



Mekong River Commission

**Weekly Wet Season Situation Report
in the Lower Mekong River Basin
20-26 October 2020**

Prepared by
The Regional Flood and Drought Management Centre
27 October 2020

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1 Introduction

This Weekly Wet Season Situation Report presents a preliminary analysis of the weekly hydrological situation in the Lower Mekong River Basin (LMB) for **20 - 26 October 2020**. 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. All water level indicated in this report refers to a 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 (October, November and December) and the weather maps issued by the Thailand Meteorology Department (TMD) were used to verify weather conditions in the LMB.

Since early October 2020, moderate to above normal rainfall has been observed in the LMB, with the amount gradually increasing from the first week of September. The data from the TMD predict that instances of low pressure and tropical cyclones may continue moving closer to the Mekong region in October, when heavy rainfall often occurs in the Mekong region. The TMD also predicts that scattered thundershowers throughout October and November will continue in the north-eastern part of Thailand (within the Mekong region).

[Figure 1](#) presents the weather map of 26 October 2020, showing two lines of low pressure of the Monsoon Trough crossing the lower Mekong region which can continue to bring heavy rainfall over the next few days.

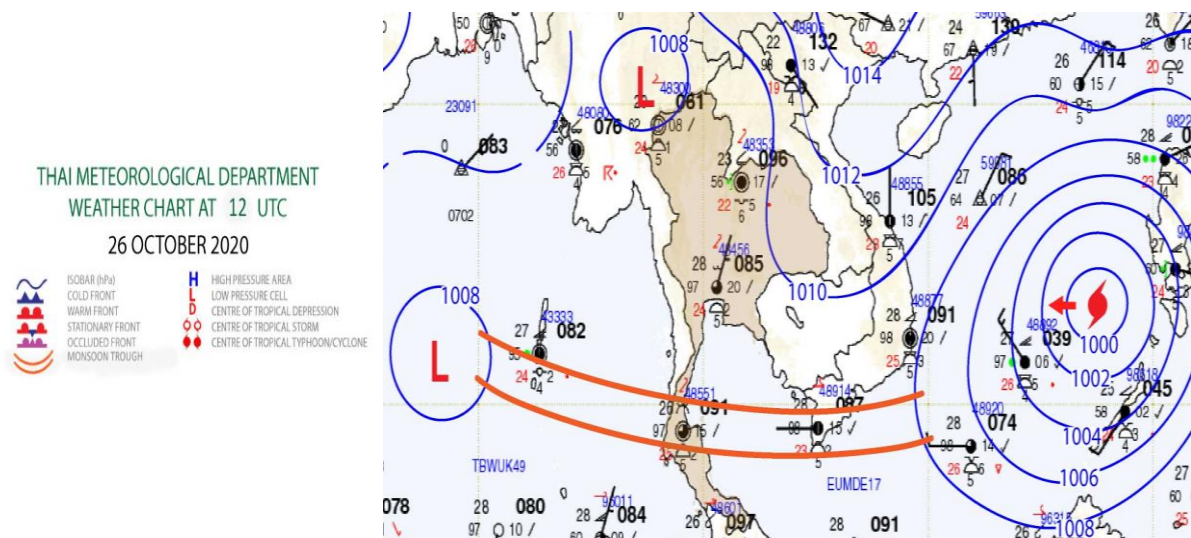


Figure 1: Summary of weather conditions over the LMB.

According to the Asian Specialised Meteorological Centre (ASMC), wetter conditions are predicted over the eastern half of Southeast Asia for the week from October 27 to 30, which can increase showers over the Mekong sub-region. During this time, the ASMC confirms that the wetter conditions in the eastern mainland Southeast Asia (Cambodia, Lao PDR, Viet Nam, and parts of Thailand) will depend on tropical cyclone evolution.

Subsequently, from October to November, there is an increasing chance of above average rainfall for most Asian countries, especially in the Mekong region. [Figure 2](#) shows the outlook of rainfall from October 19 to November 1 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

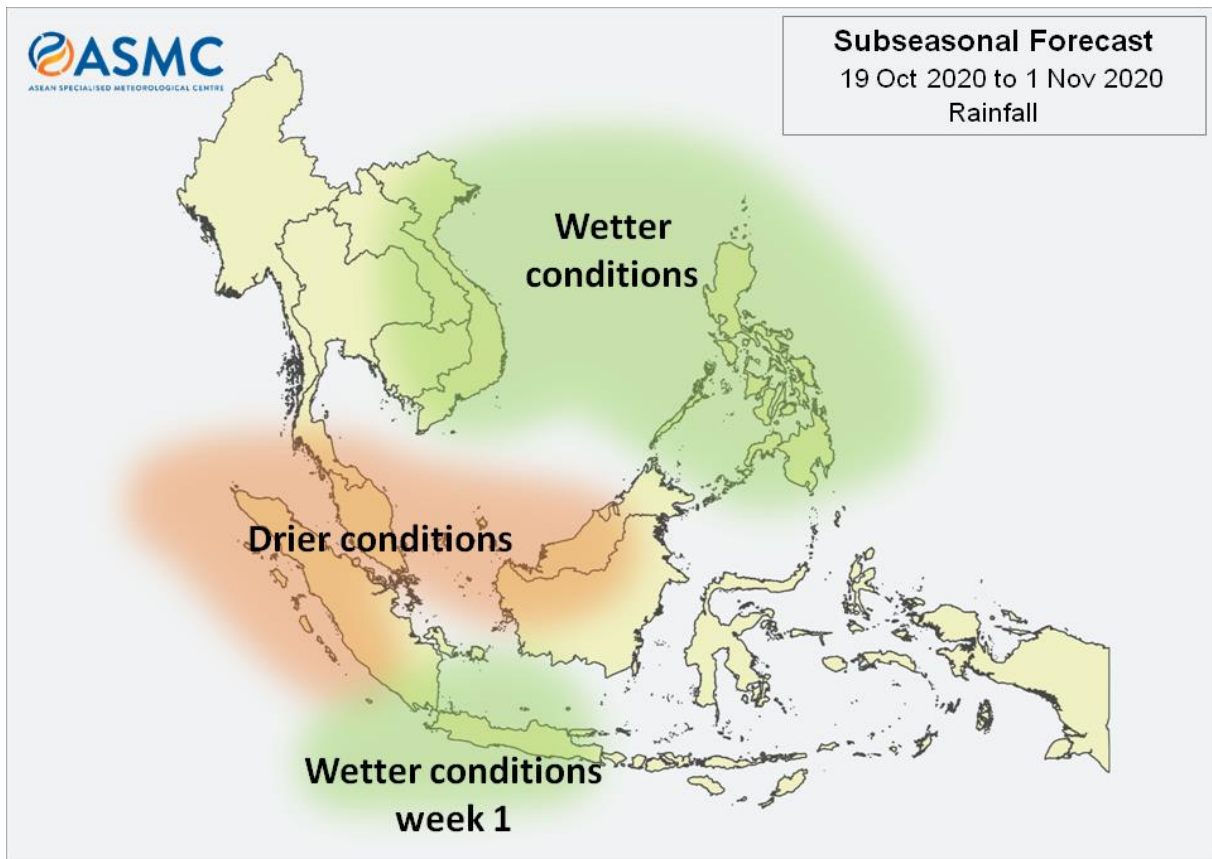


Figure 2: Outlook of rainfall over the Asian countries by ASMC.

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

Based on the Tropical Storm Risk's (TSR) website, Typhoon *Molave* is moving across the Philippines and is expected to hit Viet Nam and the Mekong region on October 28-29. This might cause heavy rainfall in the lower part of the basin from Savannakhet, in the upper part, to Pakse in Lao PDR and from Stung Treng in Cambodia to the lower part, as well as in the 3S area (Se Kong, Se San and Sre Pok) and the Mekong Delta in Viet Nam.

[Figure 3](#) shows the track of Typhoon *Molave*, which is moving from the Sea across Viet Nam to the north-eastern part of the Mekong region. The storm is moving towards the middle part of the basin from Thailand's Nakhon Phanom to Lao PDR's Pakse, including the 3S area.

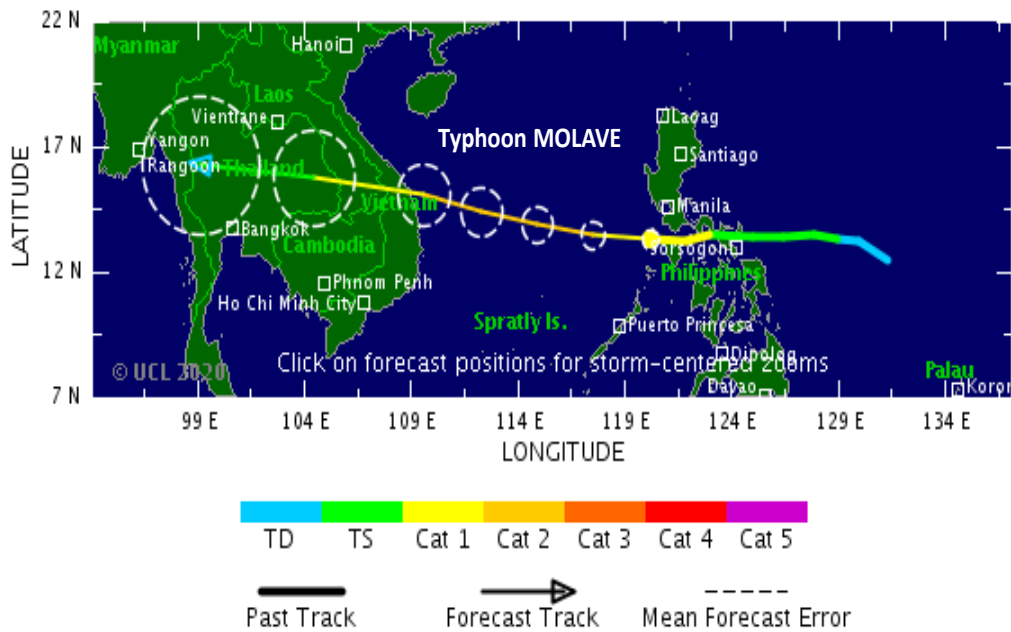


Figure 3: The moving of Typhoon Molave towards the Mekong region, observed on 26 Oct 2020.

Rainfall patterns over the LMB

This week’s rainfall is considered above average, varying from 0.4 mm to 78 mm at different stations along the LMB from Chiang Saen in Thailand to Tan Chau and Chau Doc in Viet Nam. Unlike the situation last week, rainfall during this reporting week concentrated in the middle part of the basin starting from Thailand’s Mukdahan to Lao PDR’s Pakse and the lower part from Cambodia’s Stung Treng to Viet Nam’s Tan Chau and Chau Doc, ranging from 9 mm to 78 mm. But the upper part from Chiang Saen to Nakhon Phanom of Thailand in the LMB received less amount of rainfall compared to other areas. The total observed rainfall of the week at those selected stations is shown in [Figure 4](#).

