sap Lake was most likely caused by low inflows and less rainfall from the catchment area. Up to present, the inflow into the Tonle Sap Lake condition in 2022 is higher than 2019, 2020, 2021 and even its LTA (1997-2021) inflow conditions. For next week, some rainfall is forecasted for the Tonle Sap area; thus, the outflow from the Tonle Sap Lake is likely continuing to slightly decrease from the current level.

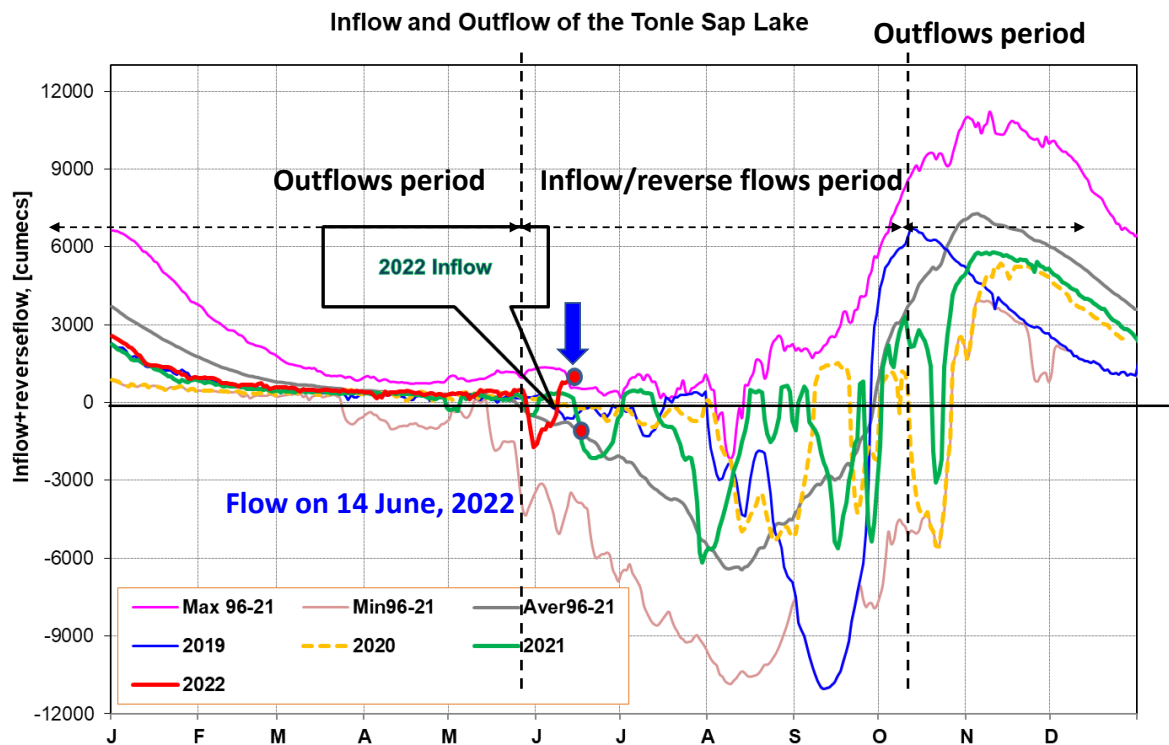


Figure 12. Seasonal change of inflows and outflows of Tonle Sap Lake

[Figure 13](#) shows seasonal changes in monthly flow volumes up to 14 June 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 June 14, **the water volume of the Tonle Sap Lake was even higher than 2019, 2020, 2021 and its LTA (121.69%), 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 tributaries and rainfall in the surrounding sub-catchments and **considered normal.**

This demonstrates the influence of the relationships of the reverse and out 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.

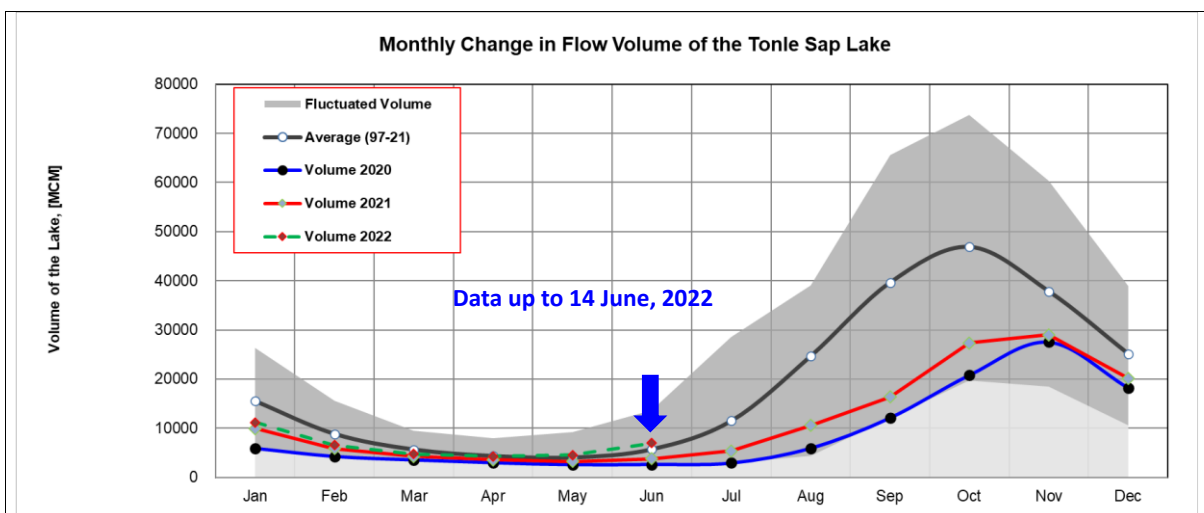


Figure 13. The seasonal change in monthly flow volume of Tonle Sap Lake.

