



Mekong River Commission

Weekly Wet Season Situation Report in the Lower Mekong River Basin 6-12 October 2020

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

The MRC is funded by contributions from its Member Countries and Development Partners, including Australia, Belgium, the European Union, Finland, France, Germany, Japan, Luxembourg, the Netherlands, Sweden, Switzerland, the United States and the World Bank.

Copyright © Mekong River Commission, 2020

First published (2020)

Some rights reserved

This work is the product of the Mekong River Commission Secretariat. While all efforts are made to present accurate information, the Secretariat does not guarantee the accuracy of the data included in this work. The boundaries, colours, denomination, and other information shown on any map in this work do not imply any judgement on the part of the MRC concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Nothing herein shall constitute or be considered to be a limitation upon or waiver of the privileges and immunities of the MRC, all of which are specifically reserved.

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made and notification is sent to the MRC. The MRC would appreciate receiving a copy of any publication that uses this publication as a source. This publication cannot be used for sale or for any other commercial purpose whatsoever without permission in writing from the MRC.

Title: Weekly wet season situation report in the Lower Mekong River Basin for 6-12 October 2020

ISSN: 1728-3248

Keywords: flood/drought/weather/Mekong/Tonle Sap

For bibliographic purposes, this volume may be cited as:

Mekong River Commission. (2020). *Weekly wet season situation report in the Lower Mekong River Basin for 6-12 October 2020*. Vientiane: MRC Secretariat.

Information on MRC publications and digital products can be found at
<http://www.mrcmekong.org/publications/>

All queries on rights and licenses should be addressed to:

Mekong River Commission

Documentation and Learning Centre

184 Fa Ngoum Road, Unit 18, Ban Sithane Neua, Sikhottabong District, Vientiane 01000, Lao PDR

Telephone: +856-21 263 263 | E-mail: mrcc@mrcmekong.org | www.mrcmekong.org

Contents

- Figures..... ii
- Table iii
- 1 Introduction 1
- 2 General Weather Patterns 2
- 3 Water Levels in the Lower Mekong River 6
- 4 Flash Flood in the Lower Mekong Basin 11
- 5 Drought Monitoring in the Lower Mekong Basin..... 13
- 6 Weather and Water Level Forecast and Flash Flood Information 16
 - 6.1 *Weather and rainfall forecast* 16
 - 6.2 *Water level forecast* 18
 - 6.3 *Flash Flood Information*..... 19
 - 6.4 *Drought forecast* 19
- 7 Summary and Possible Implications 22
 - 7.1 *Rainfall and its forecast* 22
 - 7.2 *Water level and its forecast* 22
 - 7.3 *Flash flood and its trends*..... 23
 - 7.4 *Drought condition and its forecast*..... 23
- Annex 1: Performance of the weekly flood forecasting..... 24

Figures

Figure 1: Summary of weather conditions over the LMB.	2
Figure 2: Outlook of rainfall over the Asian countries by ASMC.	3
Figure 3: The moving of Tropical Storms of LINFA and NANGHA in the Mekong region.	4
Figure 4: Weekly total rainfall at key stations in the LMB.	4
Figure 5: Weekly rainfall distribution over the LMB.	5
Figure 6: Key stations and model application for River Monitoring and Flood Forecasting. .	6
Figure 7: Water levels at Khong Chaim of Thailand and Pakse of Lao PDR.	7
Figure 8: Water levels at Stung Treng and Kratie on Mekong River.	8
Figure 9: Seasonal change of inflows and outflows of Tonle Sap Lake.	9
Figure 10: The seasonal change in monthly flow volume of Tonle Sap Lake.	10
Figure 11: Flash Flood Guidance (FFG) for the next 1 hour, 3 hours and 6 hours on October 10 at 00:00 UTC.	12
Figure 12: Weekly standardised precipitation index from October 1-7.	13
Figure 13: Weekly Soil Moisture Anomaly from October 1-7.	14
Figure 14: Weekly Combined Drought Index during October 1-7.	15
Figure 15: Track forecast of the Tropical Depression (source: JTWC)	16
Figure 16: Accumulated rainfall forecast (24 hrs) of model GFS	18

Table

Table 1. The monthly change in the flow volume of Tonle Sap Lake	10
Table 2: Detected flash flood in Viet Nam and Lao PDR on October 10.	11
Table 3. River Flood Forecasting Bulletin	21

1 Introduction

This Weekly Wet Season Situation Report presents a preliminary analysis of the weekly hydrological situation in the Lower Mekong River Basin (LMB) from **6 - 12 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 referred to 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 11 October 2020, showing two lines of low pressure of the Monsoon Trough and the track of a Tropical Storm *Linfa* crossing the upper Mekong region which can bring heavy rainfall over the next few days.

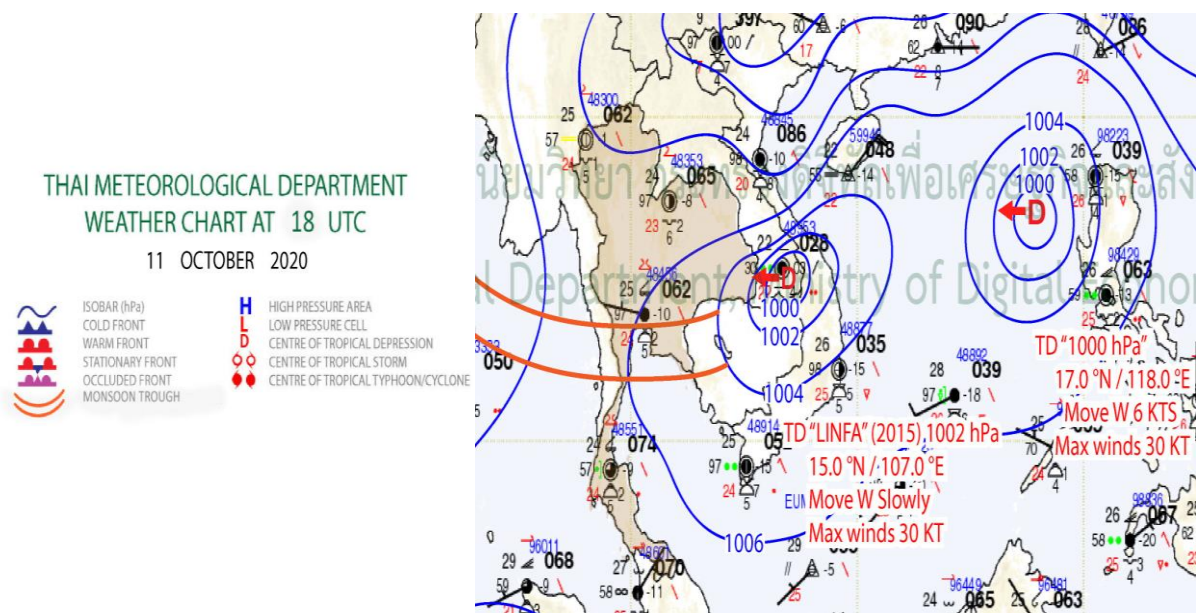


Figure 1: Summary of weather conditions over the LMB.

According to the Asian Specialised Meteorological Centre (ASMC), wetter conditions are predicted over the eastern half of Southeast Asia for the weeks from October 5-18, which can increase shower 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 5 – 18 October in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).

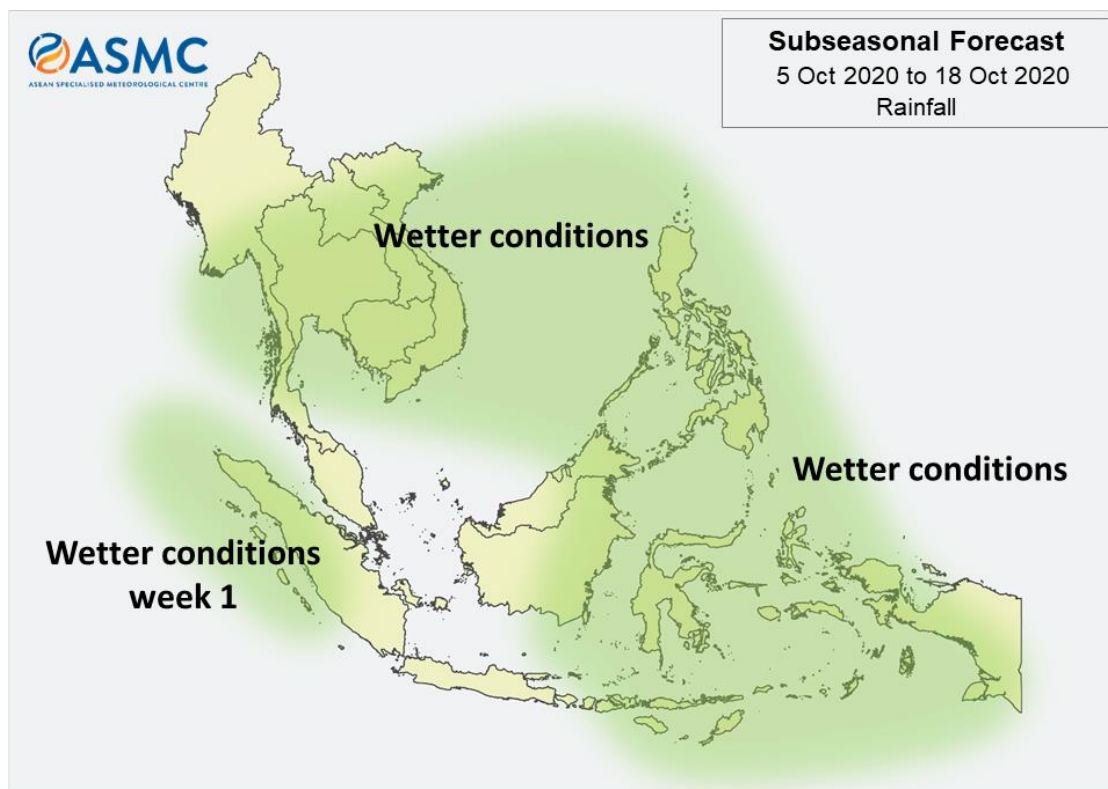


Figure 2: Outlook of rainfall over the Asian countries by ASMC.