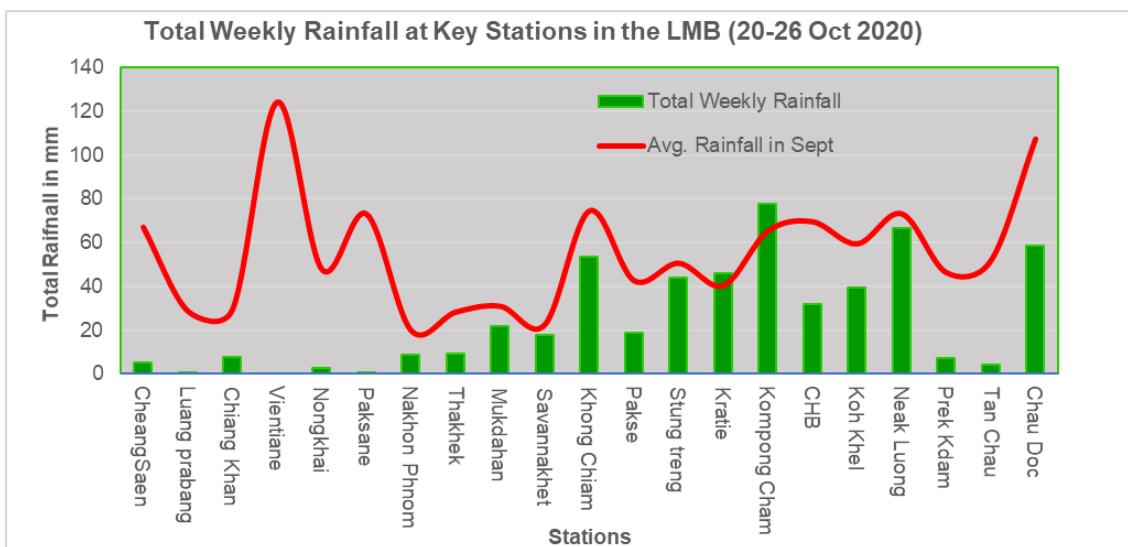


Figure 4: Weekly total rainfall at key stations in the LMB.

To verify area rainfall distribution, [Figure 5](#) shows a map of the weekly accumulated rainfall based on observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 20 to 26 October 2020.

The amount of rainfall this week – from 0.4 mm to 78 mm – is considered lower than average in the whole Mekong region.

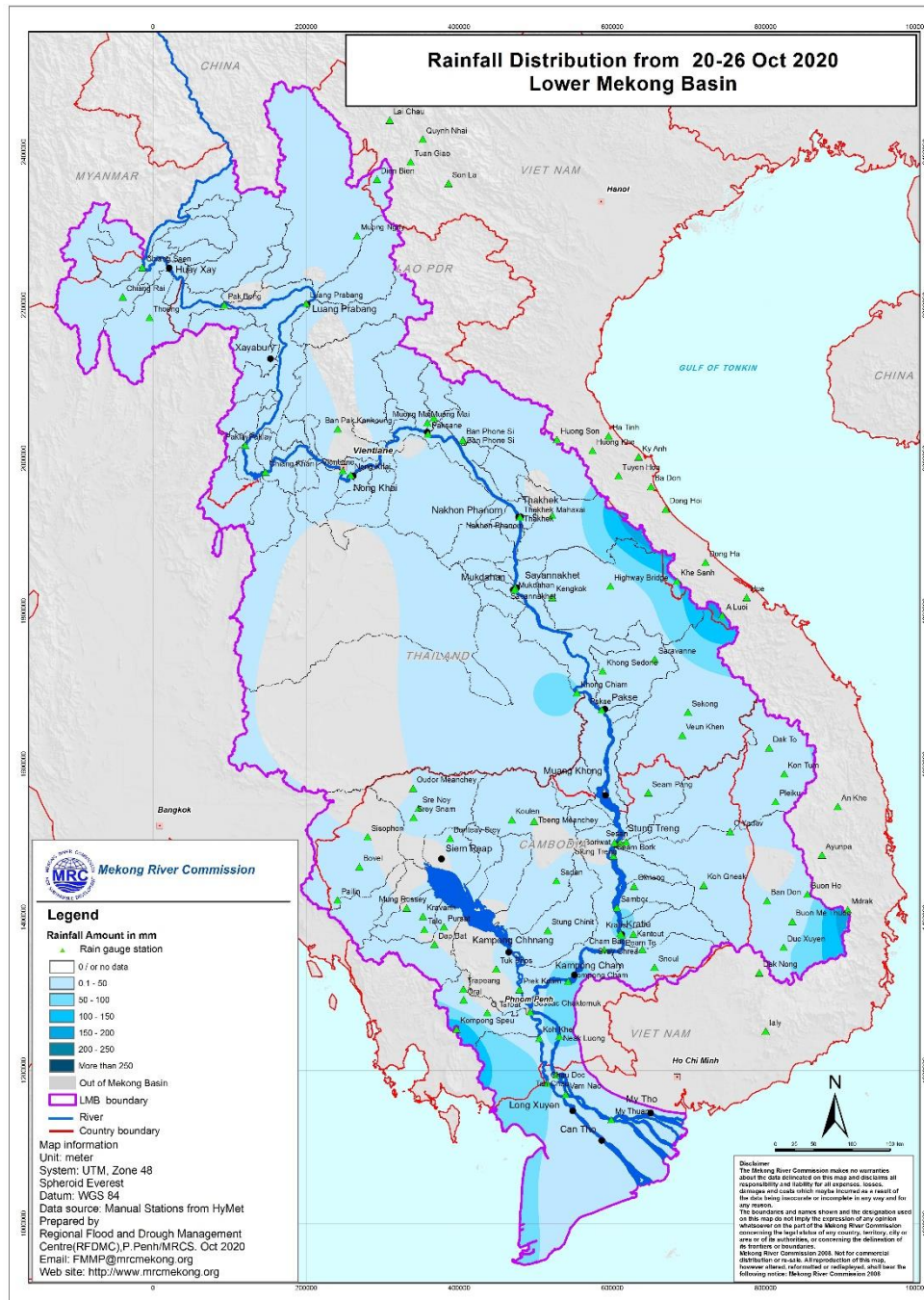


Figure 5: Weekly rainfall distribution over the LMB.

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>.

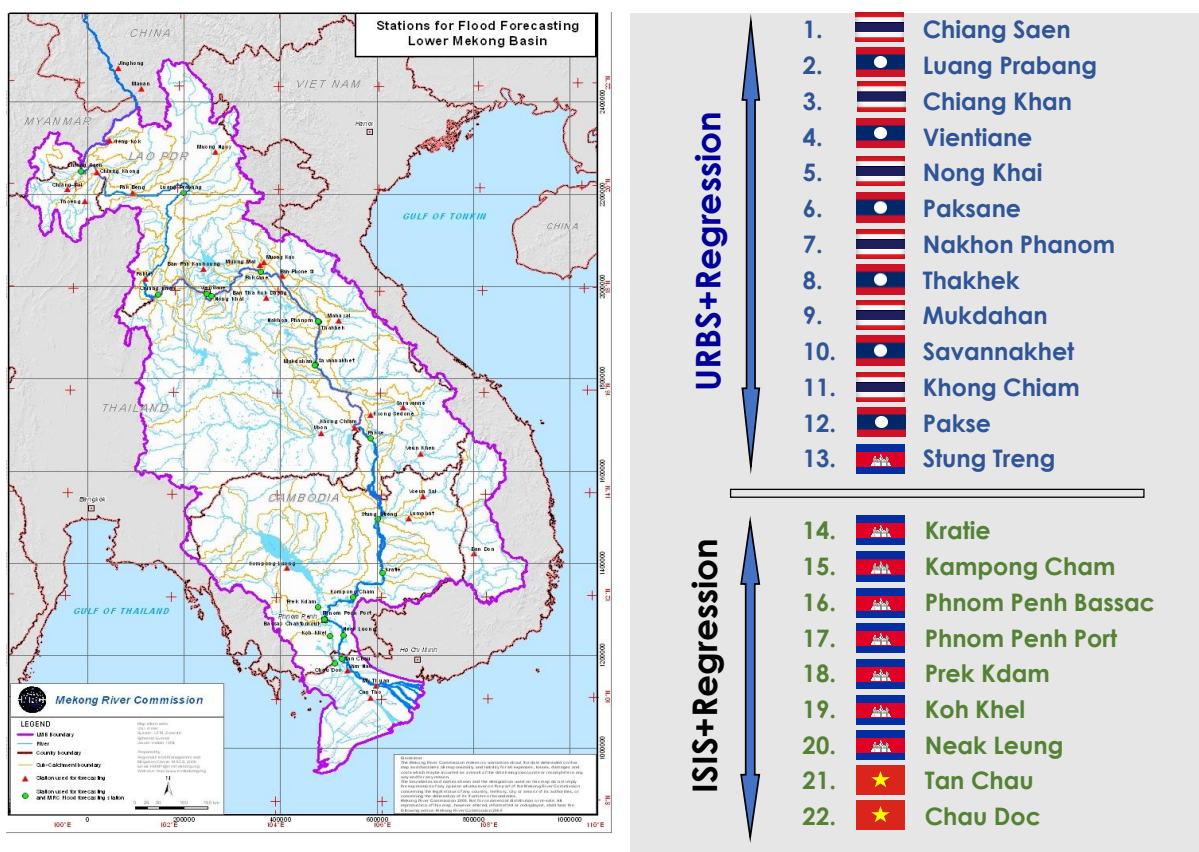


Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.

Chiang Saen and Luang Prabang

Water level during October 20-26 at Thailand’s Chiang Saen was fluctuating between -0.17 metres and 0.27 metres. The main causes of such a phenomenon are believed to be a less quantity of inflow volume from the upstream stemming from Lao PDR, Myanmar and Lancang (Mekong) in China, and low contributing inflows from catchment which were due to continued

low rainfall over the recent weeks. When comparing to last week, this week’s water level is relatively lower.

Water level at Luang Prabang station in Lao PDR was also fluctuating, between -0.08 metres and 0.25 metres, during the reporting period. Compared to last week, the figure shows an increase from 8.83 metres to 9.17 metres. This level is higher than that of 2019 but lower than its long-term average (LTA).