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]	Percentage of Volume in 2021 [%]
Jan	15523.23	26357.53	5906.80	13633.41	10285.31	5906.80	9923.80	11214.32	72.24
Feb	8837.89	15596.22	4198.60	7729.72	6019.30	4264.19	5832.97	6558.79	74.21
Mar	5654.18	9438.24	3347.07	5037.06	4354.62	3553.99	4264.88	4736.52	83.77
Apr	4346.65	8009.14	2866.91	3956.47	3667.47	2992.61	3556.68	4288.31	98.66
May	4030.23	9176.93	2417.81	3864.00	3266.43	2594.92	3240.78	4556.83	113.07
Jun	5708.30	13635.01	2468.70	5919.18	3517.06	2641.88	3798.29	6946.45	121.69
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, compared with historical Min values								
	Normal condition, compared with LTA (Long term average)								
	Low volume situation, compared with LTA values								
Unit: Million Cubic Meter (1 MCM= 0.001 Km ³)									

4 Flash Flood in the Lower Mekong Basin

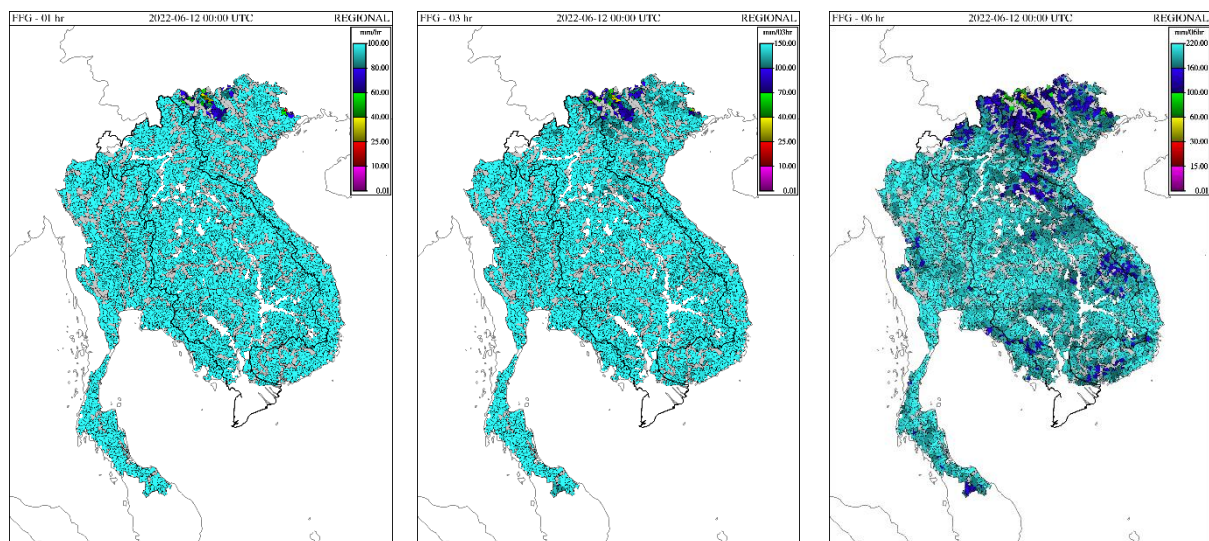
From June 7 to 13, the LMB was affected by two weather factors including (i) low-pressure cell which covered upper Viet Nam and (ii) moderate southwest monsoon prevailed over Thailand and the Gulf of Thailand during the first half of the week then it weakened. These conditions caused moderate and heavy rainfall in some areas from the upper to the lower part of the LMB.

According to the MRC-Flash Flood Guidance System (MRC-FFGS) and analysis, flash flood events were detected during the reporting period in several areas in northwest Viet Nam ranging from low to high risk level, as shown in [Figure 14](#) and [Table 2](#).

Table 2. Detected flash flood in Viet Nam on June 1.

Rate-risk and location of the flash flood may occur in the next 1, 3, and 6 hours in Viet Nam											
Date of FFG products 12/6/2022 0:00 UTC time											
01-Hour Flash Flood Risk and Location				3-Hour Flash Flood Risk and Location in Vietnam				6-Hour Flash Flood Risk and Location in Vietnam			
Provinces	Districts	Region	Level Risks	Provinces	Districts	Region	Level Risks	Provinces	Districts	Region	Level Risks
Lang Son	Chi Lang	Northeast	Low-Risk	Lang Son	Loc Binh	Northeast	Moderate-Risk	Lang Son	Chi Lang	Northeast	Low-Risk
Lang Son	Dinh lap	Northeast	Low-Risk	Lao Cai	Bat Xat	Northwest	Moderate-Risk	Lang Son	Dinh lap	Northeast	Low-Risk
Lai Chau	Muong Te	Northwest	Low-Risk	Lao Cai	Than Uyen	Northwest	Moderate-Risk	Lai Chau	Muong Lay	Northwest	Low-Risk
Lang Son	Loc Binh	Northeast	High-Risk	Lao Cai	Sa Pa	Northwest	Moderate-Risk	Lang Son	Loc Binh	Northeast	Moderate-Risk
Lao Cai	Bat Xat	Northwest	Moderate-Risk	Lai Chau	Sin Ho	Northwest	Low-Risk	Lao Cai	Bat Xat	Northwest	Moderate-Risk
Lao Cai	Than Uyen	Northwest	Moderate-Risk	Lao Cai	Than Uyen	Northwest	Low-Risk	Lao Cai	Than Uyen	Northwest	Moderate-Risk
Lao Cai	Sa Pa	Northwest	Moderate-Risk	Lai Chau	Muong Lay	Northwest	Low-Risk	Lao Cai	Van Ban	Northwest	Low-Risk
Lai Chau	Sin Ho	Northwest	Low-Risk	Lai Chau	Sin Ho	Northwest	Low-Risk	Lao Cai	Sa Pa	Northwest	Moderate-Risk
Lao Cai	Bat Xat	Northwest	Low-Risk	Lai Chau	Muong Te	Northwest	Low-Risk	Son La	QuyNh Nhai	Northwest	Low-Risk
Lai Chau	Muong Lay	Northwest	Low-Risk					Yen Bai	Mu Cang Chai	Northwest	Low-Risk
Lai Chau	Sin Ho	Northwest	Low-Risk					Lai Chau	Muong Te	Northwest	Low-Risk
								Lai Chau	TX. Lai Chau	Northwest	Low-Risk
								Yen Bai	Tram Tau	Northwest	Low-Risk
								Ha Giang	Xin Man	Northeast	Low-Risk
								Ha Giang	Bac Quang	Northeast	Low-Risk
								Lai Chau	Sin Ho	Northwest	Low-Risk

Figure 14. Flash Flood Guidance for the next 1 hour, 3 hours and 6 hours on June 12.



5 Drought Monitoring in the Lower Mekong Basin

Weekly drought monitoring from 5 to 11 June 2022

Drought monitoring data for 2022 are available from Sunday to Saturday every week; thus, the reporting period is normally delayed by three 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)**

The meteorological drought indicator of SPI from June 5 to 11, as displayed in [Figure 15](#), shows **severely dry taking place in the north covering Xayaburi, Vientiane province, Vientiane Capital, Nong Khai, and Loei**. It also shows some moderate dry in Chiang Rai. In the south, moderate dry took place in Si Saket, Surin, Chanthaburi, Battambang, Stung Treng, Kampong Cham, Kandal, and Tay Ninh. The other areas were normal.