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

There was a low pressure hitting the LMB during 6-12 October 2020. This caused heavy rainfall in the lower part of the basin from Khong Chaim in Thailand 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. Up to October 12, there were still two lines of low pressure moving across the southern part in Thailand. On October 11, the Tropical Storm *Linfa* also hit some provinces in the central part of Viet Nam.

[Figure 3](#) shows the track of another Tropical Storm *Nangha*, which is moving from the Sea across Viet Nam to the northeastern 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.

Nangha has started since October 12 and is expected to continue until October 16.

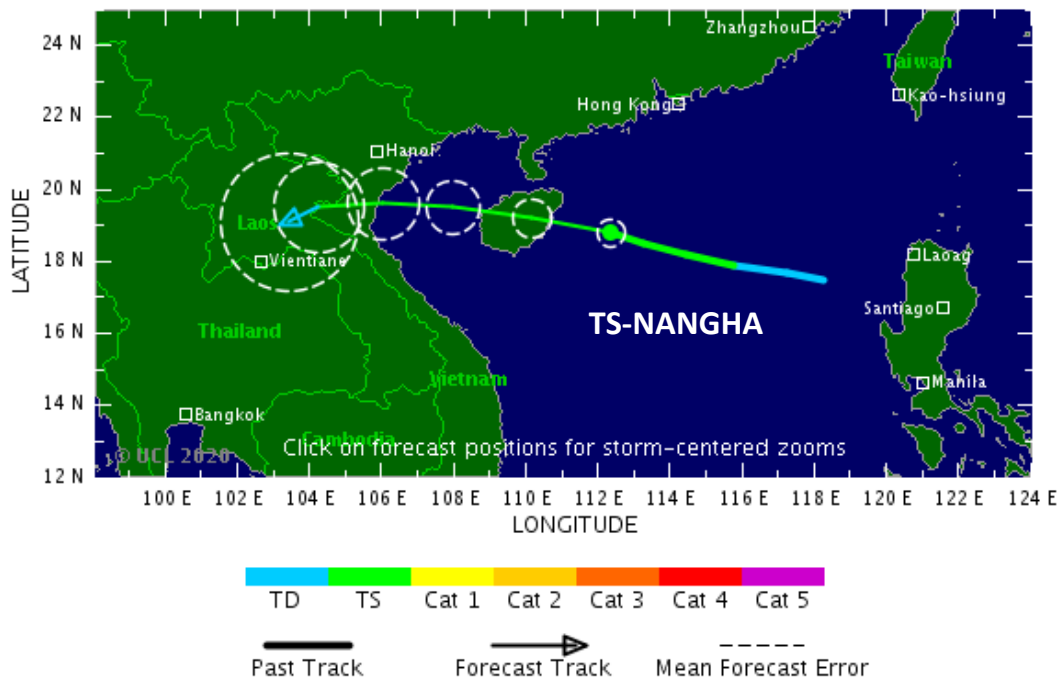


Figure 3: The moving of Tropical Storm of *Nangha* in the Mekong region.

Rainfall patterns over the LMB

This week’s rainfall is considered above average, varying from 0.4 mm to 205 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 from Thailand’s Khong Chiam 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 42 mm to 205 mm. But the upper part from Chiang Saen to Nong Khai 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](#).

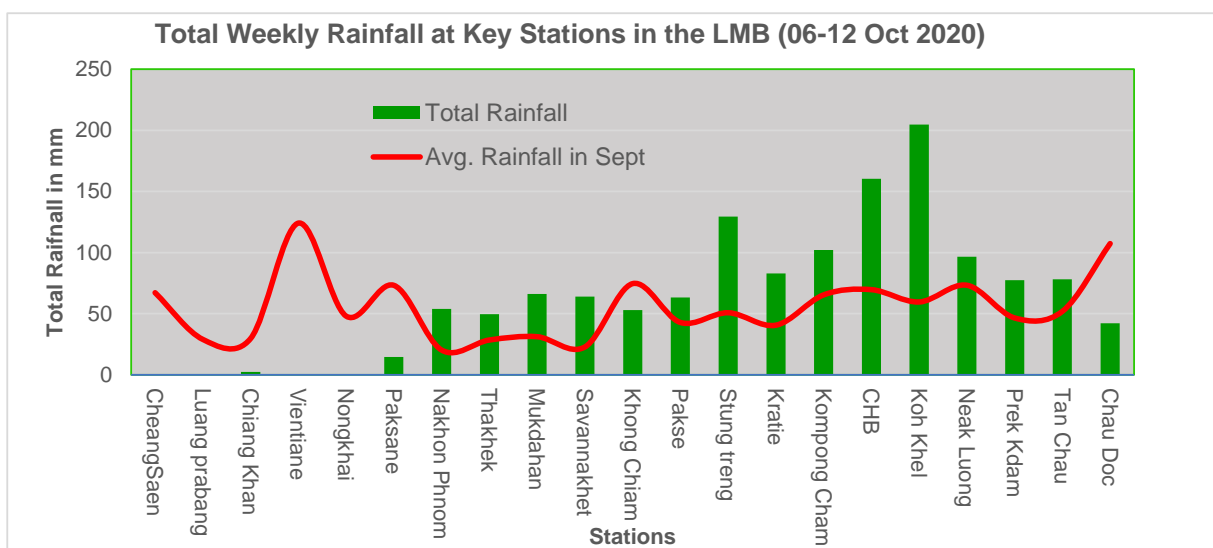


Figure 4: Weekly total rainfall at key stations in the LMB.

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 6 to 12 October 2020.

The amount of rainfall this week – from 0.4 mm to 205 mm – is considered higher than average in the lower part of the basin from Lao PDR’s Pakse to the Cambodia’s Stung Treng and Viet Nam’s Tan Chau and Chau Doc, but was lower than average in the upper part from Thailand’s Chiang Saen to Nong Khai.

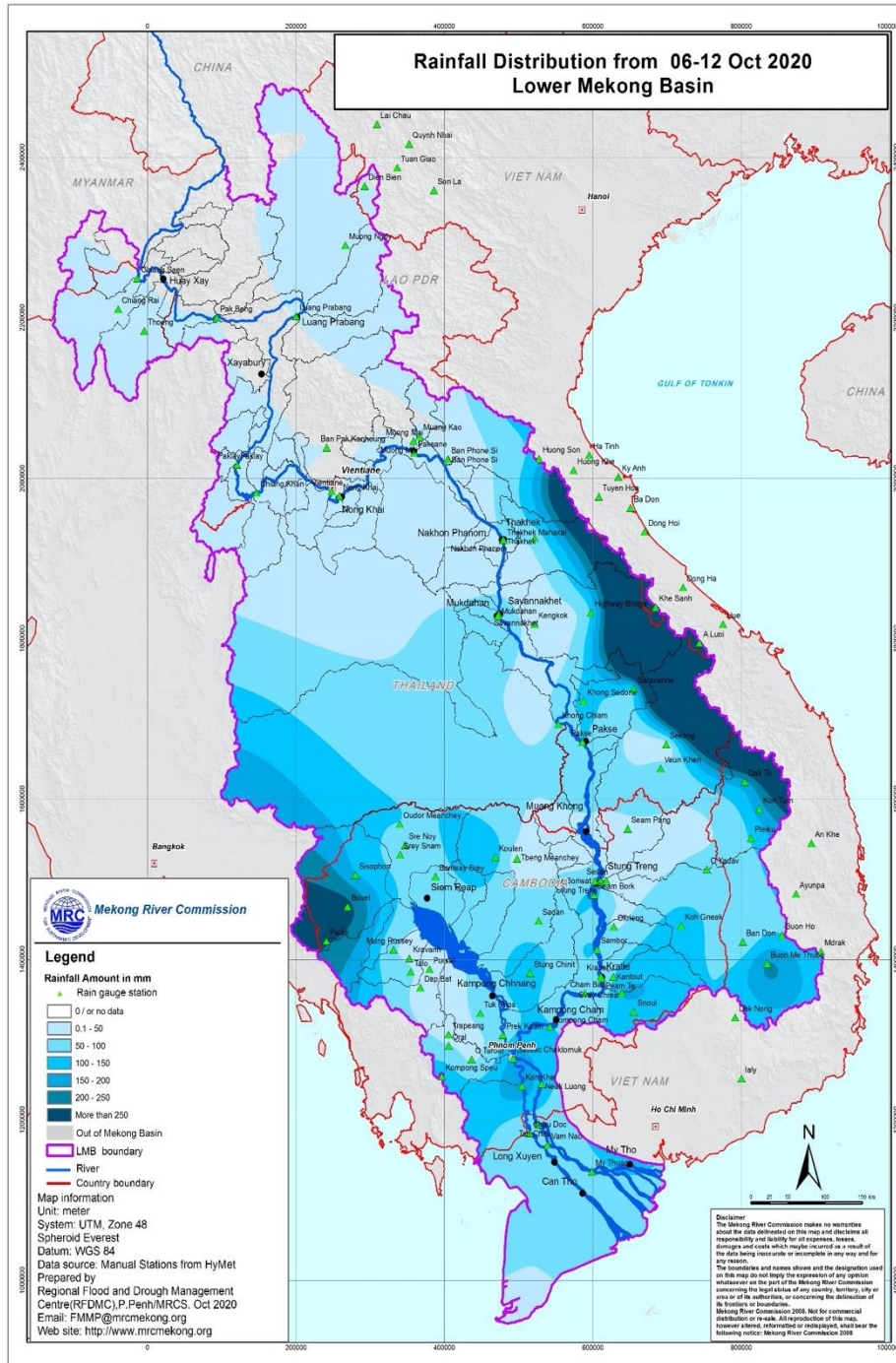


Figure 5: Weekly rainfall distribution over the LMB.