Being situated between the upstream (Nam Beng, Nam Ou, Nam Suong, and Nam Khan) and downstream (Xayaburi) hydropower dams, 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 wet season.**

Chiang Khan, Vientiane-Nong Khai and Paksane

Water level at Chiang Khan in Thailand was slightly increasing from 5.78 metres to 6.18 metres during this week, showing 1.88 metres below its LTA value. **The level is at minimum record and is lower than the record in 1992, one of the lowest-flow years in the Mekong history.**

Downstream water levels from Vientiane to Paksane in Lao PDR followed the same direction of the Chiang Khan’s ones. The decreased values varied between 0.03 and 0.09 metres. Less water contribution from upstream inflows and rainfall from sub-catchments are likely the main reason. **Compared to this time last year, the current water levels at these stations are between 0.24 and 1.9 meters higher.**

Nakhon Phanom to Pakse

Similarly, water levels from Nakhon Phanom in Thailand to Thakhet in Lao PDR were slightly decreasing about -0.20 metres, during the reporting period. Below-average rainfall in upstream and its adjacent catchments are likely the cause of these increasing water levels. **However, constant heavy rainfall since October 8 at tributaries of Nam Phao and Se Bang Fai in Lao PDR has moved water levels at Khong Chiam in Thailand and Pakse in Lao PDR remarkably up close to their historical maximum levels, as shown in [Figure 7](#).**

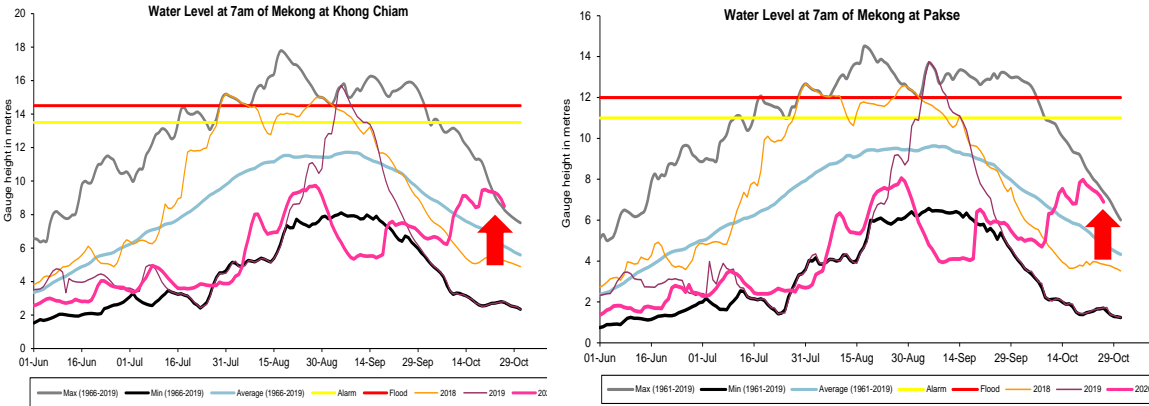


Figure 7: Water levels at Khong Chiam of Thailand and Pakse of Lao PDR.

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

Like many upstream stations, heavy rainfall from the upper part of the Mekong River and the 3S river (Sekong, Se San and Sre Pok) have caused water levels at Stung Treng, Kratie, and Kampong Cham to significantly increase. The water levels at these stations rose up, making them just 0.05 metres below their historical maximum levels.

Similarly, water levels at Chaktomuk, Koh Khel, Phnom Penh Port, and Prek Kdam stations in Cambodia were also affected by heavy rainfall in the area from last week, but gradually decreased by about 0.50 metres during this reporting week. On the other hand, **water levels at Stung Treng and Kratie were higher than their LTAs and were just 0.2 metres below their maximum levels, as shown in Figure 8. However, from Phnom Penh to Neak Luong, the levels were still lower than their LTAs.**

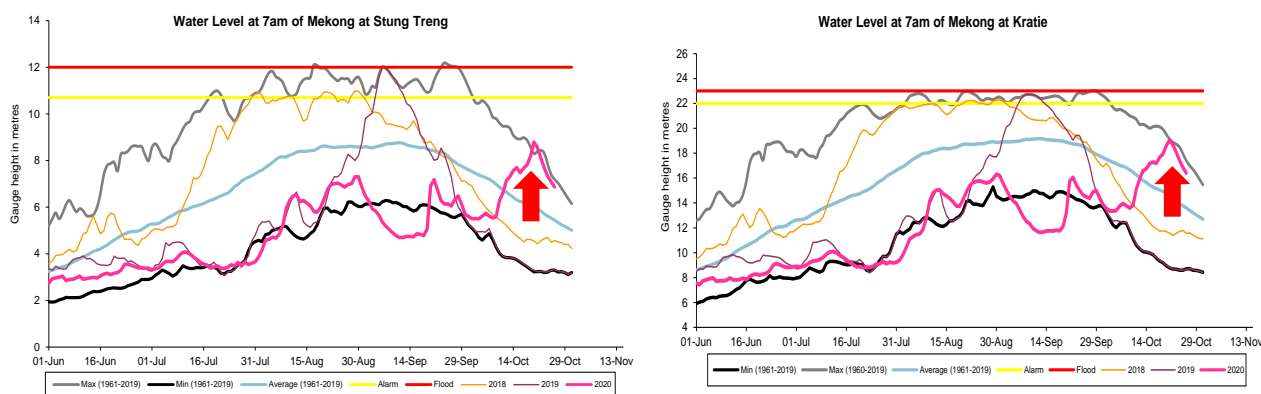


Figure 8: Water levels at Stung Treng and Kratie on the Mekong River.

Tidal stations at Tan Chau and Chau Doc

Like last week, this week from October 20 to 26, water levels at the two tidal stations of Viet Nam's Tan Chau and Chau Doc were fluctuating below their LTAs and minimum level due to daily tidal effects from the sea. **The figures are considered as critical.**

The Tonle Sap Flow

At the end of the dry season, when water levels along the Mekong River increase, flows of the Mekong River reverse into the Tonle Sap Lake (TSL). This phenomenon normally takes place from mid-May to mid-October.

[Figure 9](#) shows the seasonal changes of the inflow/reverse flow and the outflow of the TSL at Prek Kdam in comparison with the flows of 2018 and 2019, and their LTA level (1997-2019). Up to October 26 of this reporting period, **it is observed that the main reverse flow into the TSL has started since August 4. There were also two extremely small instances of the reverse flow in July, but they were not significant.** The recorded incident matches the record on

reverse flow into TSL by the PMFM’s (Procedures for the Maintenance of Flows on the Mainstream) tool on Article 6B (monitoring area). The delay of the reverse flow was due to the low water levels on the Mekong mainstream which were caused by deficit rainfall in upper sub-catchment areas, among other factors. Due to the heavy rain from last week in some of the provinces around the Tonle Sap Lake, the inflows to TSL this week showed a significant increase.

Although the reverse flows have started since August 4, water volume of the Lake up to this point has been considered critical as it is still lower than its minimum level. [Figure 10](#) shows seasonal changes in monthly flow volume up to October 26 for the TSL compared with the volumes in 2018 and 2019 and their LTA and the fluctuating levels (1997-2019). It shows that in July, August, and October (up to 19 October) water volume of the Lake was **at a very critical level**, compared with last year (2019) figure and historical minimum levels at the same period. [Table 1](#) shows the monthly change in flow volume of the TSL and the critical flow volume of the TLS in July, August and September 2020 compared to its historical minimum value and volumes of 2018 and 2019. This reveals that the TSL is still affected by low inflows from the Mekong River and insufficient rainfall in the surrounding sub-catchments since 2019.

The low inflows (inflows from the Mekong River and from tributaries) in the early wet season of 2020 has resulted in a very critical situation of the TSL. This demonstrates the influence of the relationships between the reverse flows, water levels of the Mekong River, and the flow direction in the complex hydraulic environment of the TSL during this wet season. The data show that more than half of the annual inflow volume into the lake originates from the Mekong mainstream. Thus, flow alterations in the mainstream could have direct impacts on the Tonle Sap Lake water levels and on hydrology.

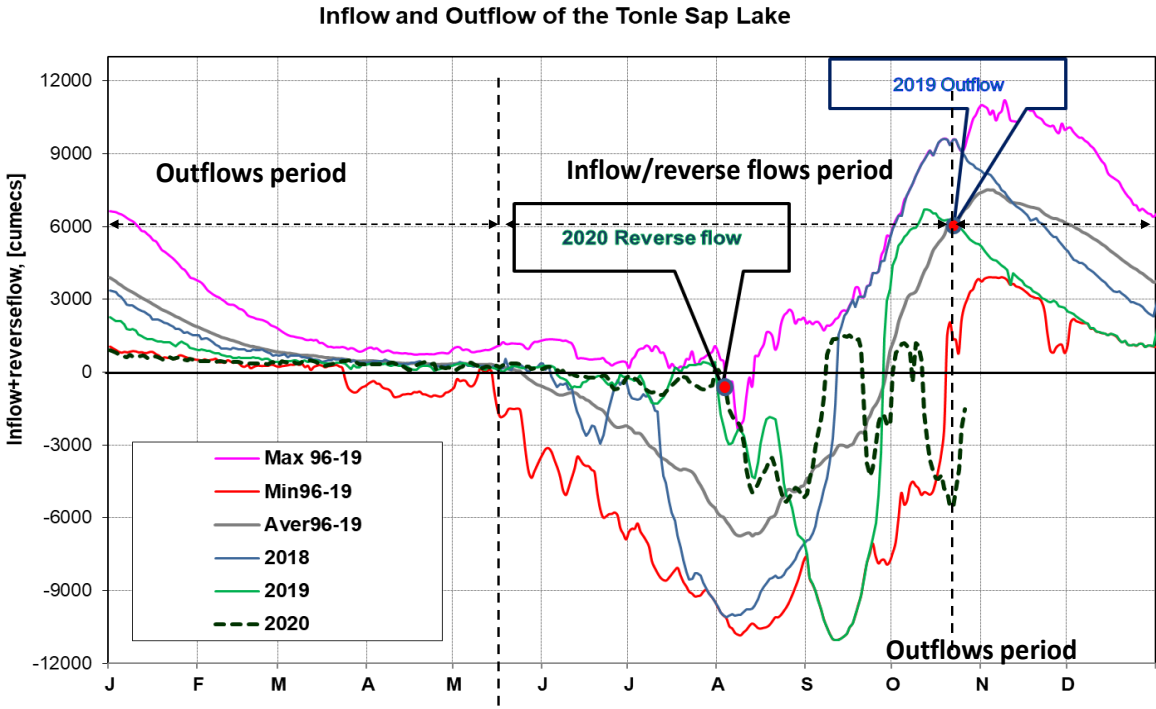


Figure 9: Seasonal change of inflows and outflows of Tonle Sap Lake.