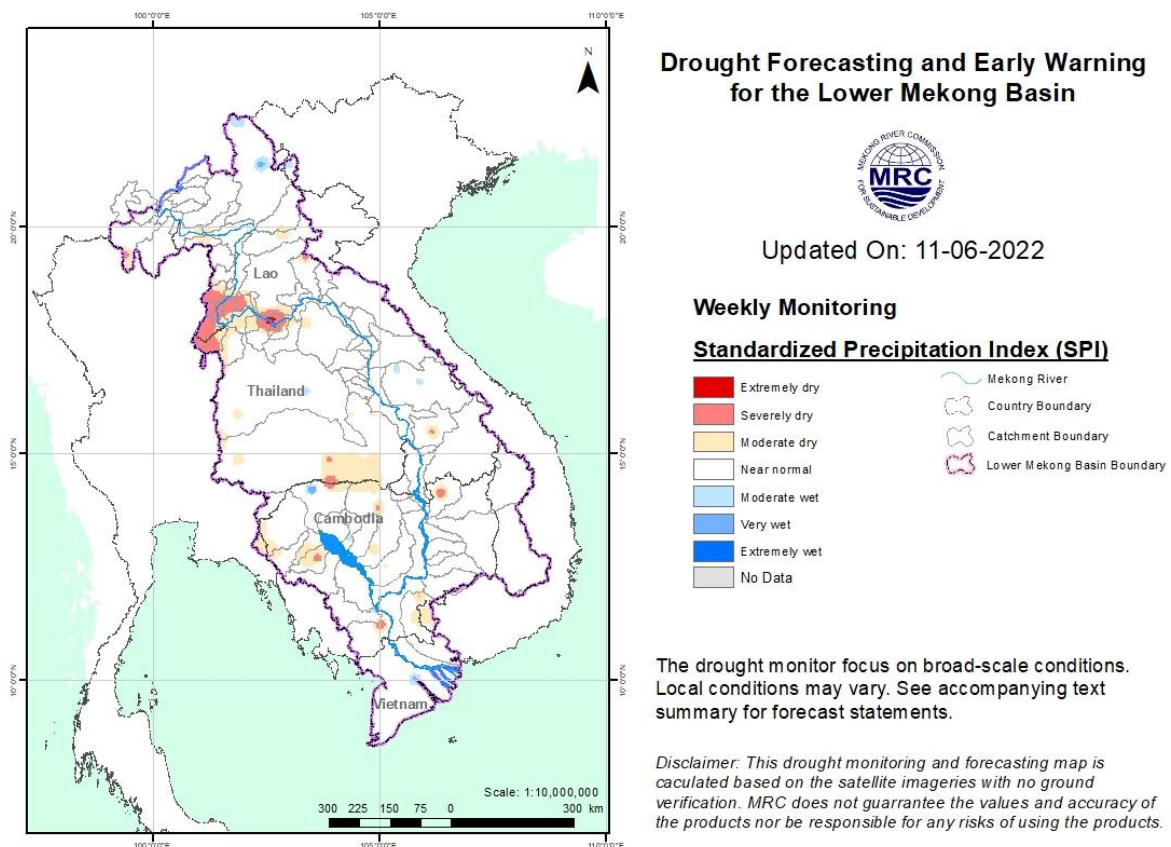


Figure 15. Weekly standardized precipitation index from 5 to 11 June 2022.

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

Unlike SPI, the soil water fraction from June 5 to 11, as displayed in [Figure 16](#), shows normal condition in all over the LMB except some moderate dry condition in some areas of Loei, Surin, Battambang, Banteay Meanchey, and Dak Lak. However, the condition was not significant.

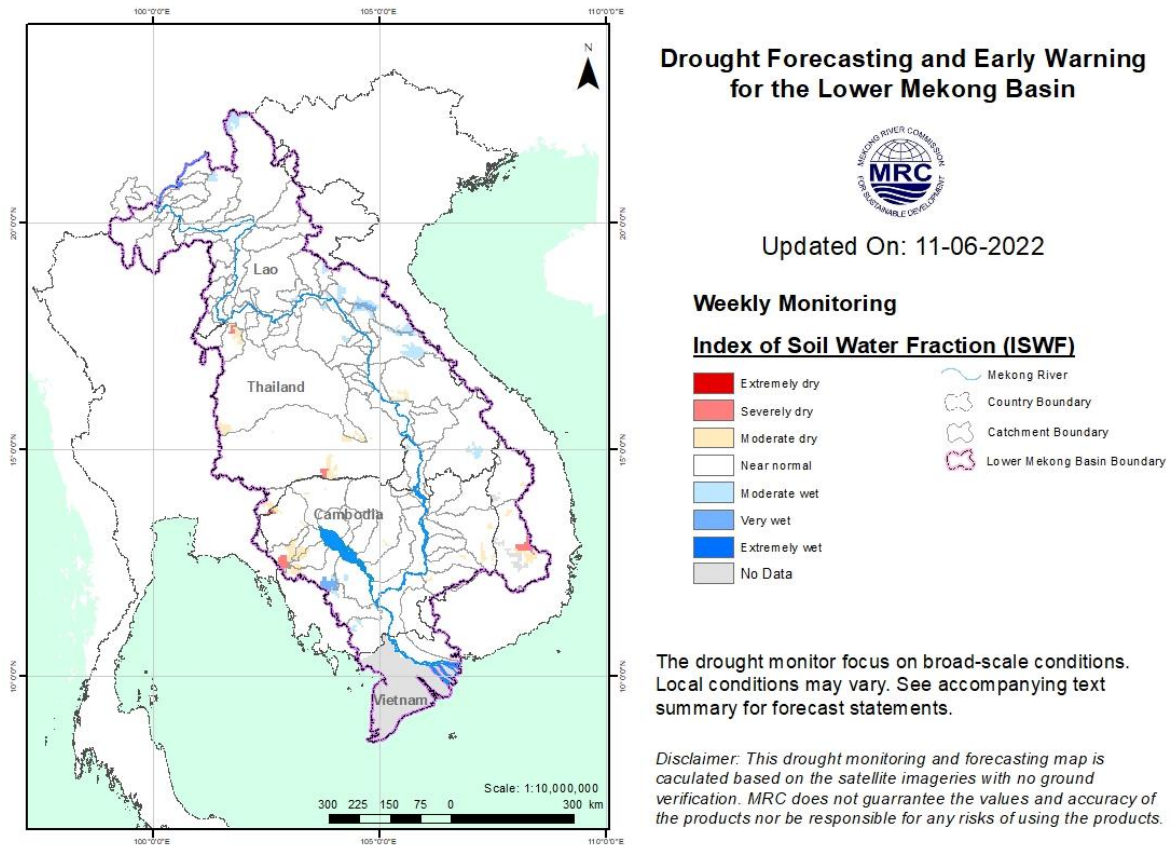


Figure 16. Index of Soil Water Fraction from 5 to 11 June 2021.