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>.

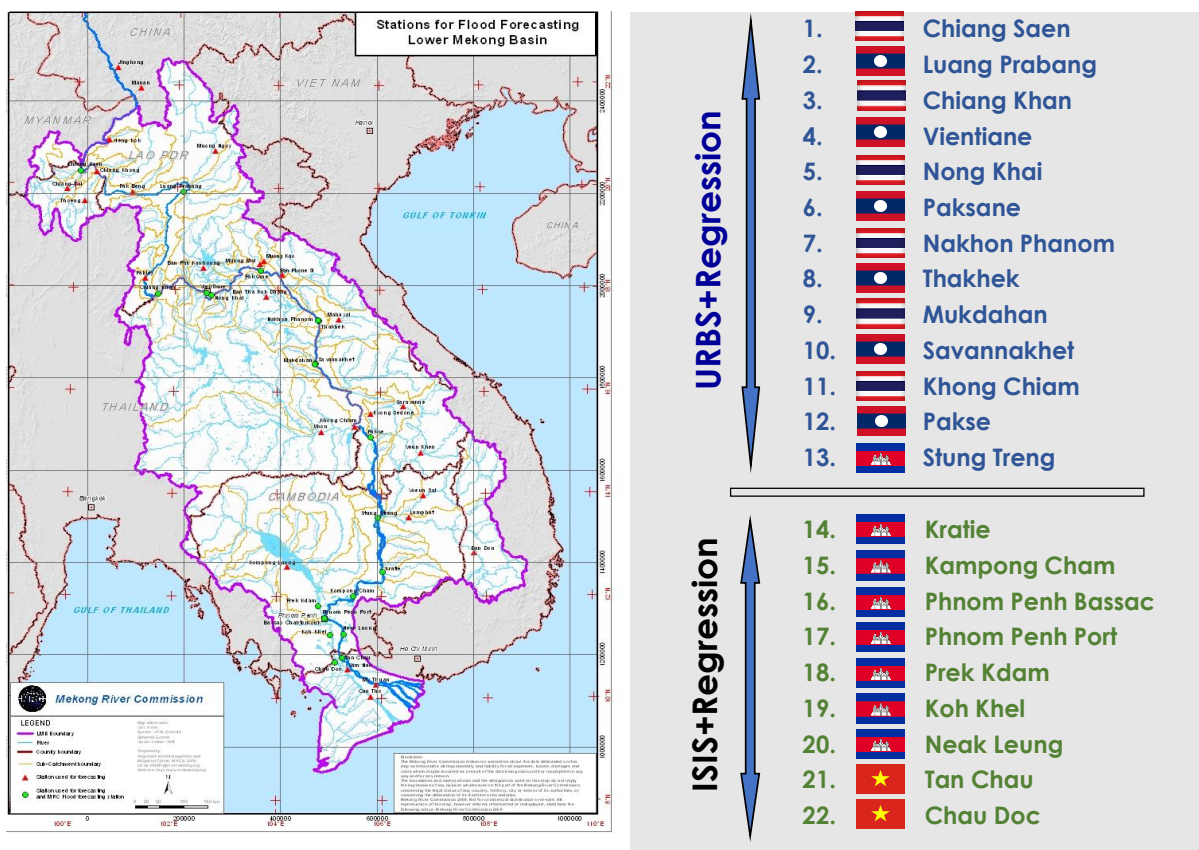


Figure 6: Key stations and model application for River Monitoring and Flood Forecasting.

Chiang Saen and Luang Prabang

Water level during October 6-12 at Thailand’s Chiang Saen was fluctuating between -0.17 metres and 0.24 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 continued lower rainfall over recent weeks contributed by catchment inflows. 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 -0.34 metres and 0.48 metres, during the reporting period. Compared to last week, the figure shows a decreasing number, from 9.72 metres to 9.26 metres. This level is higher than that of 2019 and is now staying close to 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 decreasing from 7.68 metres to 7.06 metres during this week, showing 2.09 metres below its LTA value. **The level is at minimum record and is similar to the record in 1992, one of the years when the water level was very low.**

Downstream water levels from Vientiane to Paksane in Lao PDR followed the same direction of the Chiang Khan’s one. The decreased values varied between 0.26 and 0.34 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 about three meters higher.**

Nakhon Phanom to Pakse

Similarly, water levels from Nakhon Phanom in Thailand to Savannakhet in Lao PDR were slightly decreasing during the reporting period, ranging from -0.22 to 0.15 metres. Below-average rainfall in upstream and its adjacent catchments is likely the cause of these increasing water levels. **On the contrary, the water levels at Khong Chaim in Thailand and Pakse in Lao PDR went up, reaching a level above their LTAs, as shown in [Figure 7](#).**

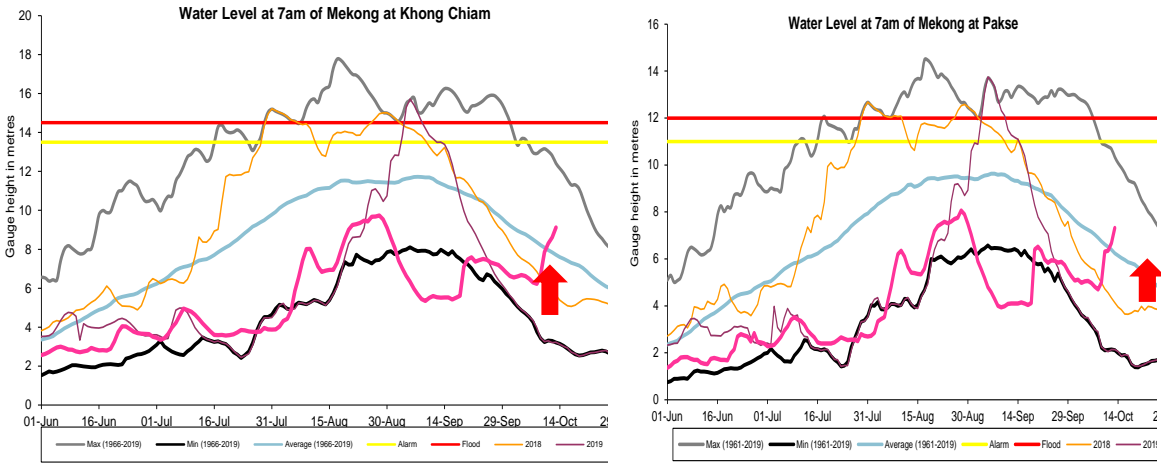


Figure 7: Water levels at Khong Chaim of Thailand and Pakse of Lao PDR.

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

Like many of the upstream stations, water levels at Stung Treng, Kratie, Kampong Cham, Chaktomuk, Koh Khel, Phnom Penh Port, and Prek Kdam stations in Cambodia were influencing due to heavy rainfall in the area, rising by about 0.86 metres. **During this week, water levels at Stung Treng and Kratie were higher than their LTA levels, as shown in [Figure 8](#). However, from Kampong Cham to Neak Luong, the levels were still low.**

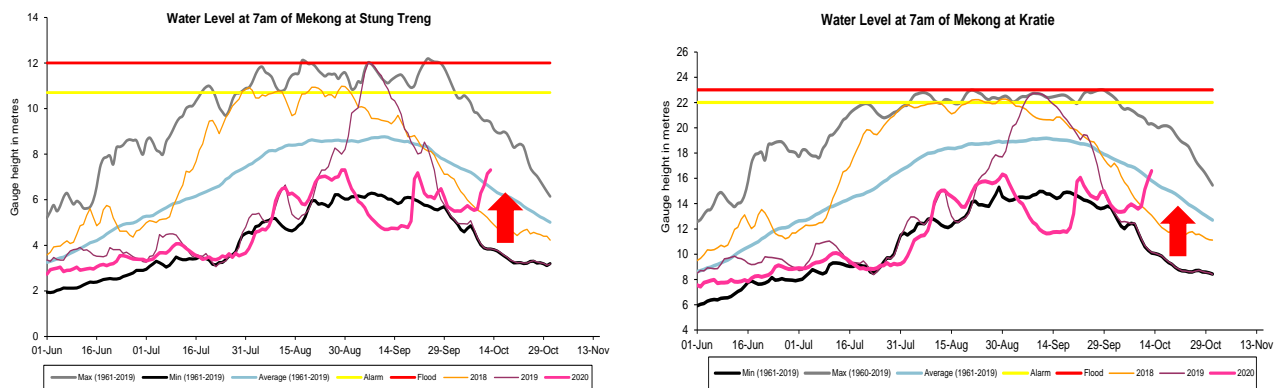


Figure 8: Water levels at Stung Treng and Kratie on Mekong River.

Tidal stations at Tan Chau and Chau Doc

Like last week, this week from 6 to 12 October, 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 12 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 rainfall in some of the provinces around the Tonle Sap Lake, the flows in this week showed increased values.

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 12 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 12 Oct) 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.