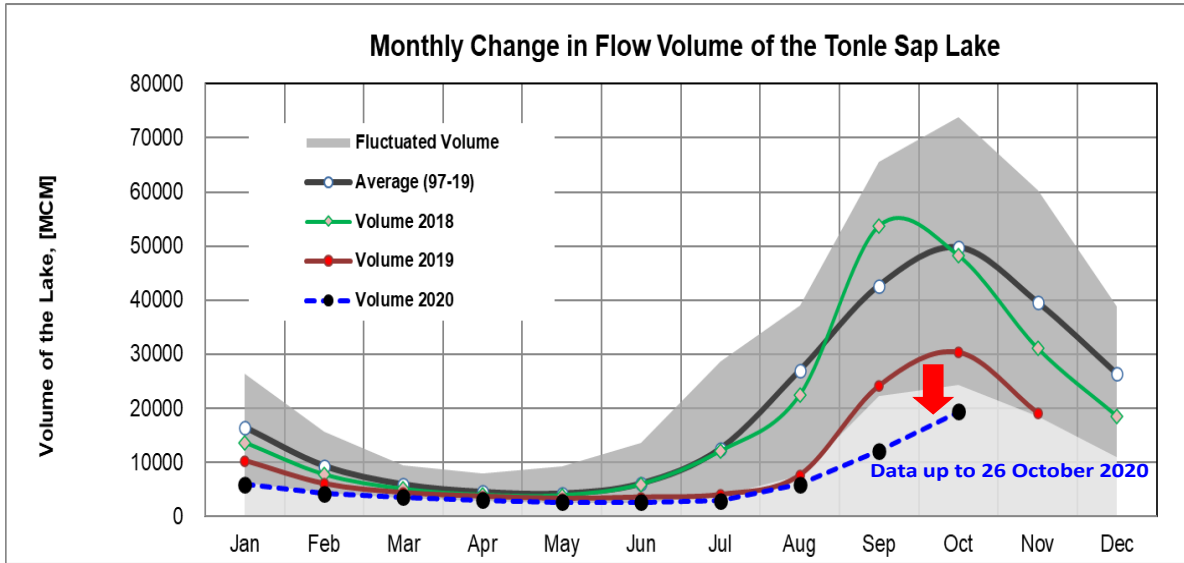


Figure 10: The seasonal change in monthly flow volume of Tonle Sap Lake.

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

Month	Average Volume (97-19) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2018 [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Percentage of Volume in 2020 [%]
Jan	16452.95	26357.53	6272.01	13633.41	10285.31	5906.80	35.90
Feb	9312.36	15596.22	4281.41	7729.72	6019.30	4264.19	45.79
Mar	5868.92	9438.24	3350.92	5037.06	4354.62	3553.99	60.56
Apr	4474.98	8009.14	2875.42	3956.47	3667.47	2992.61	66.87
May	4166.07	9176.93	2417.81	3864.00	3266.43	2594.92	62.29
Jun	6034.10	13635.01	2470.54	5919.18	3517.06	2641.88	43.78
Jul	12502.58	28599.56	3832.51	12024.96	4001.99	2925.86	23.40
Aug	26934.35	39015.12	7554.93	22399.65	7622.71	5941.07	22.06
Sep	42644.05	65632.35	22180.73	53639.54	24194.19	12105.31	28.39
Oct	49698.19	73757.23	24276.79	48193.08	30358.38	19378.36	
Nov	39542.58	60367.33	18576.01	31036.07	19112.65		
Dec	26325.13	38888.95	10869.43	18469.21	10577.29		
	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

During October 20-26, the southwest monsoon was strongly developing in the Gulf of Thailand and the Tropical Depression (TD) from the Sea was also transforming to be a typical *Saudel* typhoon. This typhoon was then weakening to be a Low Pressure (L) in the Sea area about 100km from north-central Viet Nam on October 26. It brought heavy rainfall (50 - 100 mm/24hrs) to north-central Viet Nam and moderate (20-50mm/24hrs) to heavy rain in the middle part of the LMB, including Viet Nam, Lao PDR, and Thailand. According to the MRC-Flash Flood Guidance System (FFGS) and analysis, flash flood events were detected in some areas of Viet Nam and Lao PDR with the impacts ranging from low to high level, as shown in [Figure 11](#) and [Table 2](#) and [Table 3](#).

The figure and table also show Flash Flood Guidance (FFG) results for the next one, three, and six hours produced on October 21 at 00:00 UTC (07:00 AM local time).

Table 2: Detected flash flood in Viet Nam on Oct 21.

01-Hour Flash Flood Risk and Location in Viet Nam				3-Hour Flash Flood Risk and Location in Viet Nam				6-Hour Flash Flood Risk and Location in Vietnam			
Provinces	Districts	Region	Level Risks	Provinces	Districts	Region	Level Risks	Provinces	Districts	Region	Level Risks
Quang Tri	Huong Hoa	North Central	Low-Risk	Quang Tri	Huong Hoa	North Central	Moderate-Risk	Quang Tri	Huong Hoa	North Central	Moderate-Risk
Thua Thien Hue	A Luoi	North Central	Low-Risk	Thua Thien Hue	A Luoi	North Central	Moderate-Risk	Thua Thien Hue	A Luoi	North Central	Moderate-Risk
Quang Nam	Hien	South Central Coast	Low-Risk	Quang Nam	Hien	South Central Coast	Moderate-Risk	Quang Nam	Hien	South Central Coast	Moderate-Risk
Quang Nam	Nam Giang	South Central Coast	Low-Risk	Quang Nam	Nam Giang	South Central Coast	Moderate-Risk	Quang Nam	Nam Giang	South Central Coast	Moderate-Risk
Thua Thien Hue	Phong Dien	North Central	Low-Risk	Quang Binh	Quang Ninh	North Central	Low-Risk	Quang Binh	Quang Ninh	North Central	Low-Risk
Quang Nam	Que Son	South Central Coast	Moderate-Risk	Quang Binh	Le Thuy	North Central	Low-Risk	Quang Binh	Le Thuy	North Central	Low-Risk
				Quang Tri	Da Krong	North Central	Low-Risk	Quang Tri	Da Krong	North Central	Low-Risk
								Thua Thien Hue	Phong Dien	North Central	Moderate-Risk
				Thua Thien Hue	Nam Dong	North Central	Low-Risk	Thua Thien Hue	Nam Dong	North Central	Low-Risk
				Da Nang	Hoa Vang	South Central Coast	Low-Risk	Da Nang	Hoa Vang	South Central Coast	Low-Risk
				Quang Nam	Hien	South Central Coast	Low-Risk	Quang Nam	Dai Loc	South Central Coast	Moderate-Risk
				Quang Nam	Dai Loc	South Central Coast	Moderate-Risk	Quang Nam	Phuoc Son	South Central Coast	Low-Risk
				Quang Nam	Phuoc Son	South Central Coast	Low-Risk	Quang Ngai	Tra Bong	South Central Coast	Low-Risk
				Quang Nam	Tra My	South Central Coast	Low-Risk	Quang Nam	Tra My	South Central Coast	Moderate-Risk
				Quang Nam	Que Son	South Central Coast	Moderate-Risk	Quang Nam	Que Son	South Central Coast	Moderate-Risk
				Binh Dinh	Phu Cat	South Central Coast	Low-Risk	Binh Dinh	Phu Cat	South Central Coast	Low-Risk
				Phu Yen	Tuy Hoa	South Central Coast	Low-Risk	Phu Yen	Tuy Hoa	South Central Coast	Low-Risk

Table 3: Detected flash flood in Lao PDR on Oct 21.

01-Hour Flash Flood Risk and Location in Lao PDR					03-Hour Flash Flood Risk and Location Lao DPR					06-Hour Flash Flood Risk and Location Lao PDR				
Provinces	Districts	Villages	Region	Level Risk	Provinces	Districts	Villages	Region	Level Risk	Provinces	Districts	Villages	Region	Level Risk
Saravane	Ta oi	PHOR SANH	South	Low-Risk	Saravane	Ta oi	PHOR SANH	South	Moderate-Risk	Saravane	Ta oi	PHOR SANH	South	Moderate-Risk
Sekong	Kaleum	PRO	Southeast	Low-Risk	Sekong	Kaleum	PRO	Southeast	Moderate-Risk	Sekong	Kaleum	PRO	Southeast	Moderate-Risk
Sekong	Kaleum	KA-OUANG	Southeast	Low-Risk	Sekong	Kaleum	KA-OUANG	Southeast	Moderate-Risk	Sekong	Kaleum	KA-OUANG	Southeast	Moderate-Risk
Sekong	Kaleum	PALAENG	Southeast	Low-Risk	Sekong	Kaleum	AR-PEUANG	Southeast	Moderate-Risk	Sekong	Kaleum	AR-PEUANG	Southeast	Moderate-Risk
					Sekong	Kaleum	PALAENG	Southeast	Moderate-Risk	Sekong	Kaleum	PALAENG	Southeast	Moderate-Risk
					Sekong	Kaleum	VAK TAI	Southeast	Low-Risk	Sekong	Kaleum	VAK TAI	Southeast	Low-Risk
					Sekong	Kaleum	TIN	Southeast	Low-Risk	Sekong	Kaleum	TIN	Southeast	Low-Risk
					Sekong	Kaleum	STTHORN	Southeast	Low-Risk	Sekong	Kaleum	STTHORN	Southeast	Low-Risk
										Sekong	Lamarm	KANONG MAI	Southeast	Low-Risk

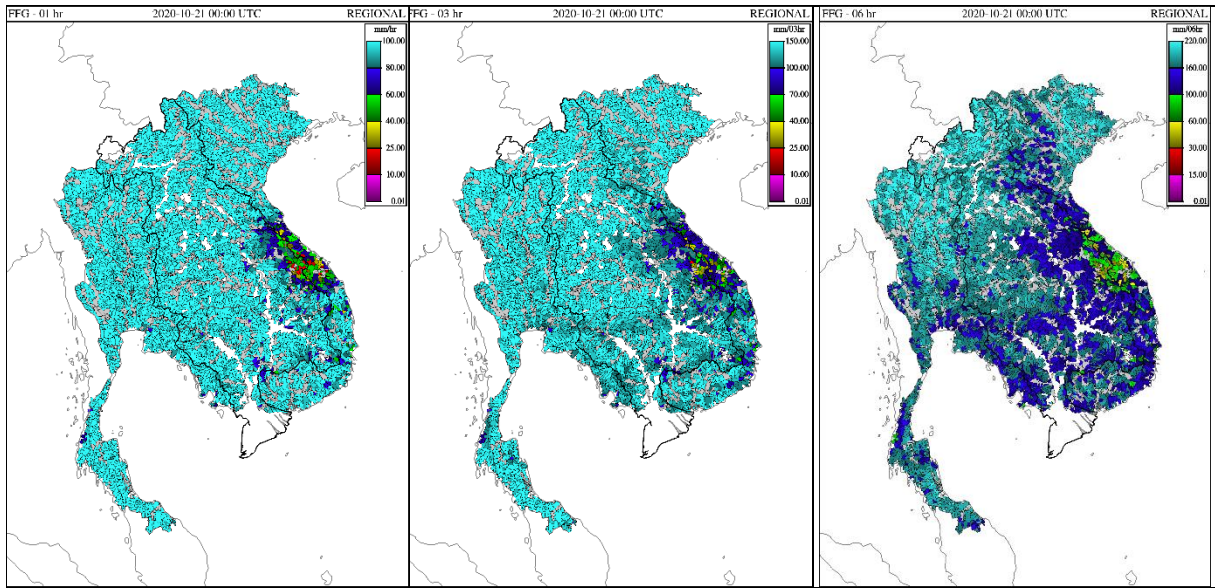


Figure 11: Flash Flood Guidance for the next 1 hour, 3 hours and 6 hours on Oct 21.