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

The combined drought indicator from the meteorological and agricultural indices, as displayed in [Figure 17](#), shows that the LMB were facing some moderate drought in some areas of Xayaburi, Loei, and Nong Khai in the north and Surin and Battambang in the South. However, the condition scattered in small areas which was not giving any serious effect to the people in the areas.

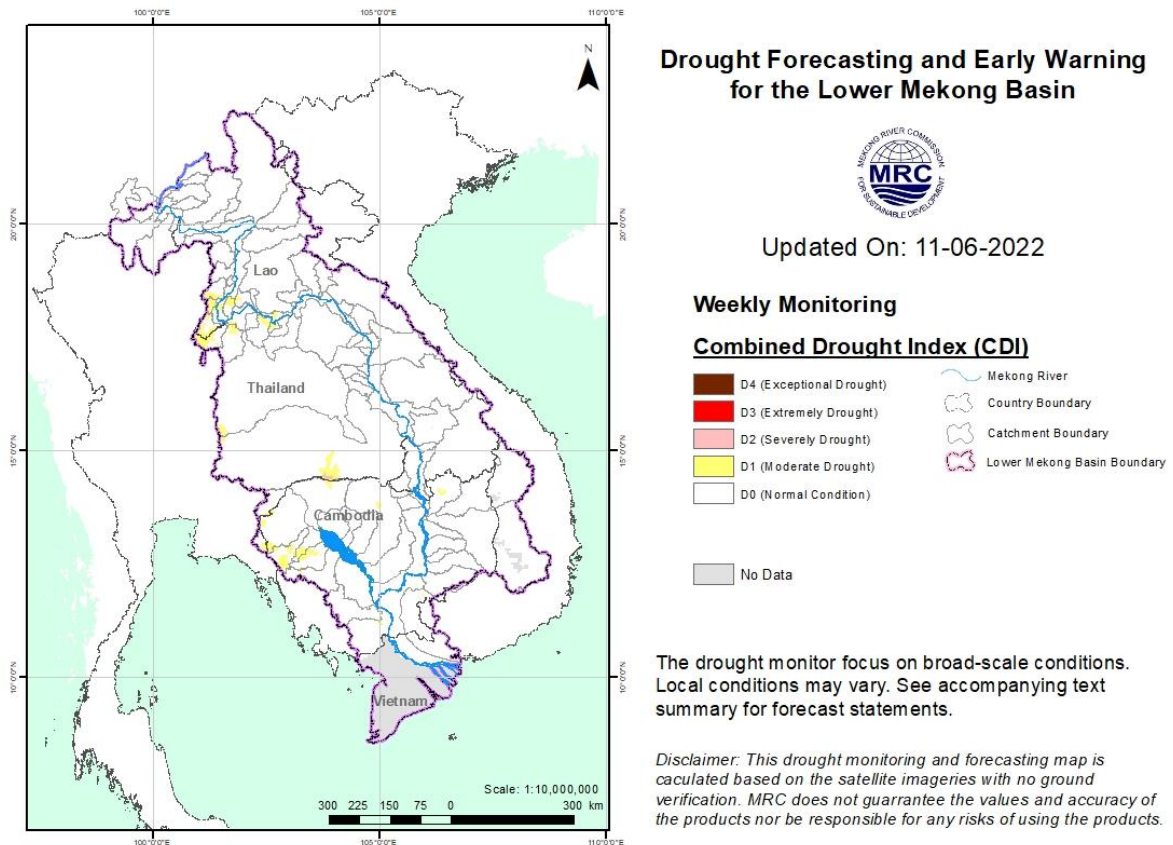


Figure 17. Weekly Combined Drought Index from 5 to 11 June 2022.

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.

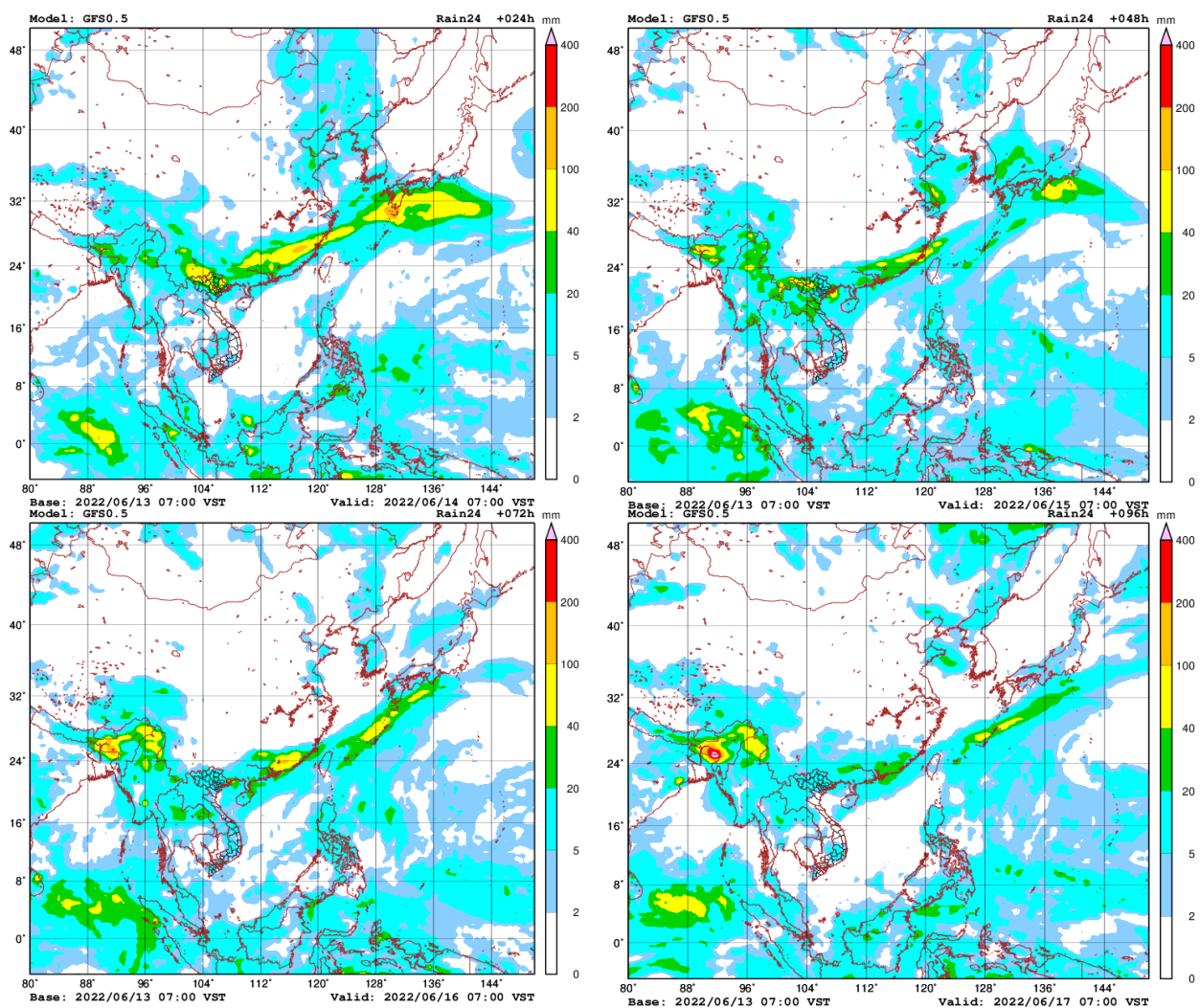
6 Weather and Water Level Forecast and Flash Flood Information

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, the southwest monsoon and low-pressure cell will continue prevailing over the LMB.