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.

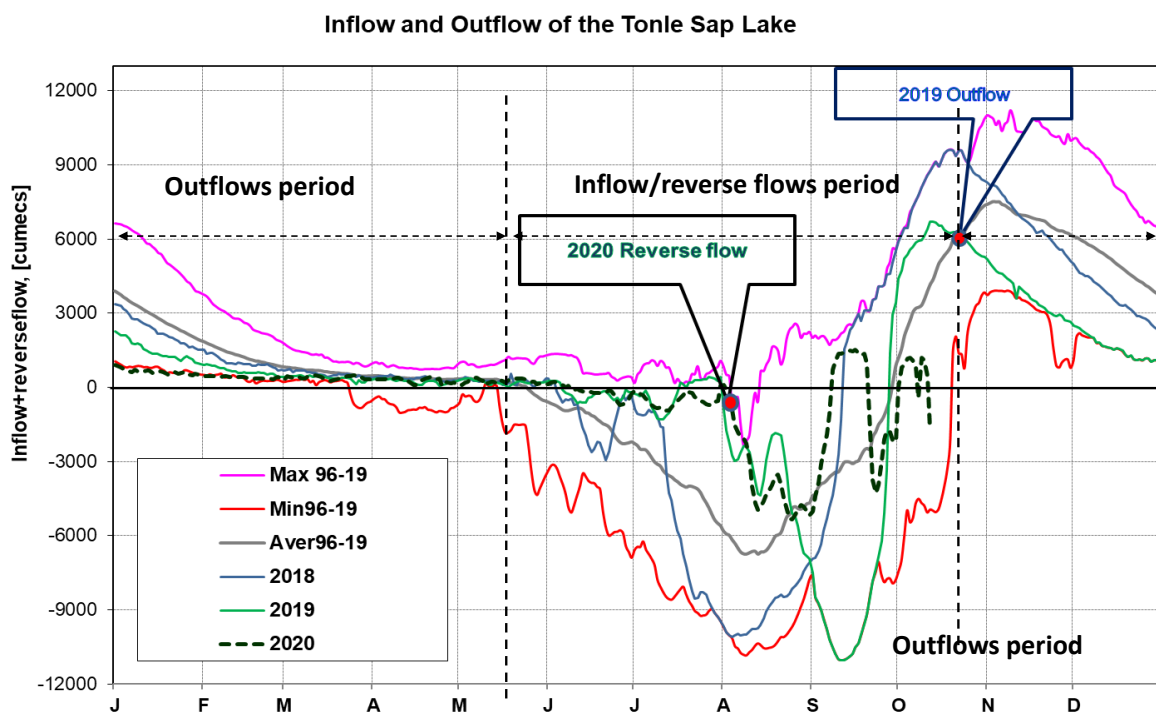


Figure 9: Seasonal change of inflows and outflows of Tonle Sap Lake.

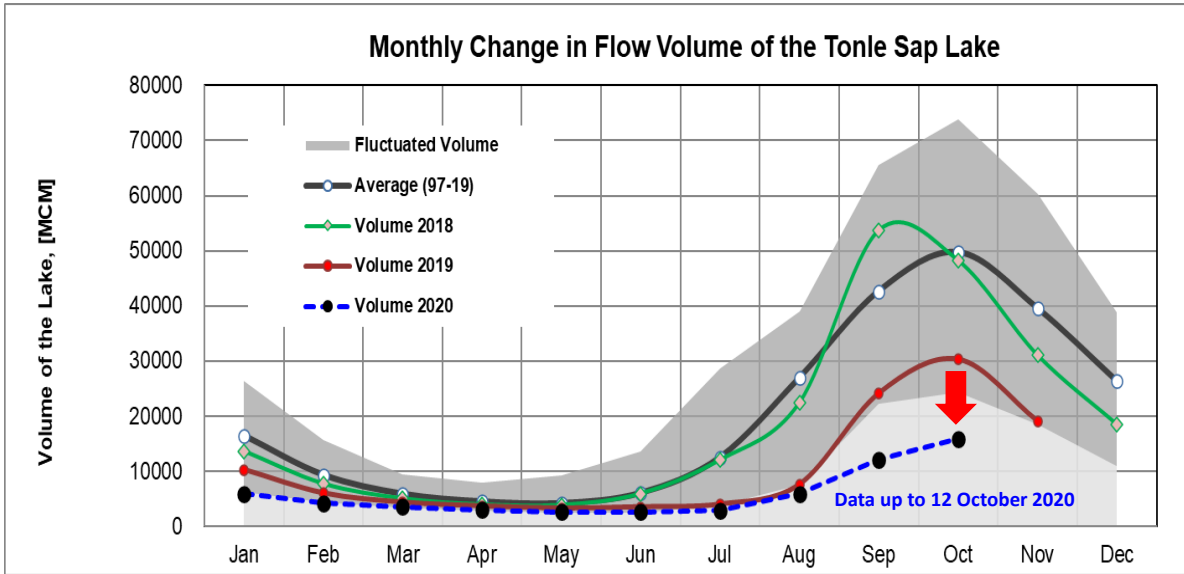


Figure 10: The seasonal change in monthly flow volume of Tonle Sap Lake.

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	15923.96	
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 6-12, a weak monsoon trough was moving from the upper to the middle part of the LMB. Coincidentally, the south-west monsoon was strongly developing in the Gulf of Thailand, causing moderate (20 -50 mm/24hrs) to heavy rain (50 -100 mm/24hrs) in some areas south-west Cambodia. Additionally, the Tropical Depression (TD) from the Sea strongly developed and became a typhoon called *Linfu* hitting Quang Nam province of Viet Nam on October 11. During October 8-11, the TD's circulation brought heavy to very heavy rainfall (>100 mm/24hrs) in some areas of the central region of Viet Nam and caused moderate to heavy rainfall 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](#).

The figure and table also show Flash Flood Guidance (FFG) results for the next one, three, and six hours produced on October 10 at 00:00 UTC (07:00 AM local time).

Table 2: Detected flash flood in Viet Nam and Lao PDR on October 10.

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 Viet Nam			
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	Moderate-Risk	Thua Thien Hue	A Luoi	North Central	Moderate-Risk	Quang Nam	Nam Giang	South Central Coast	Moderate-Risk
Quang Nam	Hien	South Central Coast	Moderate-Risk	Quang Nam	Nam Giang	South Central Coast	Moderate-Risk	Quang Binh	Le Thuy	North Central	Low-Risk
Quang Nam	Nam Giang	South Central Coast	Moderate-Risk	Quang Binh	Le Thuy	North Central	Low-Risk	Quang Tri	Da Krong	North Central	Moderate-Risk
Quang Tri	Da Krong	North Central	Low-Risk	Quang Tri	Da Krong	North Central	Moderate-Risk	Thua Thien Hue	Phong Dien	North Central	Moderate-Risk
Thua Thien Hue	Phong Dien	North Central	Moderate-Risk	Thua Thien Hue	Phong Dien	North Central	Moderate-Risk	Thua Thien Hue	A Luoi	North Central	High-Risk
Thua Thien Hue	Nam Dong	North Central	Moderate-Risk	Quang Nam	Hien	South Central Coast	High-Risk	Quang Nam	Hien	South Central Coast	High-Risk
Da Nang	Hoa vang	South Central Coast	Moderate-Risk	Thua Thien Hue	Nam Dong	North Central	Moderate-Risk	Thua Thien Hue	Nam Dong	North Central	Moderate-Risk
Quang Nam	Dai Loc	South Central Coast	Moderate-Risk	Da Nang	Hoa vang	South Central Coast	Moderate-Risk	Da Nang	Hoa vang	South Central Coast	Moderate-Risk
Quang Nam	Nam Giang	South Central Coast	Moderate-Risk	Quang Nam	Dai Loc	South Central Coast	High-Risk	Quang Nam	Dai Loc	South Central Coast	High-Risk
Quang Nam	Que Son	South Central Coast	Moderate-Risk	Quang Nam	Nam Giang	South Central Coast	Moderate-Risk	Kon Tum	Dak Glei	Central Highlands	Low-Risk
				Kon Tum	Dak Glei	Central Highlands	Low-Risk	Quang Nam	Phuoc Son	South Central Coast	Moderate-Risk
				Quang Nam	Que Son	South Central Coast	Moderate-Risk	Quang Ngai	Tra Bong	South Central Coast	Low-Risk
				Quang Nam	Phuoc Son	South Central Coast	Moderate-Risk	Quang Nam	Tra My	South Central Coast	Low-Risk
				Quang Nam	Tra My	South Central Coast	Low-Risk	Quang Nam	Que Son	South Central Coast	High-Risk
				Phu Yen	Tuy Hoa	South Central Coast	Low-Risk	Phu Yen	Tuy Hoa	South Central Coast	Low-Risk
								Khanh Hoa	Van Ninh	South Central Coast	Low-Risk