5 Drought Monitoring in the Lower Mekong Basin

Weekly drought monitoring from October 15-21

Drought monitoring data are available from Thursday to Wednesday every week; thus, the reporting period is normally delayed for one week compared to Flood and Flash Flood reports.

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

Drought condition of the LMB from October 15 to 21, as shown in [Figure 12](#), was very wet in the central and lower parts of the LMB. The region had similar drought condition in the north compared to last week (October 8-14) but was wetter in the lower part which covers Mekong Delta of Viet Nam.

Meteorological indicator of SPI shows that the LMB received average rainfall in upper part and above average rainfall in central and lower parts of the LMB.

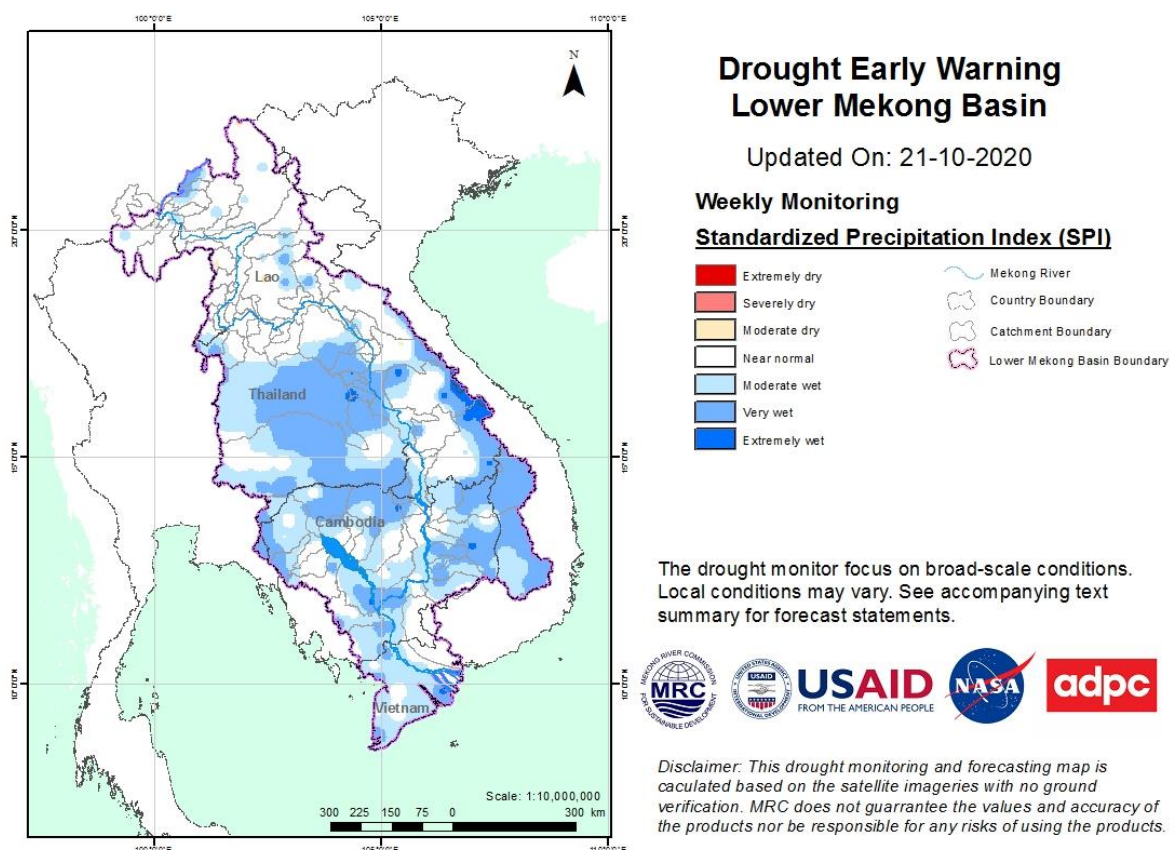


Figure 12: Weekly standardised precipitation index from Oct 15-21.

• **Weekly Soil Moisture Anomaly (SMA)**

The excessive rainfall in middle and lower parts of the region during the monitoring week from October 15 to 21 has made soil moisture ultimately saturated in the east and southwest areas of the LMB, which cover southern provinces of Lao PDR and western provinces of Cambodia. Nevertheless, some provinces in the northern part of the region were still dry. The soil moisture anomaly, as displayed in [Figure 13](#), shows moderate and severe dryness in some areas of Thailand’s Chiang Mai, Chiang Rai and Payao, and Lao PDR’s Bokeo, Luang Namtha, Xayaburi, and southern Luang Prabang.

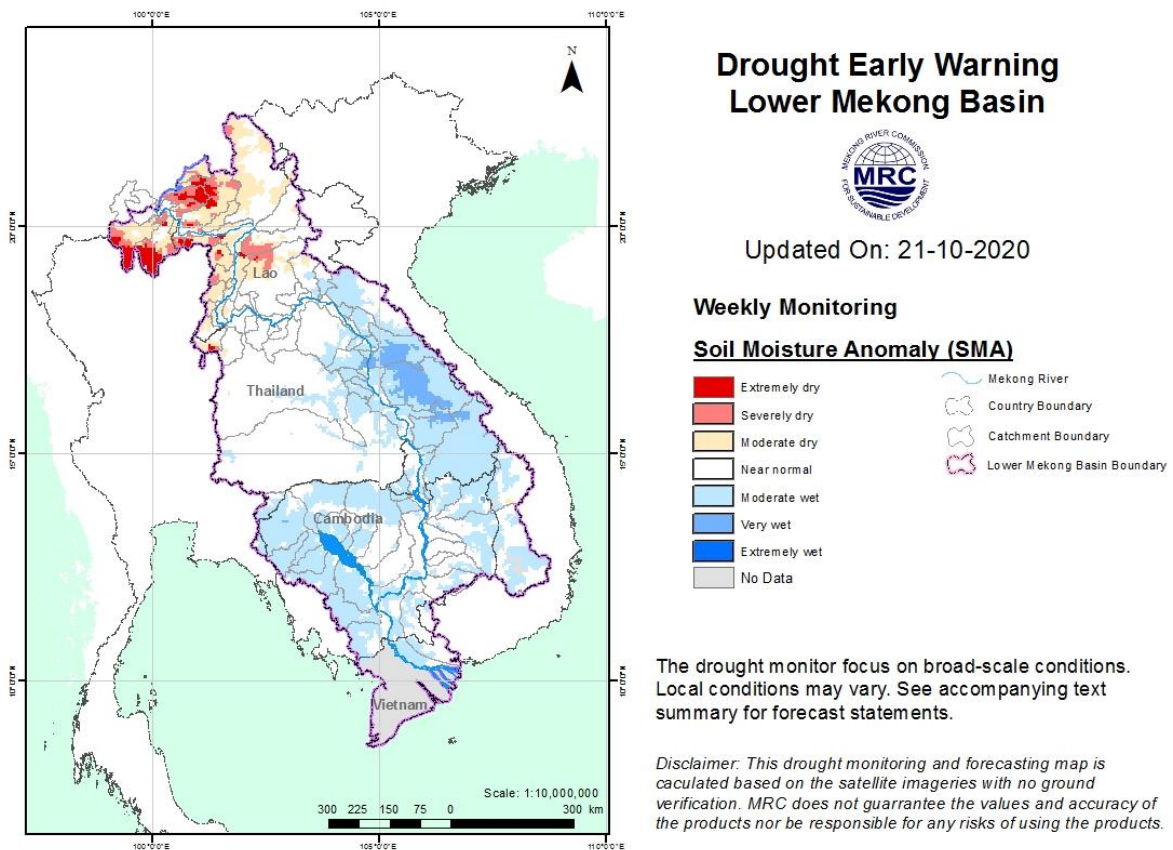
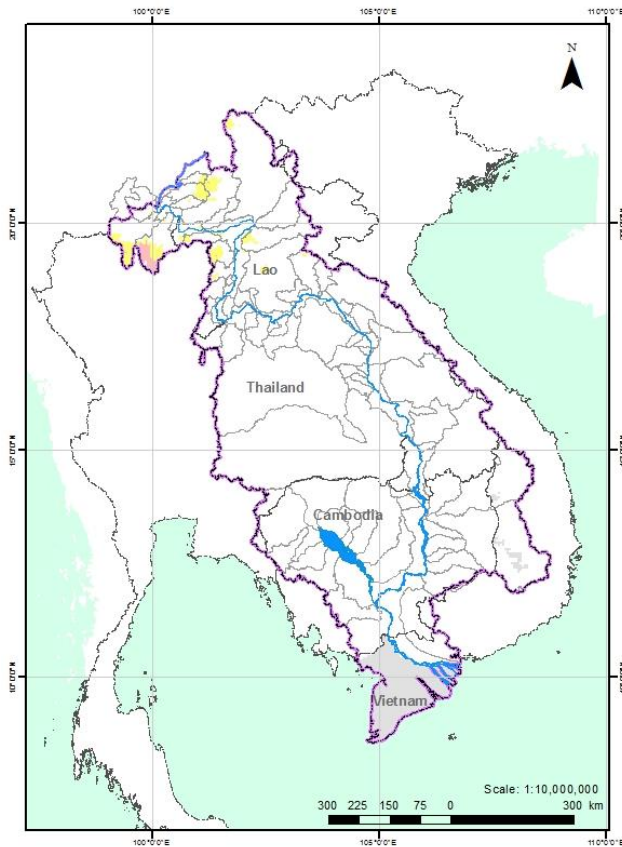


Figure 13: Weekly Soil Moisture Anomaly from Oct 15-21.

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

With a better soil moisture this week (October 15-21), the overall drought condition through combined drought index, as presented in [Figure 14](#), shows no drought threat over the region. The only moderate dry condition was found in northern part of the region covering small area of Chiang Mai, Chiang Rai, and Phayao of Thailand. The condition this week is very much similar to that of last week.