In general, from June 14 to 20, small (5 -20 mm/24h) amount of rainfall will likely occur over the LMB. However, from June 14 to 15, moderate (20-50mm/24h) rainfall will likely happen in some areas in the upper part of the LMB.

[Figure 18](#) shows accumulated rainfall forecast (24 h) of the GFS model from June 14 to 20.



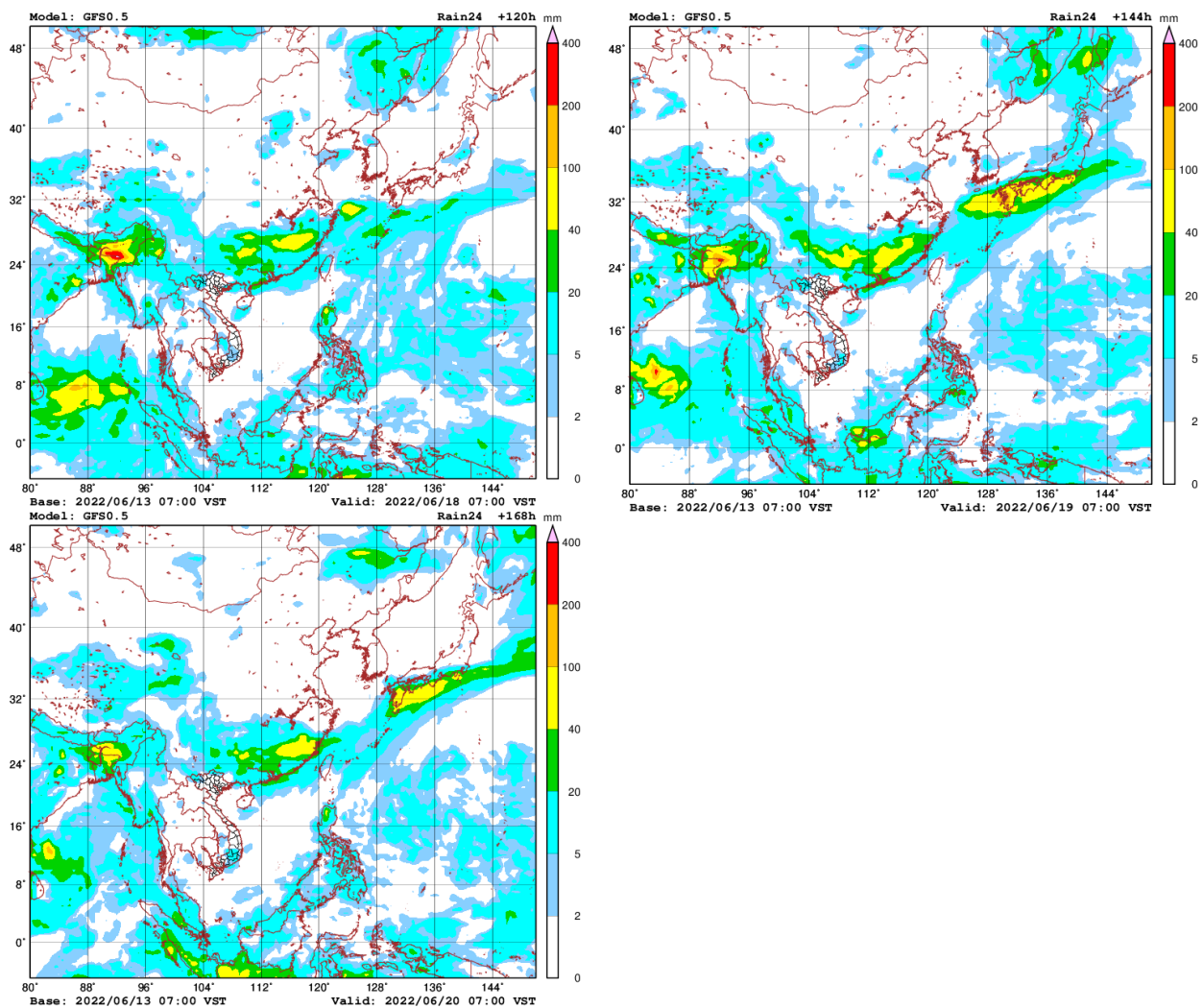


Figure 18. Accumulated rainfall forecast (24 h) based on a GFS model.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on June 14's daily flood forecasting bulletin, the daily forecasted water level at Chiang Saen in Thailand is expected to increase from 3.65 m to 3.88 m over the next five days. The trend will keep the water level at this station above its LTA.

For Luang Prabang in Lao PDR, the water level will decrease from 10.80 m to 10.63 m during the next five days. The current water level is higher than its LTA. Precipitation is forecasted for the area between Chiang Saen and Luang Prabang next week.

Chiang Khan, Vientiane-Nong Khai and Paksane

The water level at Chiang Khan in Thailand is forecasted to go down approximately 0.33 m, while water level at Vientiane in Lao PDR will also decrease about 0.10 m. Furthermore, from Nong Khai in Thailand, the water level will decrease also about 0.10m over the next five days;

at Paksane in Lao PDR water level will increase about 0.45 m due to forecasted rainfall in the upper catchments. Rainfall is forecasted for the area of Paksane next week.

The water levels at these stations are remaining lower than their LTA.

Nakhon Phanom to Pakse

The water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR are forecasted to go up between 0.20 m and 0.60 m over the next five days. Water level at these stations will stay close to their LTA level. Rainfall is forecasted for the area next week.

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 down from 0.10 m to 0.50 m over the next five days. Precipitation 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 0.30 m over the next five days.

Water levels at most of the stations will continue to stay higher 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. Precipitation 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, the water levels will be fluctuating above their minimum level, following daily tidal effects from the sea. Rainfall is forecasted for the Delta area next week.

The performance of the weekly flood forecast, with an accuracy and data input evaluation from 8 to 14 June 2022, is presented in **Annex 1**.