01-Hour Flash Flood Risk and location in Lao PDR					03-Hour Flash Flood Risk and location in Lao PDR					06-Hour Flash Flood Risk and location in Lao PDR				
Provinces	Districts	Villages	Region	Level Risk	Provinces	Districts	Villages	Region	Level Risk	Provinces	Districts	Villages	Region	Level Risk
Savannakhet	Nong	LAGNENG KHOK	Southern	Low-Risk	Savannakhet	Nong	LAGNENG KHOK	Southern	Moderate-Risk	Savannakhet	Nong	LAGNENG KHOK	Southern	Moderate-Risk
Saravane	Ta oi	PHOR SANH	South	Moderate-Risk	Saravane	Ta oi	PHOR SANH	South	High-Risk	Saravane	Ta oi	PHOR SANH	South	High-Risk
Sekong	Kaleum	PRO	Southeast	Moderate-Risk	Savannakhet	Phine	PHAY	Southern	Low-Risk	Savannakhet	Phine	PHAY	Southern	Low-Risk
Sekong	Kaleum	KA-OUANG	Southeast	Moderate-Risk	Sekong	Kaleum	PRO	Southeast	Moderate-Risk	Sekong	Kaleum	PRO	Southeast	Moderate-Risk
Sekong	Kaleum	AR-PEUANG	Southeast	Low-Risk	Sekong	Kaleum	KA-OUANG	Southeast	Moderate-Risk	Sekong	Kaleum	KA-OUANG	Southeast	Moderate-Risk
Sekong	Kaleum	PALAENG	Southeast	Moderate-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	Moderate-Risk
					Sekong	Kaleum	STTHORN	Southeast	Low-Risk	Sekong	Kaleum	STTHORN	Southeast	Low-Risk
					Sekong	Lamarm	KANONG MAI	Southeast	Low-Risk	Sekong	Lamarm	KANONG MAI	Southeast	Low-Risk
					Sekong	Dakcheung	DAKVANG	Southeast	Low-Risk	Sekong	Dakcheung	DAKVANG	Southeast	Low-Risk

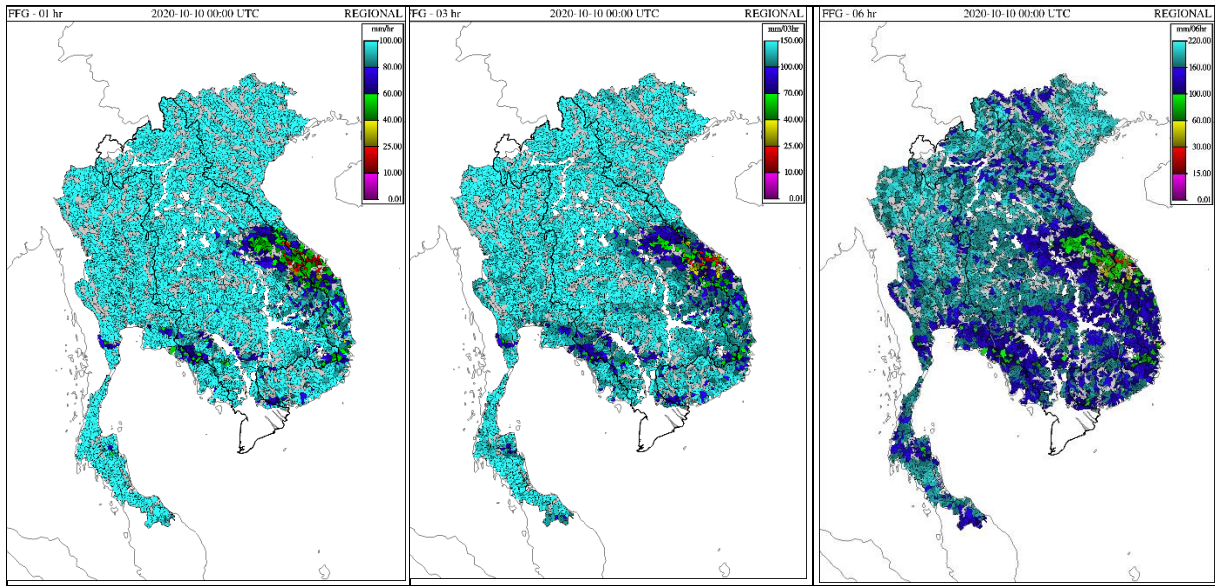


Figure 11: Flash Flood Guidance for the next 1 hour, 3 hours and 6 hours on Oct 10.

5 Drought Monitoring in the Lower Mekong Basin

Weekly drought monitoring from October 1-7

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 1-7, as shown in [Figure 12](#), was very much similar to last week except the lower part of the LMB which was relatively drier. Meteorological indicator of SPI shows that the LMB received average rainfall in the upper and central parts of the LMB, above average rainfall in the east and lower part which covers southern Cambodia, and below average rainfall in the lower part of the LMB which covers Mekong Delta of Viet Nam during the monitoring week.

The driest areas were found in Cambodia's Svay Rieng and Viet Nam's Tay Ninh, Long An, Ho Chi Minh, Tien Giang, and Ca Mau with moderate and severe dry conditions.

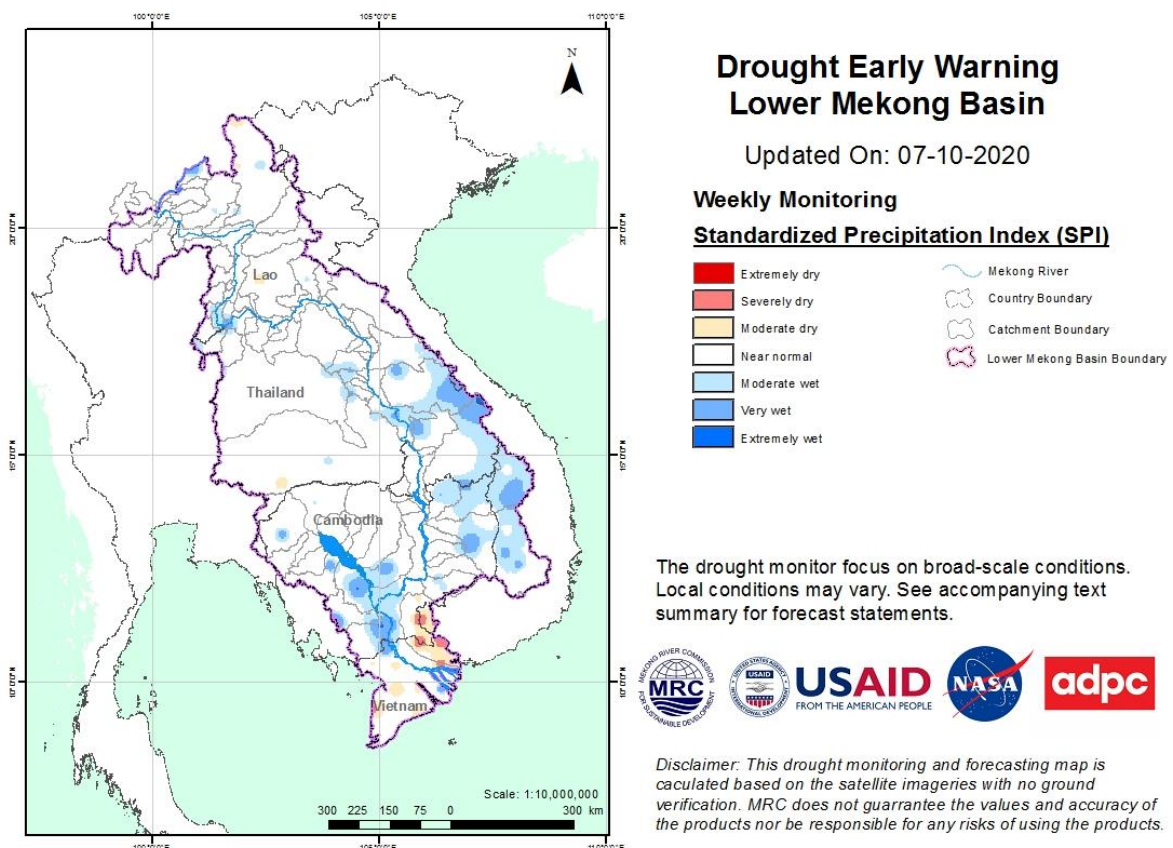


Figure 12: Weekly standardised precipitation index from Oct 1-7.

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

The soil moisture anomaly index, as shown in [Figure 13](#), indicates a better agricultural indicator of the LMB during the monitoring week from October 1-7. The driest area was still the upper part of the LMB but was getting much better this week.

The only remaining severe dry soil moisture areas cover some parts of Thailand’s Chiang Mai, Chiang Rai and Payao, and Lao PDR’s Bokeo, Luang Namtha, Xayaburi and southern Luang Prabang. Central part of the LMB, which covers north-east Thailand, was at normal condition, while the lower part of the LMB, which covers Cambodia and Viet Nam, was at normal and wet conditions.