Drought Early Warning Lower Mekong Basin



Updated On: 21-10-2020

Weekly Monitoring

Combined Drought Index (CDI)

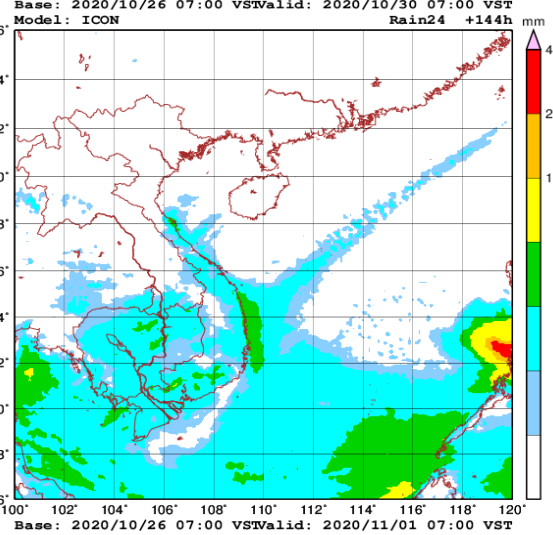
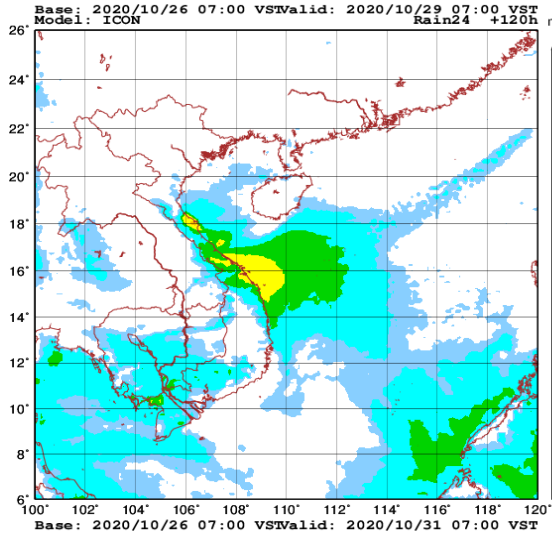
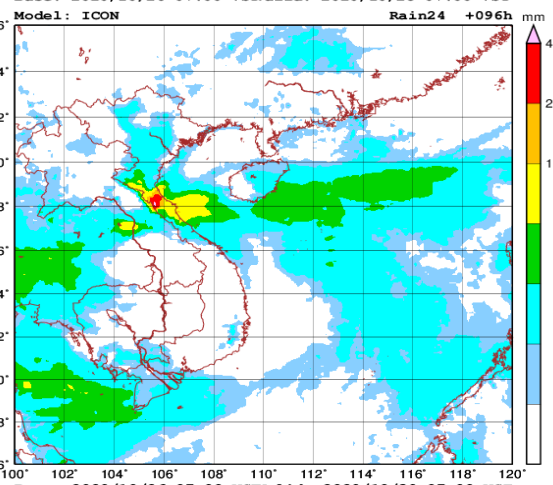
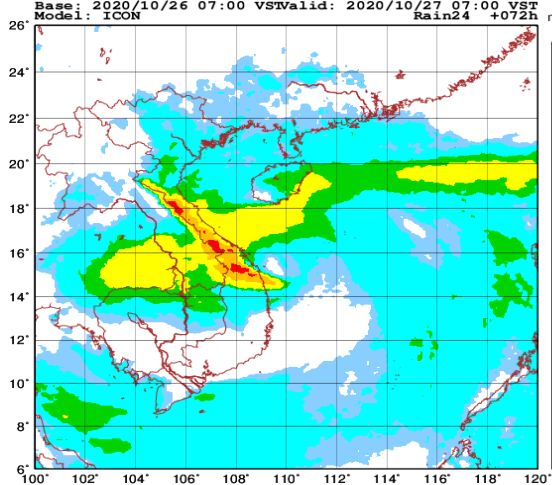
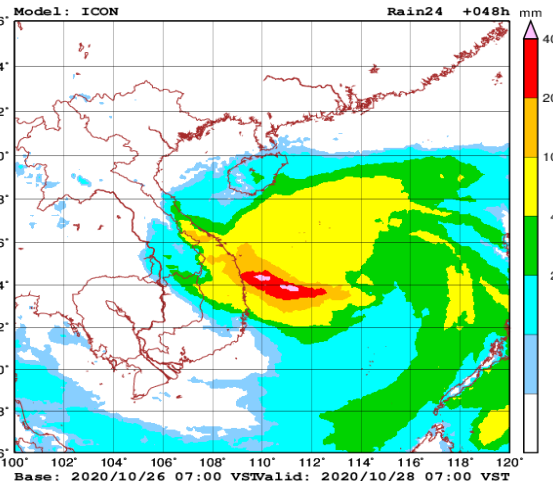
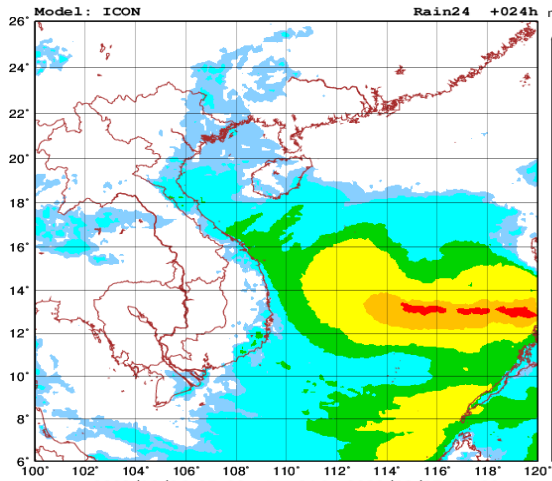
	D4 (Exceptional Drought)		Mekong River
	D3 (Extremely Drought)		Country Boundary
	D2 (Severely Drought)		Catchment Boundary
	D1 (Moderate Drought)		Lower Mekong Basin Boundary
	D0 (Normal Condition)		
	No Data		

The drought monitor focus on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Disclaimer: This drought monitoring and forecasting map is calculated based on the satellite imageries with no ground verification. MRC does not guarantee the values and accuracy of the products nor be responsible for any risks of using the products.

Figure 14: Weekly Combined Drought Index during Oct 15-21.

More information on Drought Early Warning and Forecasting as well as the explanation is available here: <http://droughtforecast.mrcmekong.org/templates/view/our-product>



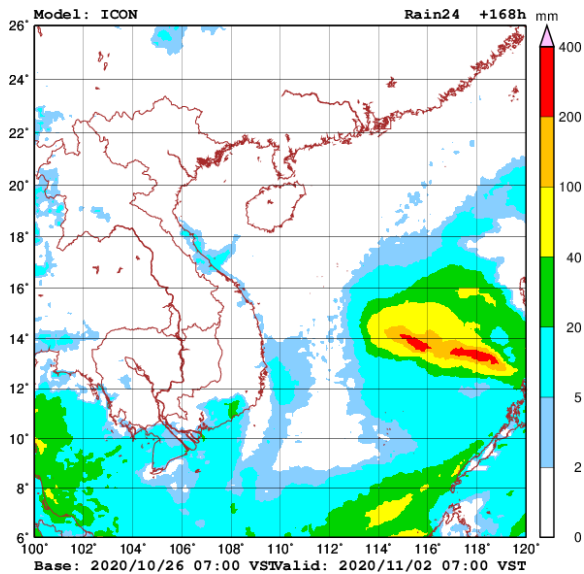


Figure 16: Accumulated rainfall forecast (24 hrs) of model ICON.

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on October 26's daily flood bulletin, the daily forecast water level at Chiang Saen in Thailand is expected to slightly decrease from 2.48 to 2.42 metres in the next five days.

For Luang Prabang in Lao PDR, the water level will increase from about 9.17 to 9.30 metres during the same period.

Despite the highs and lows, trend of water levels at these stations will continue staying below their LTAs.

Chiang Khan, Vientiane-Nong Khai and Paksane

Water level at Vientiane station in Lao PDR is forecasted to go up slightly from 3.25 to 3.53 metres. At Paksane in Lao PDR, the level will also increase slightly from 3.73 to 3.96 metres in the next five days. Average quantity of precipitation is forecasted in the area. The water levels here will remain lower than their LTAs.

Nakhon Phanom to Pakse

Water levels from Nakhon Phanom in Thailand and Thakhet in Lao PDR will slightly decrease by about 0.05 metres in the next five days. From Khong Chaim in Thailand to Pakse in Lao PDR the water will also decrease by about 0.20 metres.

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

From Stung Treng to Neak Luong along the Mekong River in Cambodia, water levels will slightly decrease by about 0.28 meters in the next five days as no heavy rain forecasted in the 3S (Sekong, Se San and Sre Pok) nor in the surrounding areas.

Water levels of the Tonle Sap Lake at Prek Kdam and Phnom Penh Port, as well as at Phnom Penh, Chaktomuk, and Koh Khel on the Bassac River, will decrease by about 0.10 metres over the next five days.

With the trend, water levels at these stations will continue staying just below their LTA levels, particularly from Bassac Phnom Penh to Neak Luong.

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 below their LTAs, following daily tidal effects from the sea.

[Table 4](#) shows the River Flood Forecasting Bulletin issued on October 26. Results of the daily flood forecasting bulletin are also available at http://ffw.mrcmekong.org/bulletin_wet.php.

The performance of the weekly flood forecast, with an accuracy and data input evaluation from 20 to 26 October, is presented in [Annex 1](#).

6.3 Flash Flood Information

With some potential rainfall forecasted for next week, flash flood events are likely to happen from the middle to the lower parts of the LMB. Moreover, local heavy rain in a short period of time is also possible with unexpected short flash floods. The information on flash flood guidance for the next one, three, and six hours is updated twice daily 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 December 2020. The MRC's Drought Forecasting and Early Warning System (DFEWS) adopts an ensemble model, which averages all scenarios called the North America Multi-Model Ensemble (NMME).

Temporarily, the global scale of rainfall prediction is used to see how the rain distribution looks like for the coming months. [Figure 17](#) of the monthly anomaly maps shows daily average of each month in mm/day from October to December 2020 produced by the NMME.