[Table 2](#) shows the daily flood forecasting Bulletin issued on 14 June 2022. Results of the weekly river monitoring bulletin are also available at http://ffw.mrcmekong.org/bulletin_wet.php.

6.3 Flash Flood Information

With small and moderate rainfall forecasted for next week, flash floods with high level are not expected to take place in the LMB. However local heavy rain in a short period of time is possible with unexpected short flash floods. The information on flash flood guidance for the next one, three, and six hours is updated twice a day at: <http://ffw.mrcmekong.org/ffg.php>.

Detailed information on Flash Flood Warning Information 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 November 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 18](#) shows the ensemble mean of daily average precipitation (mm/day) each month from July to November 2022 produced by the NMME.

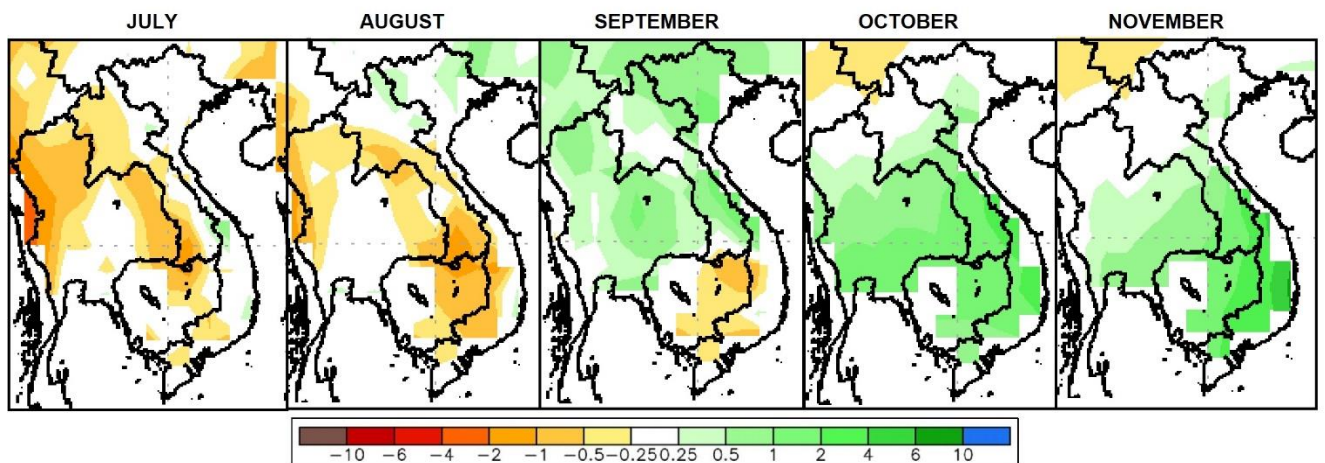


Figure 19. Daily average of monthly rainfall anomaly forecast from July to November 2022.

The ensemble prediction model based on the initial conditions in June 2022 reveals that the LMB is likely to receive below-average rainfall in **July and August** with equivalent from **moderate to severe meteorological droughts**. Below-average rainfall is also forecasted for the lower part of the region covering **Cambodia and Viet Nam during this coming September with moderate drought**. While in October and November the LMB is likely to receive more than average rainfall, meaning no drought threat is predicted for the LMB.

The 2021 dry season is relatively wetter than that of 2020 and the monsoon rain in 2022 might come on time or even earlier than normal year.

7 Summary and Possible Implications

7.1 Rainfall and its forecast

Rain was observed from Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam during June 8-14, including the lower part in Lao PDR and Cambodia, varying from 1.60 mm to 86.10 mm due to low-pressure dominating the LMB. However, this week rainfall was considered low at the middle and lower parts of the LMB compared with last week rainfall.

Based on the forecasted satellite data, rainfall is forecasted for some areas of the LMB with the value range from 30 mm to 100 mm for the next seven days. The forecasting model using GFS data, moreover, shows that no significant rainfall (<100 mm) is likely to take place in the Mekong region from 15 to 22 June 2022.

7.2 Water level and its forecast

According to MRC's observed water level at Jinghong, it showed a significant decrease of about 1.35 m from 537.81 m to 536.69 m from 08 to 14 June 2022 (recorded on 7:00 am), staying about 0.08 m higher than its Long-Term-Average (LTA: 2015-2021) value. The outflow at Jinghong station decreased from 2810.00 m³/s to 1830.00 m³/s from 08 to 14 June 2022.

Along with the decreased outflow from Jinghong upstream, water levels of monitoring stations at Chiang Saen in Thailand also decreased about 0.10 m from 8 to 14 June 2022. However, from Chiang Khan in Thailand to Vientiane in Lao PDR, water levels increased about 0.25 m during June 8-14 due to some rainfall in the area and influence of dam operation. Water levels from Nakhon Phanom in Thailand to Pakse in Lao PDR, on the other hand, were decreasing. Water levels from the stretches of the river from Stung Treng to Kratie and at Kompong Cham in Cambodia, moreover, were also decreasing, due to less contributed rainfall from the upstream part (at Pakse and 3S area in Viet Nam).

Over the next five days, the water levels from Stung Treng to the lower part at key stations in Cambodia are expected to go down between 0.05 m and 0.30 m.

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

From Stung Treng to Kratie, the water levels will continue staying higher than their LTA value. 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 continue higher than their LTA.

The situation in Tan Chau on the Mekong River and Chau Doc on the Bassac River is expected to remain unchanged.

Since the fourth week of October 2020, 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 and November 2020 to May 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 amount of rainfall for the coming week as mentioned earlier in [section 6.1](#), the major flash floods are not expected in the LMB during next week. However local heavy rain in a short period of time is possible with unexpected short flash floods.

7.4 Drought condition and its forecast

During June 5-11, the LMB was facing some moderate and severe meteorological droughts **in the north covering Chiang Rai, Xayaburi, Vientiane province, Vientiane Capital, Nong Khai, and Loei** and moderate drought in the south covering Si Saket, Surin, Chanthaburi, Battambang, Stung Treng, Kampong Cham, Kandal, and Tay Ninh. However, no significant agricultural drought threat was found during the monitoring week.

For the upcoming three months’ forecasts, the LMB is likely to receive below-average rainfall **in July and August** with equivalent from **moderate to severe meteorological droughts**. Below-average rainfall is also forecasted for the lower part of the region covering **Cambodia and Viet Nam during this coming September with moderate drought**. While in October and November the LMB is likely to receive more than average rainfall, meaning no drought threat is predicted for the LMB.