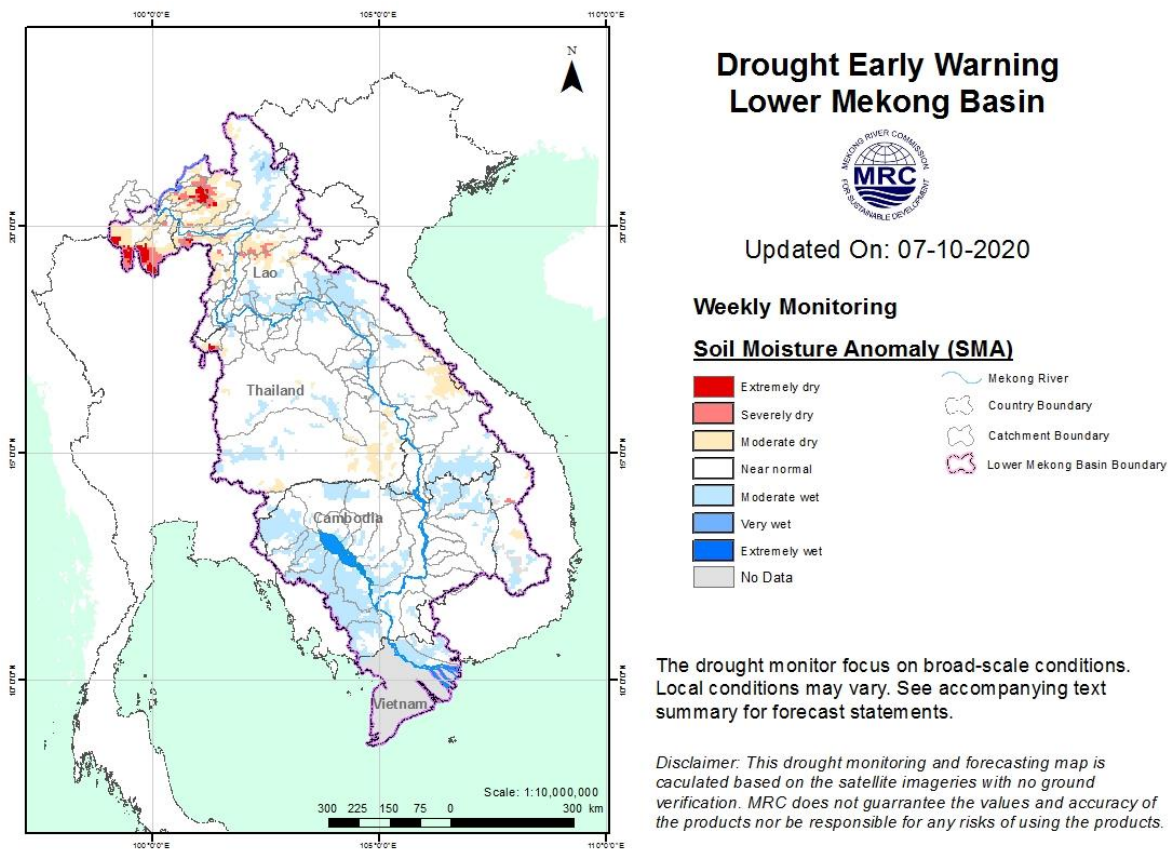
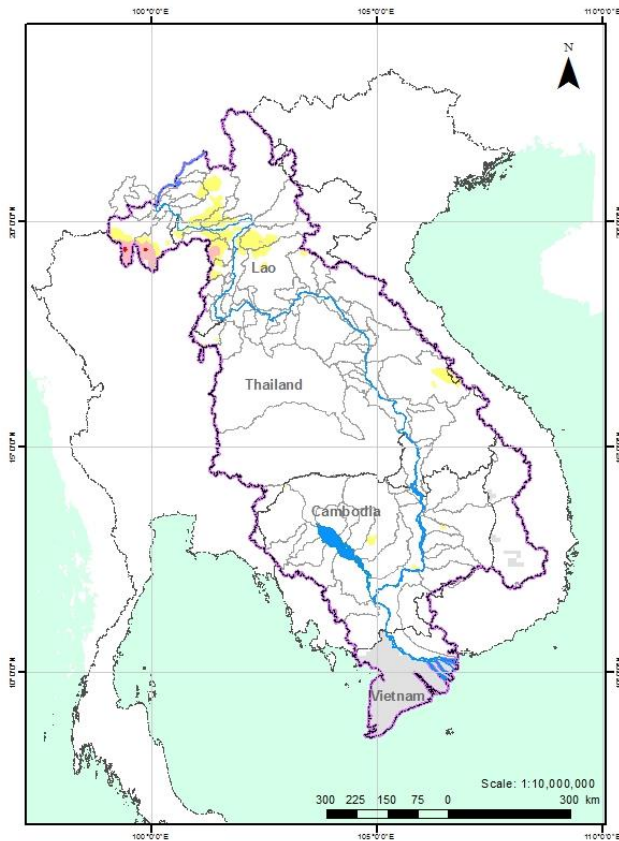


Figure 13: Weekly Soil Moisture Anomaly from Oct 1-7.

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

With a better soil moisture this week (October 1-7), the overall drought condition map through combined drought index, as presented in [Figure 14](#), shows no drought threat over the region. The only moderate dry condition was found in the northern part of the region covering small area of Chiang Mai, Chiang Rai, and Phayao of Thailand.



Drought Early Warning Lower Mekong Basin



Updated On: 30-09-2020

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 1-7.

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

6 Weather and Water Level Forecast and Flash Flood Information

6.1 Weather and rainfall forecast

The Tropical Storm *Linfa*'s circulation is currently weak and is likely to disappear very soon in the LMB. On October 11, another TD was forming in the Sea and is likely to become a storm in a few days. Based on the forecasting of Joint Typhoon Warning Center (JTWC), as shown in [Figure 15](#), the TD is likely to move northwest towards the North-Central regions of Viet Nam. It may hit the area on October 14-15.

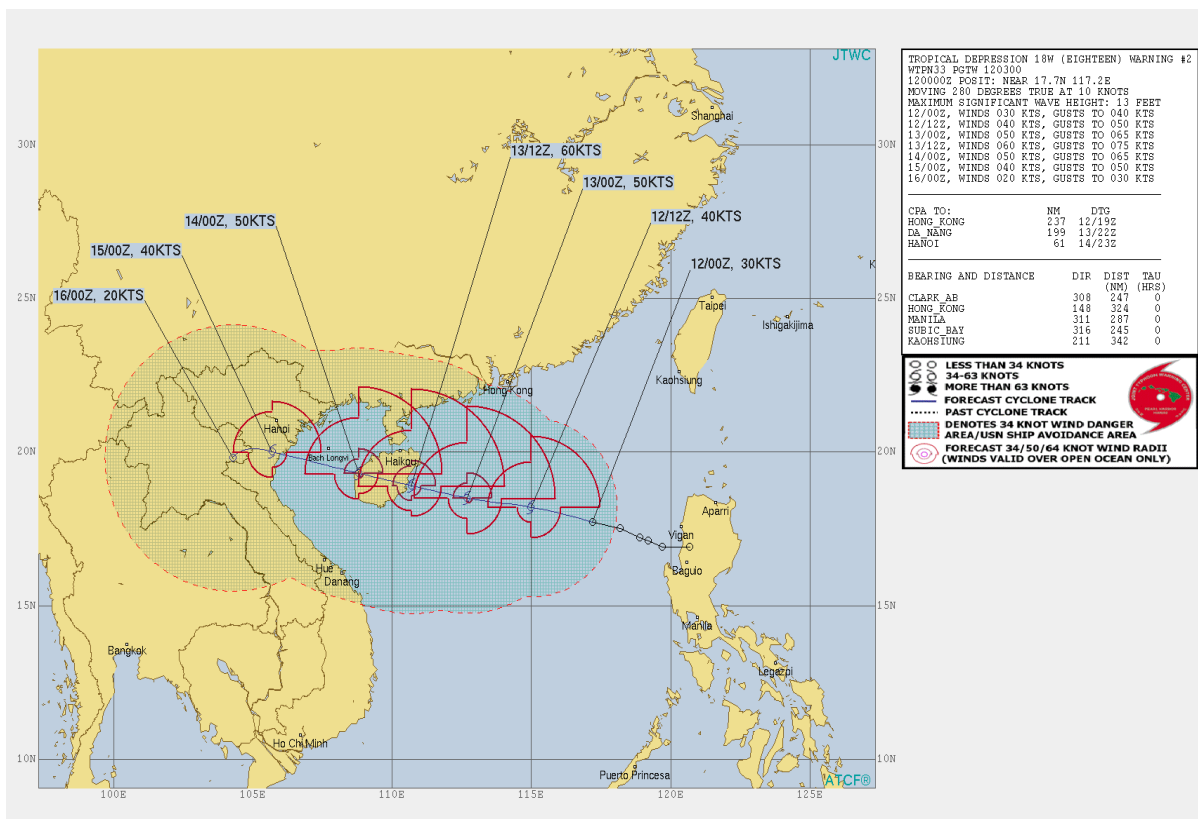
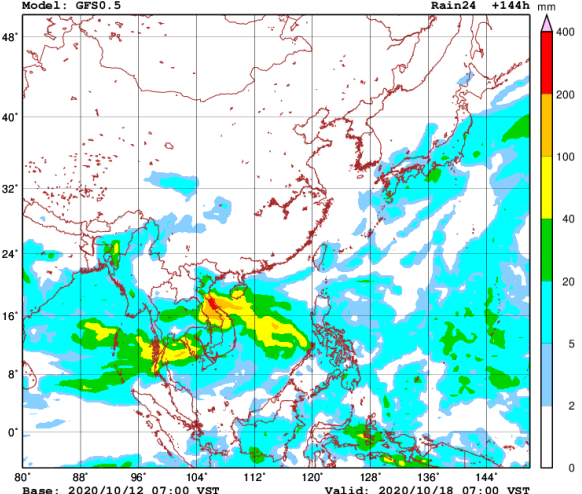
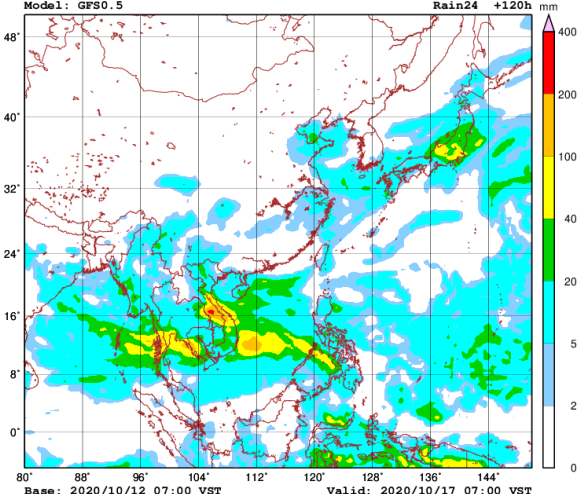
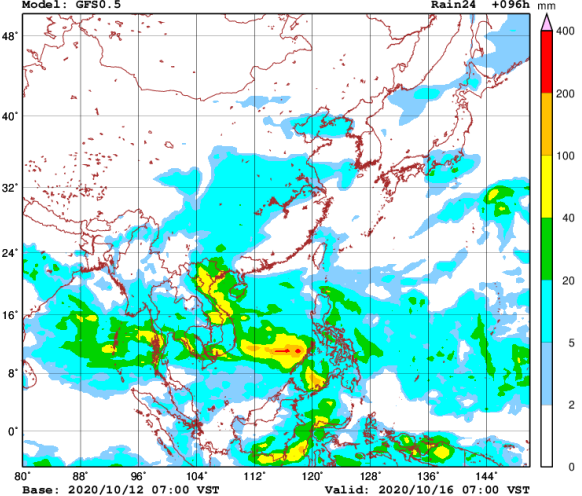
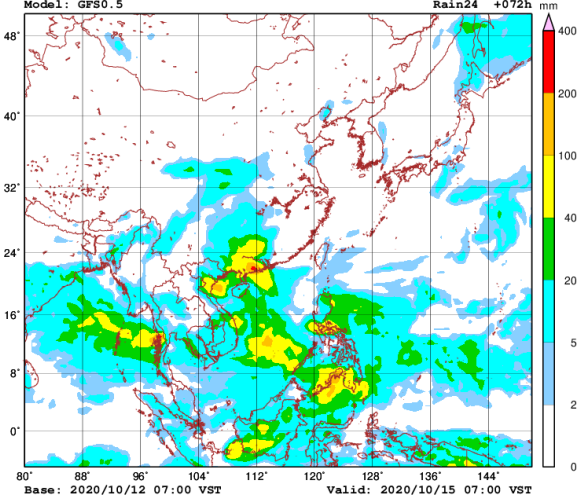
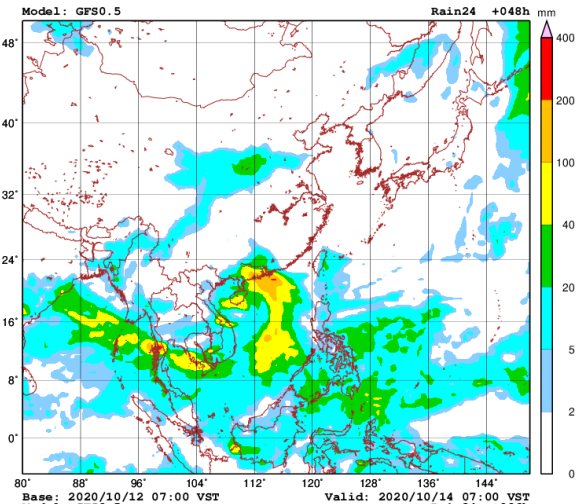
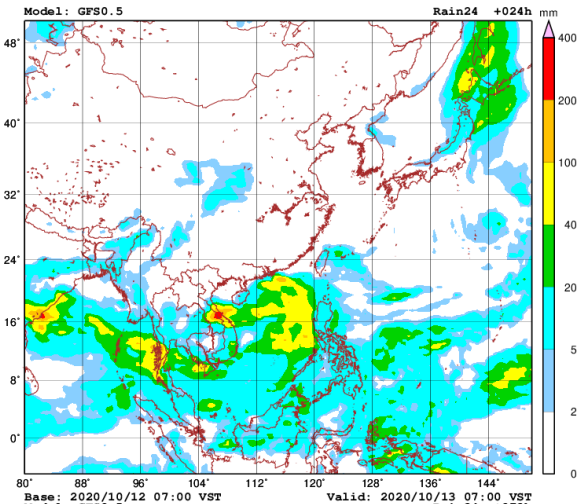