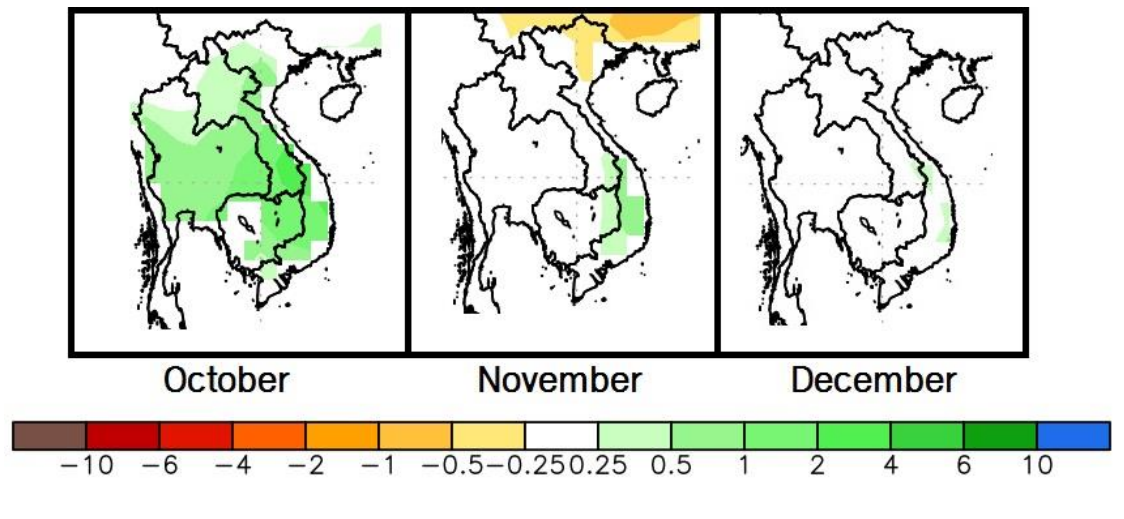


Figure 17: Daily average monthly rainfall forecast from Oct to Dec 2020.

From the ensemble prediction model, the LMB is likely to receive above average rainfall in October, average rainfall in November, and the least rainfall amount in December 2020. Among the upcoming three months, October is likely wet in all over the LMB, while November is likely wet in the southeast and a bit dry in the upper north.

Table 4. River Flood Forecasting 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
 River Flood Forecast: 26 - 31 October 2020

Date: 26 October 2020

Location	Country	24-hr Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Flood level (m)	Alarm level (m)	Observed W. level against zero gauge (m)		Forecasted Water Levels (m)					There is currently no flood warning in place at monitoring sites on the Mekong											
						25-Oct	26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct	26	27	28	29	30	31						
Jinghong		0.0				535.55	535.57											X	X	X	X	X	X	
Chiang Saen		0.0	357.110	12.80	11.50	2.65	2.48	2.52	2.53	2.50								↓					★	★
Luang Prabang		nr	267.195	18.00	17.50	9.10	9.17	9.22	9.26	9.30	9.33	9.30												
Chiang Khan		0.0	194.118	16.00	14.50	6.07	6.18	6.26	6.31	6.35								↑					★	★
Vientiane		0.0	158.040	12.50	11.50	3.16	3.25	3.31	3.38	3.43	3.48	3.53												
Nongkhai		0.0	153.648	12.20	11.40	2.95	2.99	3.03	3.08	3.13													★	★
Paksane		0.9	142.125	14.50	13.50	3.83	3.73	3.78	3.82	3.86	3.91	3.96												
Nakhon Phanom		4.0	130.961	12.00	11.50	3.03	2.91	2.81	2.78	2.80								↓	↓				★	★
Thakhek		3.7	129.629	14.00	13.00	4.26	4.18	4.09	4.06	4.09	4.13	4.17												
Mukdahan		18.8	124.219	12.50	12.00	4.11	4.00	3.95	3.90	3.88								↓					★	★
Savannakhet		18.0	125.410	13.00	12.00	3.05	3.03	3.01	2.99	2.98	2.98	3.00												
Khong Chiam		0.5	89.030	14.50	13.50	8.92	8.50	8.30	8.19	8.10								↓	↓	↓			★	★
Pakse		0.0	86.490	12.00	11.00	7.18	6.89	6.78	6.70	6.64	6.60	6.57						↓	↓	↓	↓			
Stung Treng		nr	36.790	12.00	10.70	7.10	6.87	6.63	6.57	6.65	6.77	6.81						↓	↓	↓	↑	↑		
Kratie		nr	-0.101	23.00	22.00	16.86	16.41	16.06	15.77	15.70	15.82	15.97						↓	↓	↓	↓	↑	↑	
Kompong Cham		nr	-0.930	16.20	15.20	11.24	10.92	10.62	10.39	10.25	10.20	10.31						↓	↓	↓	↓	↓	↓	↑
Phnom Penh (Bassac)		nr	-1.020	12.00	10.50	7.26	7.19	7.09	7.01	6.95	6.93	6.98						↓	↓	↓	↓	↓	↑	
Phnom Penh Port		nr	0.070	11.00	9.50	6.23	6.21	6.16	6.11	6.07	6.06	6.11						↓	↓	↓	↓	↓	↑	
Koh Khel (Bassac)		nr	-1.000	8.40	7.90	6.51	6.44	6.35	6.27	6.19	6.16	6.19						↓	↓	↓	↓	↓	↑	
Neak Luong		nr	-0.330	8.00	7.50	5.42	5.34	5.24	5.15	5.08	5.03	5.00						↓	↓	↓	↓	↓	↓	↓
Prek Kdam		nr	0.080	10.00	9.50	6.34	6.29	6.23	6.17	6.12	6.10	6.13						↓	↓	↓	↓	↓	↑	
Tan Chau		0.0	0.000	4.50	3.50	2.65	2.69	2.71	2.72	2.73	2.70	2.67						↑					↓	↓
Chau Doc		16.4	0.000	4.00	3.00	2.47	2.54	2.57	2.59	2.62	2.58	2.53						↑	↑	↑	↑	↓	↓	↓

REMARKS:

-: not available.
 nr: no rain.

LEGEND		
rising water level		↑
stable water level		
falling water level		↓
alarm stage		
alarm situation		
flood stage		
no data available		X
as suggested by Thailand, forecasted values are not displayed pending further improvement of the system		★

Note: Stable water level is defined as a daily change of less than 10cm from Chiang Saen to Savannakhet; less than 5cm at Pakse and Stung Treng; and no more than 3cm cm from Kratie downstream.
Flood stage is when the flood level exceeds. A flood level is determined by each Member Country.
Alarm stage is when the water level ranges between alarm and flood levels.
Alarm situation is when the water level is forecasted to reach the flood stage within the next three days.

River Flood Forecaster

K. Sothea
 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

Rainfall during this reporting week was considered above average in the middle and lower parts of the LMB (0.40 to 78 mm). However, rainfall in the upper part was considered very low, varying from 0.2 mm to 8 mm at different stations along the LMB from Chiang Saen to Nong Khai in Thailand. The highest concentration was from Kampong Cham in Cambodia to Viet Nam's Tan Chau and Chau Doc area (up to 78 mm). Compared with last week's amount, the rainfall this week was considered lower in the middle and downstream parts.

Typhoon *Molave* is expected to hit the LMB during October 29-30, causing heavy rainfall in some areas of the middle and lower parts of the Mekong region.

Based on the forecasted rainfall from satellite using GFS data, rainfall is likely to take place in the areas from Paksane to Pakse in Lao PDR to the low area of Cambodia and the Central Highland of Viet Nam, varying from 50 mm to 100 mm during October 29-30. This will increase the chance of rainfall concentration over the LMB in the upcoming week (average rainfall expected).

7.2 Water level and its forecast

Water levels in the lower part of the monitoring locations in the LMB during this reporting week were decreasing from Khong Chiam in Thailand to Stung Treng and Kratie in Cambodia, after the end of heavy rainfall from last week. Also, water levels at Kampong Cham to Neak Luong in Cambodia were still lower than their LTA levels. The low level was due little rainfall in the region from October 20-26. Generally, this week's water levels were relatively lower than those of last week in the upper part but higher in the lower part of the LMB.

The starting date of the reverse flow from the Mekong River into the Tonle Sap Lake took place on August 4, slightly late compared to a normal event. However, two extremely small and brief instances happened in July. Due to late reverse flows this year, the water volume of the Lake at this reporting point remains extremely small and less than its minimum volume (even than the 2019's) and is considered at critical level.

Over the next few days, water levels across most monitoring stations in the LMB are expected to continue slightly increasing, ranging from 0.05 to 0.30 metres. This continues to put most stations' water levels below their LTAs, except at Khong Chiam, Pakse, Stung Treng, Kratie and Kampong Cham where water levels will stay higher than their LTA levels.

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

Below average precipitation during the past months is believed to be one of the main factors causing low water levels at most of the stations along the Mekong mainstream.

Since the beginning of this year (2020), water levels in the LMB have been lower than their LTAs for all monitoring stations (from upper to lower stretches within the LMB). Like many parts of the world, the Mekong region has been affected by the prolonged El Nino event, the phenomenon that usually causes extreme heat and insufficient rainfall. This climate change impact has been observed since 2019. Therefore, the main cause of low water levels in the Mekong mainstream from June to July 2020 could be the unusual low rainfall as results of the climate change affecting the Lower Mekong Region.

For a more complete preliminary analysis of the hydrological conditions in the LMB over January – July 2020, please refer to this [Situation Report](#).

The contribution to the Mekong River's flow from the Upper Mekong Basin 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 moderate and heavy amounts of rainfall for the coming week as mentioned earlier in [section 6.1](#), major flash floods are likely to happen in some areas from the middle to lower parts of the LMB on 29-30 October 2020.

7.4 Drought condition and its forecast

Drought condition of the LMB from October 15 to 21 was very similar to last week (October 8-14). The region only showed some moderate dry soil moisture in the north and no meteorological drought in the whole LMB. In general, drought condition was getting much better - with no potential threat - over the region.

For the upcoming three-month forecast, the LMB is likely to receive above average rainfall in October, average rainfall in November, and the least rainfall amount in December 2020. October is likely wet in all over the LMB, while November is likely wet in the southeast and a bit dry in the upper north.