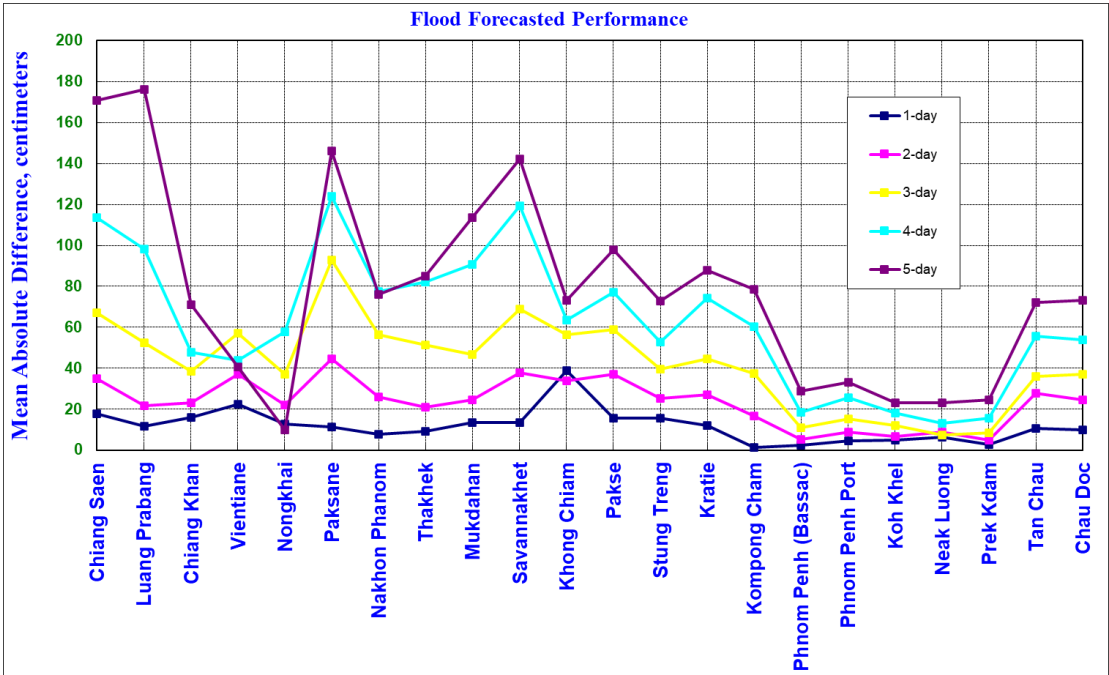
Annex 1: Performance of the weekly flood forecasting

Accuracy

“Accuracy” here refers to the state where data recorded in the MRC’s Mekong River Flood Forecasting System are cleaned and verified.

The adjustment of flood forecasting outcomes from the flood forecasting system requires flood forecasters to have extensive knowledge in hydrology and statistical modelling for estimating the relationships between stations upstream and downstream in the Mekong River Basin. Flood forecasting performance presented in the graph below shows the average flood forecasting accuracy at each key station along the Mekong mainstream from 1-7 June 2022.

The forecasting values from 8-14 June 2022 show that the overall accuracy is fair for a one-day to five-day forecast in lead time at stations in the lower parts of the Mekong River from Luang Prabang in Lao PDR to Savannakhet due to some effect of rainfall and dams' operation in this area during the report period.



Note: The higher percentage of flood forecasting accuracy is due to several key factors as follows:

- Missing rainfall in Cambodia (DOM) data and data input are not sufficient to be used for inputting into the flood forecasting model system.
- Luang Prabang to Chiang Khan and Stung Treng to Kratie have been effluent by hydropower operations upstream, tributaries inflows.
- The influence of heavy rainfall caused by storms and hydropower operations from upstream, tributaries inflows and the lower part of the Mekong floodplain, including the 3S (Stung Treng and Kratie).

- Khong Chaim, Pakse, Stung Treng and Kratie stations have been affected by heavy rainfall from Viet Nam and some hydropower operations on Sekong, Sesan and Sre Pok (water retention and release). Rainfall always accumulates at this spot, which could be causing rapidly high-water levels.
- Fluctuations of the water levels at Tan Chau and Chau Doc stations were due to daily tidal effects of the sea in the Mekong Delta.
- Satellite rainfall data were not representative of the actual rainfall at ground stations in some areas of the Mekong region.

Performance based on data from the Member Countries

Flood forecasting performance is based on the hydro-met data received from the Member Countries. The flood forecasting achievement indicated in (%) and (cm) from 1 day to 5 days at each key station, against with Old Benchmark are presented in Table B1 and Table B2.

The evaluation of performance indicators, missing data and completion time for flood forecasting are presented in Table B3 and Figures B4, B5 and B6, respectively from 8 to 13, June 2022.

Table B1: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 8 to 13 June, 2022 in cm

Lead-time Forecasted	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
1-day	18	12	16	<u>23</u>	13	11	8	9	13	14	<u>39</u>	16	16	12	1	2	4	5	6	3	11	10
2-day	<u>35</u>	<u>22</u>	<u>23</u>	<u>37</u>	<u>22</u>	<u>45</u>	<u>26</u>	<u>21</u>	<u>25</u>	<u>38</u>	<u>34</u>	<u>37</u>	<u>25</u>	<u>27</u>	17	5	9	7	9	5	<u>28</u>	<u>25</u>
3-day	67	52	<u>39</u>	57	<u>37</u>	93	56	51	<u>47</u>	69	56	59	<u>40</u>	<u>45</u>	<u>37</u>	11	15	12	7	9	<u>36</u>	<u>37</u>
4-day	114	98	<u>48</u>	<u>44</u>	58	124	78	82	91	120	64	77	53	74	60	19	<u>26</u>	18	13	16	56	54
5-day	171	176	71	<u>41</u>	10	146	76	85	114	142	73	98	73	88	79	<u>29</u>	<u>33</u>	<u>23</u>	<u>23</u>	<u>25</u>	72	73

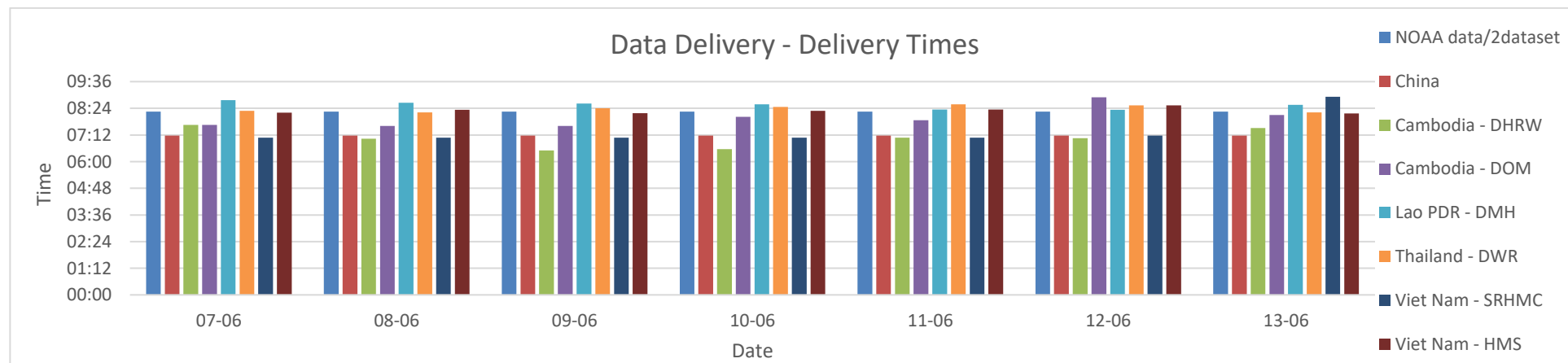
Table B2: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 8 to 13 June, 2022 in %