Figure 15: Track forecast of Tropical Depression. Source: JTWC

Based on the analysis of synoptic meteorological information and result from the Global Forecast System (GFS) model, in the coming week there might be three factors affecting the LMB. They include (i) TD's circulation, (ii) Monsoon Trough moving from the upstream part, and (iii) the on-going prevailing southwest monsoon from the Gulf of Thailand to the lower part of the LMB. During October 14-17, moderate to heavy rain (50-150 mm) may occur in some areas from the middle to the lower parts of the LMB, including Lao PDR, Cambodia, and Viet Nam.

[Figure 16](#) shows accumulated rainfall forecast (24hrs) of the GFS model from October 13 through October 18.



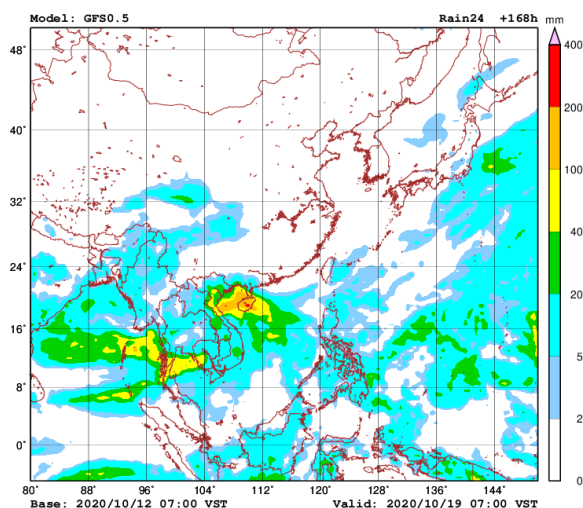


Figure 16: Accumulated rainfall forecast (24 hrs) of model GFS

6.2 Water level forecast

Chiang Saen and Luang Prabang

Based on October 12's daily flood bulletin, the daily forecast water level at Chiang Saen in Thailand is expected to slightly increase from 2.75 to 2.83 metres in the next five days.

For Luang Prabang in Lao PDR, the water level will decrease from around 9.12 to 8.89 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 down slightly from 4.13 to 3.67 metres. At Paksane in Lao PDR, the level will also decrease slightly from 5.32 to 4.67 metres in the next five days. Average quantity of precipitation is forecasted in the area. Despite that, the water levels here will still be lower than their LTAs.

Nakhon Phanom to Pakse

Water levels from Nakhon Phanom in Thailand to Savannakhet in Lao PDR will slightly decrease by about 0.10 metres in the next five days. However, water levels from Khong Chaim in Thailand to Pakse in Lao PDR will increase by about 0.30 metres because of the tropical storm *Linfa*.

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 increase by about 0.50 meters in the next five days.

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 increase by about 0.40 metres over the next five days.

Even with some anticipated rain in the areas, the water levels at these stations will continue staying above their minimum levels, particularly from Kampong Cham 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 3](#) shows the River Flood Forecasting Bulletin issued on October 12. 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 6 to 12 October, is presented in [Annex 1](#).

6.3 Flash Flood Information

With some potential rainfall forecasted for next week, flash flood event is 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 Warnings, 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). The system is updating the data resolution from 25 km to 5 km and is expected to be ready by October for the MRC DFEWS.

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.

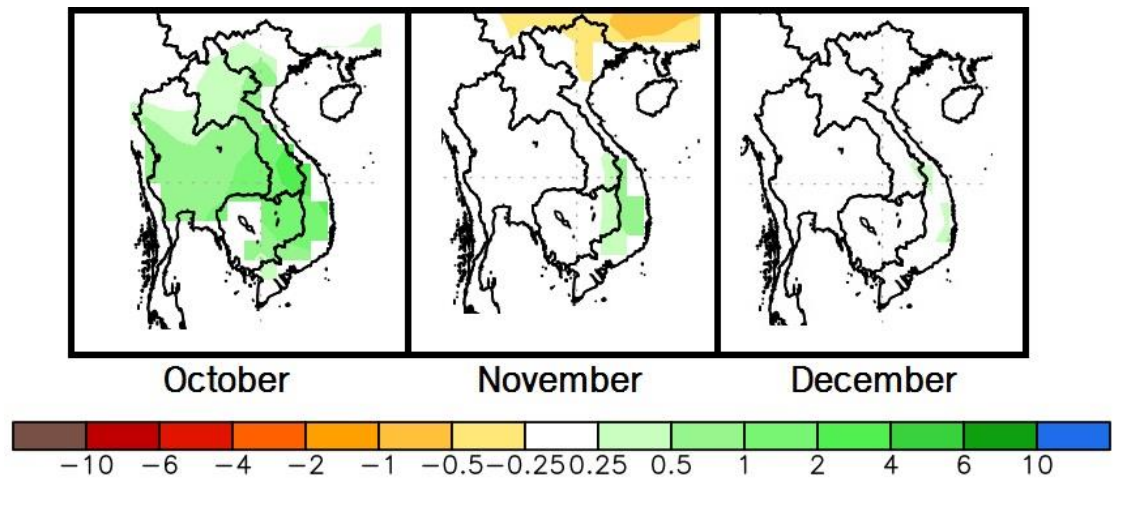


Figure 17: Daily average monthly rainfall forecast from Oct to Dec 2020.

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.

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 (0.4 to 205 mm). However, rainfall in the upper part was considered lower than average, varying from 0.3 mm to 2.3 mm at different stations along the LMB from Chiang Saen to Nong Khai in Thailand. The highest concentration was from Stung Treng in Cambodia to Viet Nam's Tan Chau and Chau Doc area (up to 205 mm). Compared with last week's amount, the rainfall this week was considered higher in the downstream part.