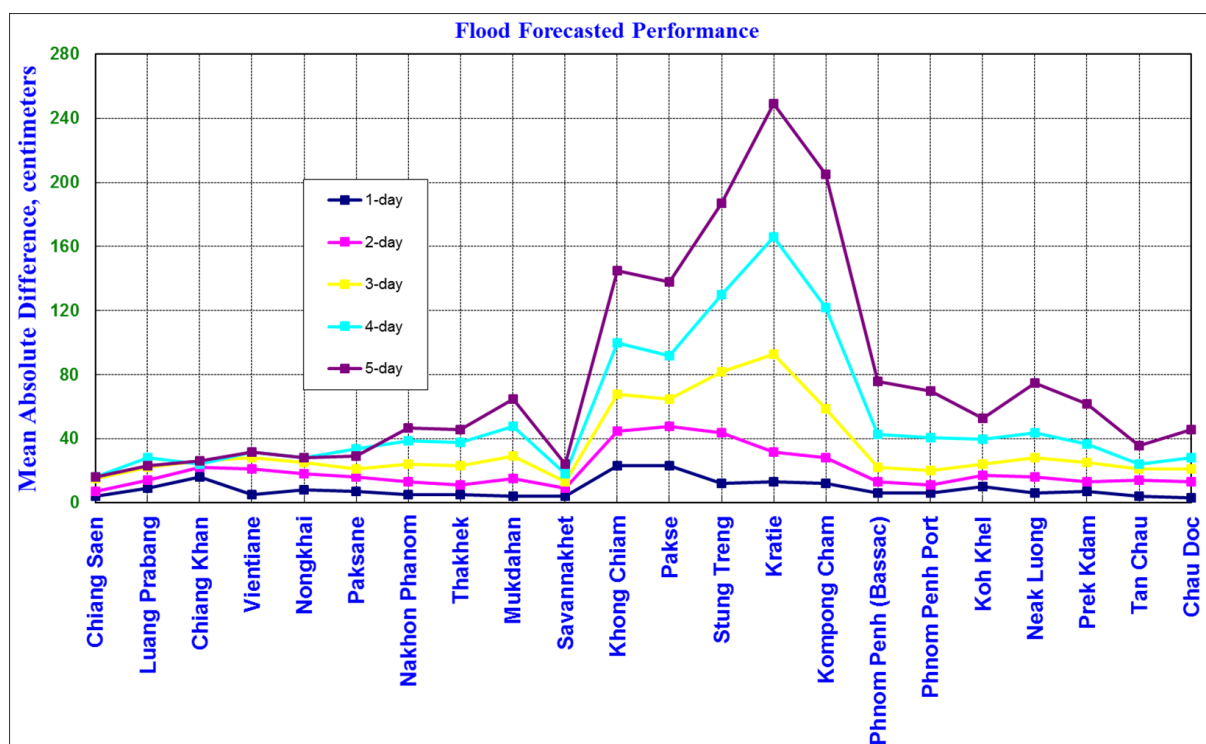
Annex 1: Performance of the weekly flood forecasting

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 20 to 26 October 2020.

The forecasting values from 20 to 26 October 2020 show that the overall accuracy is fair for a one-day to three-day forecast in lead time at stations in the middle to the lower parts of the Mekong River from Khong Chiam to Kampong Cham due to the effect of heavy rain in this area during the report period.



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

- Missing data and data input are not sufficient to be used for inputting into the flood forecasting model system.
- The influence of heavy rainfall caused by storms and hydropower operations from upstream (Xayaburi), tributaries inflows and the lower part of the Mekong floodplain.

- Luang Prabang, Chiang Khan and Paksane stations have been affected by hydropower operations of Xayaburi and Nam Nguem (water retention and release). Rainfall always accumulates at this spot, which could be causing rapid high-water levels.
- Rapid fluctuations of water levels at Tan Chau and Chau Doc stations due to daily tidal effects of the sea in the Mekong Delta.
- Satellite rainfall data was 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 20-26 October 2020.

Table B1: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 20-26 October 2020 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 Kheh	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
1-day	4	9	16	5	8	7	5	5	4	4	23	23	12	13	12	6	6	10	6	7	4	3
2-day	7	14	22	21	18	16	13	11	15	9	45	48	44	32	28	13	11	17	16	13	14	13
3-day	15	22	26	28	25	21	24	23	29	13	68	65	82	93	59	22	20	24	28	25	21	21
4-day	16	28	24	32	28	34	39	38	48	18	100	92	130	166	122	43	41	40	44	37	24	28
5-day	16	23	26	32	28	29	47	46	65	24	145	138	187	249	205	76	70	53	75	62	36	46

Table B2: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 20-26 October 2020 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 Kheh	Neak Luong	Prek Kdam	Tan Chau	Chau Doc	Average	
1-day	57.1	57.1	71.4	57.1	57.1	57.1	42.9	71.4	71.4	71.4	71.4	71.4	71.4	57.1	57.1	28.6	57.1	57.1	57.1	57.1	57.1	57.1	42.9	59.1
2-day	50.0	66.7	66.7	66.7	33.3	33.3	50.0	50.0	66.7	83.3	66.7	66.7	66.7	50.0	66.7	83.3	83.3	50.0	50.0	66.7	66.7	66.7	50.0	60.6
3-day	40.0	60.0	60.0	80.0	40.0	60.0	60.0	60.0	60.0	80.0	60.0	60.0	60.0	60.0	60.0	80.0	80.0	40.0	80.0	40.0	60.0	60.0	60.0	60.9
4-day	50.0	50.0	50.0	75.0	50.0	50.0	50.0	50.0	75.0	75.0	75.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	54.5
5-day	66.7	66.7	66.7	33.3	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	66.7	33.3	33.3	51.5

Note: Red values are not well matched with the actual values in (%) and (cm)

Table B3: Overview of performance indicators for the past 7 days from 20-26 October 2020

2020	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	10:01	00:00	-	-	08:15	07:10	07:08	07:48	08:32	08:26	07:01	08:12	0	0	0	0	84	14	0	0
month	10:24	00:00	-	-	08:15	07:10	07:38	08:11	08:39	08:26	07:14	08:11	0	0	37	0	464	0	2	38

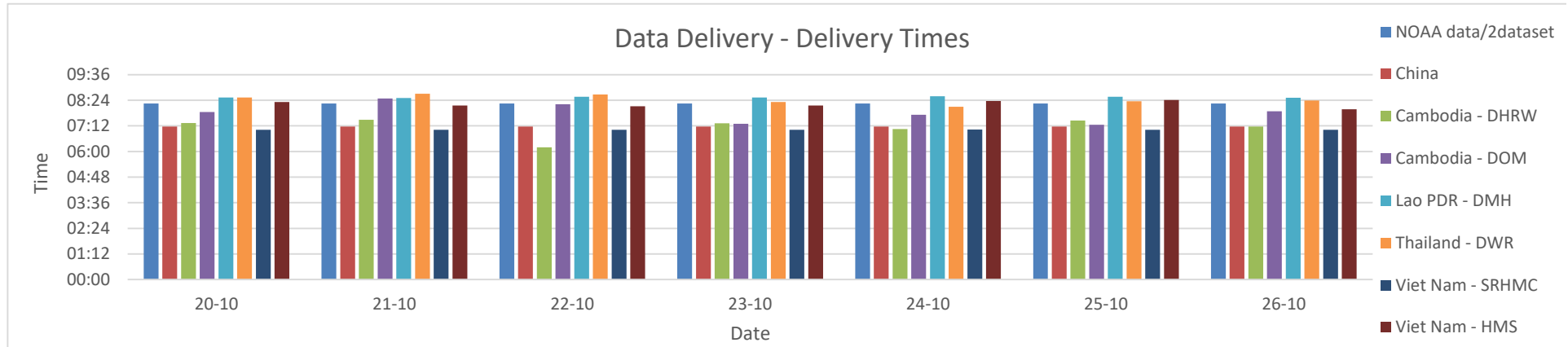


Fig. B4: Data delivery times for the past 7 days from 20-26 October 2020

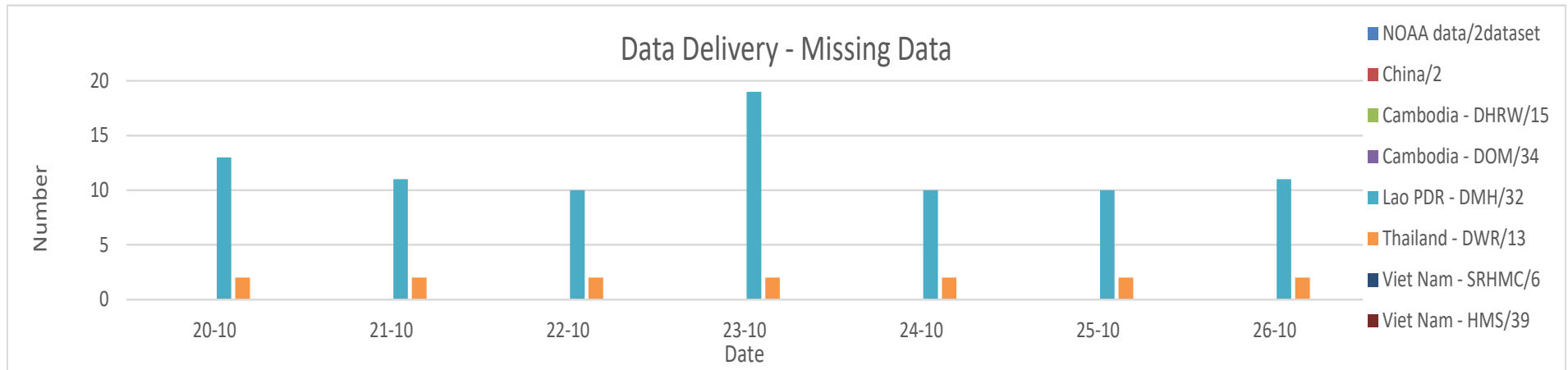


Fig. B5: Missing data for the past 7 days from 20-26 October 2020

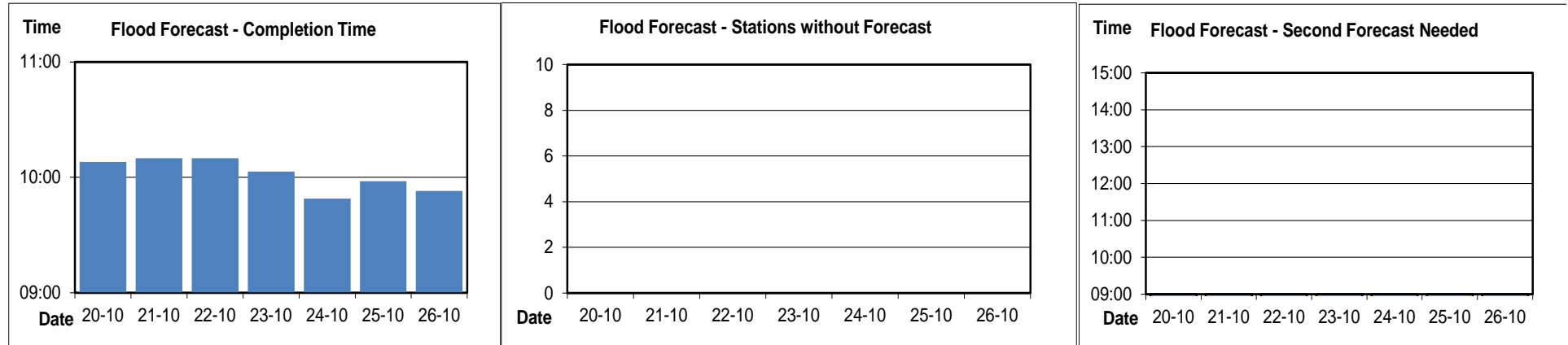


Fig. B6: Flood forecast completion time, stations without forecasts, and second forecasts need from 20-26 October 2020



Mekong River Commission Secretariat

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