Lead-time Forecasted	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	Average	
1-day	57.1	57.1	57.1	71.4	<u>28.6</u>	57.1	<u>42.9</u>	57.1	<u>42.9</u>	57.1	57.1	57.1	85.7	57.1	57.1	57.1	<u>42.9</u>	57.1	71.4	<u>42.9</u>	<u>42.9</u>	57.1	<u>55.2</u>	
2-day	66.7	<u>33.3</u>	<u>50.0</u>	83.3	<u>50.0</u>	66.7	<u>50.0</u>	<u>50.0</u>	66.7	66.7	<u>50.0</u>	66.7	83.3	83.3	83.3	66.7	<u>33.3</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>59.1</u>
3-day	60.0	<u>40.0</u>	<u>40.0</u>	<u>40.0</u>	60.0	<u>40.0</u>	<u>40.0</u>	60.0	60.0	80.0	<u>40.0</u>	60.0	80.0	80.0	80.0	60.0	<u>40.0</u>	<u>40.0</u>	60.0	60.0	60.0	<u>40.0</u>	<u>55.5</u>	
4-day	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	75.0	<u>50.0</u>	75.0	75.0	75.0	75.0	<u>50.0</u>	75.0	75.0	75.0	75.0	<u>50.0</u>	<u>60.2</u>	
5-day	66.7	66.7	<u>33.3</u>	66.7	66.7	<u>33.3</u>	<u>33.3</u>	<u>33.3</u>	<u>33.3</u>	66.7	<u>33.3</u>	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	<u>33.3</u>	66.7	<u>56.1</u>	

Table B3: Overview of performance indicators for the past 7 days from 8 to 13 June, 2022

2022	FF time sent				Arrival time of input data								Missing data (number-mainstream and trib.st.)							
	FF completed and sent (time)	Stations without forecast	FF2 completed and sent (time)	Weather data available (time)	NOAA data	China	Cambodia - DHRW	Cambodia - DOM	Lao PDR - DMH	Thailand - DWR	Viet Nam - SRHMC	Viet Nam - HMS	NOAA data/2dataset	China/2	Cambodia - DHRW/15	Cambodia - DOM/34	Lao PDR - DMH/32	Thailand - DWR/13	Viet Nam - SRHMC/6	Viet Nam - HMS/39
week	10:26	#DIV/0!	-	-	08:15	07:10	07:03	07:57	08:33	08:23	07:21	08:17	0	0	0	0	16	0	0	0
month	10:31	#DIV/0!	-	-	08:15	07:10	07:32	07:51	08:32	08:23	07:21	08:18	0	0	0	34	0	0	0	2

Fig. B4: Data delivery times for the past 7 days from 8 to 13 June, 2022



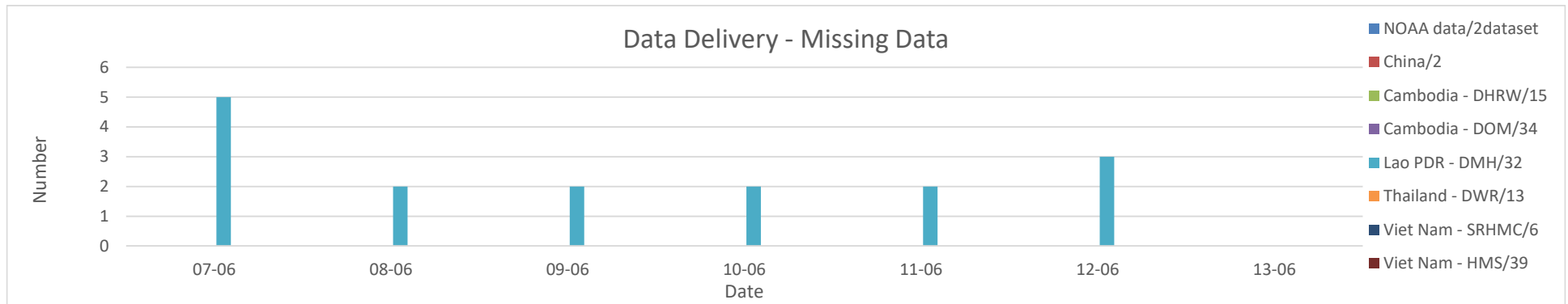
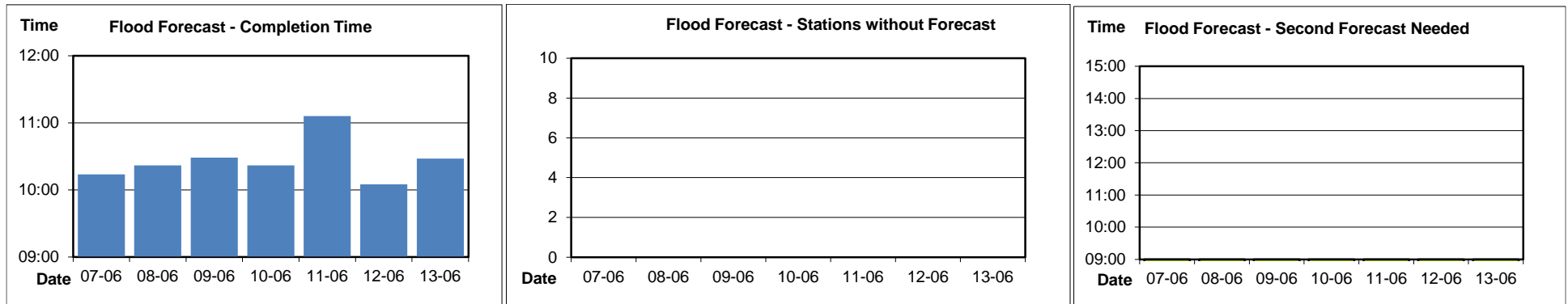


Fig. B5: Missing data for the past 7 days from 8 to 13 June, 2022

Fig. B6: Flood forecast completion time, stations without forecasts, and second forecasts need from 8 to 13 June, 2022





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