There was a low pressure hitting the LMB during October 8-10, causing heavy rainfall in some parts of the region. The two lines of Monsoon Trough low pressure, which continue from the previous weeks, will still bring some more rainfall to the LMB. Also, the Tropical Storms *Linf*a and *Nangha* are developing from the Sea from October 11 – 16, which will bring heavy rainfall in 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 60 mm to 150 mm during October 11-16. 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 increasing from Khong Chiam in Thailand to Stung Treng and Kratie in Cambodia. However, water levels at Kampong Cham to Neak Luong were still lower than their LTA levels. The rising level was due to the low-pressure weather, which brought heavy rainfall to the lower part of the region from October 8-11. 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 0.04 to 0.50 metres. Even so, all the stations' water levels are expected to remain below their LTAs.

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 amount 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 including Lao PDR, Cambodia, and Viet Nam during October 8-10.

7.4 Drought condition and its forecast

Drought condition of the LMB from **October 1-7** was much similar to last week (September 24-30). However, the region showed some moderate and severe meteorological drought in the Mekong Delta area of Viet Nam during the monitoring week. For agricultural indicator, LMB showed less severe and extreme dry soil moisture in northern part which was more serious in the past few weeks. 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.

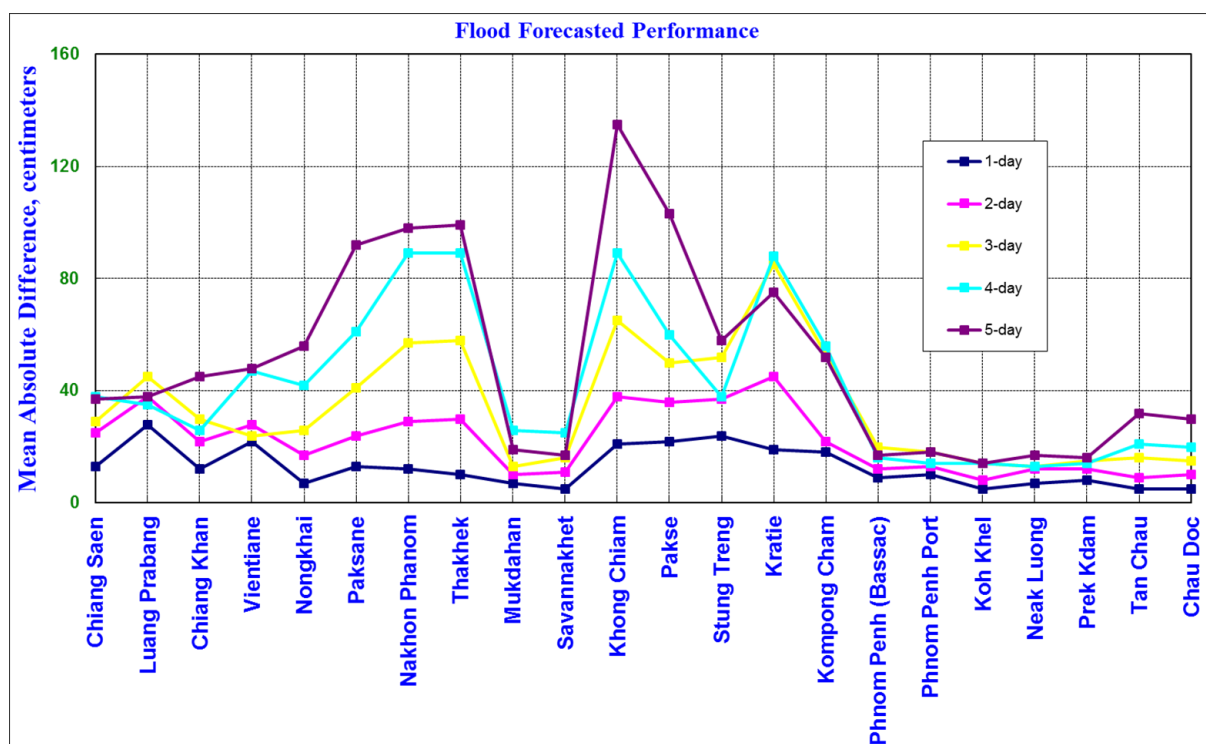
Annex 1: Performance of the weekly flood forecasting

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 6-12 October 2020.

The forecasting values from 6-12 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 Savannakhet to Kratie 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 6-12 October 2020.

Table B1: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 6-12 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 Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
1-day	13	<u>28</u>	12	<u>22</u>	7	13	12	10	7	5	<u>21</u>	<u>22</u>	<u>24</u>	19	18	9	10	5	7	8	5	5
2-day	<u>25</u>	<u>38</u>	<u>22</u>	<u>28</u>	17	<u>24</u>	<u>29</u>	<u>30</u>	10	11	<u>38</u>	<u>36</u>	<u>37</u>	<u>45</u>	<u>22</u>	12	13	8	12	12	9	10
3-day	<u>29</u>	<u>45</u>	<u>30</u>	<u>24</u>	<u>26</u>	<u>41</u>	57	58	13	16	65	<u>50</u>	52	85	53	<u>20</u>	18	14	13	15	16	15
4-day	<u>38</u>	<u>35</u>	<u>26</u>	<u>47</u>	<u>42</u>	61	89	89	<u>26</u>	<u>25</u>	89	60	<u>38</u>	88	56	16	14	14	13	14	<u>21</u>	<u>20</u>
5-day	<u>37</u>	<u>38</u>	<u>45</u>	<u>48</u>	56	92	98	99	19	17	135	103	58	75	52	17	18	14	17	16	<u>32</u>	<u>30</u>

Table B2: The Mean Absolute Difference (Error) of Flood Forecasting base on old defined Benchmark from 6-12 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 Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc	Average	
1-day	57.1	57.1	71.4	57.1	57.1	71.4	85.7	71.4	57.1	71.4	57.1	71.4	71.4	57.1	71.4	71.4	71.4	71.4	57.1	57.1	71.4	57.1	57.1	65.6
2-day	<u>33.3</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>33.3</u>	66.7	66.7	83.3	<u>50.0</u>	66.7	66.7	<u>50.0</u>	<u>33.3</u>	83.3	66.7	<u>50.0</u>	<u>50.0</u>	83.3	66.7	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	56.8
3-day	60.0	<u>40.0</u>	60.0	<u>40.0</u>	60.0	60.0	60.0	60.0	80.0	80.0	<u>40.0</u>	<u>40.0</u>	<u>40.0</u>	60.0	60.0	60.0	60.0	<u>40.0</u>	60.0	60.0	80.0	60.0	57.3	
4-day	<u>50.0</u>	75.0	75.0	75.0	<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>	<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>	<u>50.0</u>	<u>50.0</u>	<u>50.0</u>	55.7
5-day	66.7	<u>33.3</u>	<u>33.3</u>	66.7	<u>33.3</u>	<u>33.3</u>	<u>33.3</u>	<u>33.3</u>	66.7	66.7	66.7	<u>33.3</u>	<u>33.3</u>	66.7	66.7	<u>33.3</u>	66.7	66.7	66.7	66.7	<u>33.3</u>	66.7	<u>51.5</u>	

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 6-12 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	10:16	00:00	-	-	08:15	07:10	07:06	08:21	08:47	08:23	07:00	08:15	0	0	0	1	78	18	2	0
month	10:24	00:00	-	-	08:15	07:10	07:38	08:11	08:39	08:26	07:14	08:10	0	0	37	0	464	0	2	38

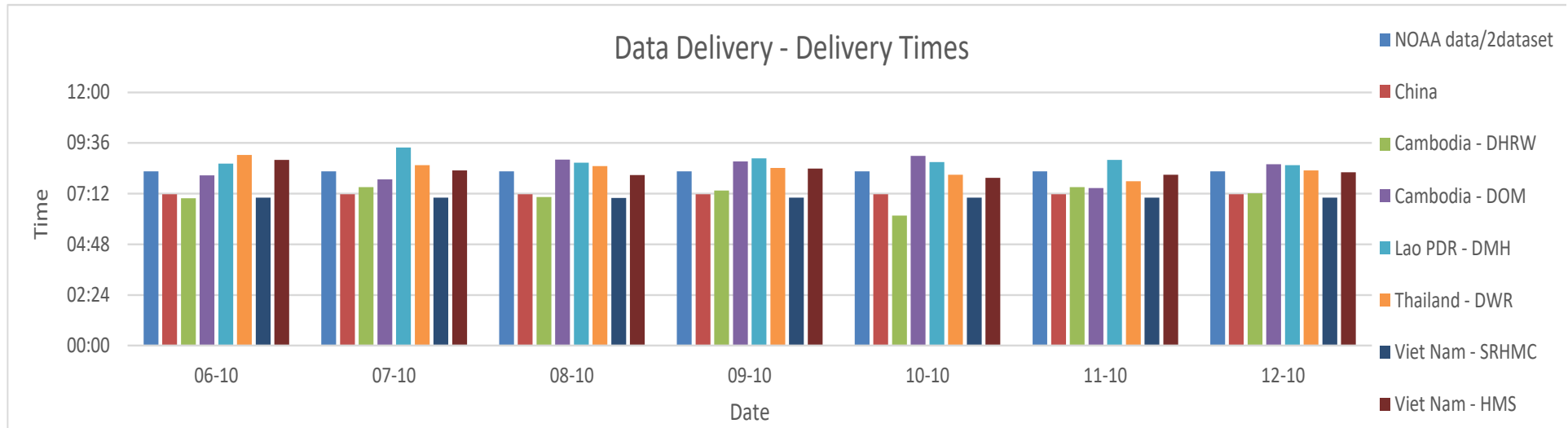


Fig. B4: Data delivery times for the past 7 days from 6-12 October 2020

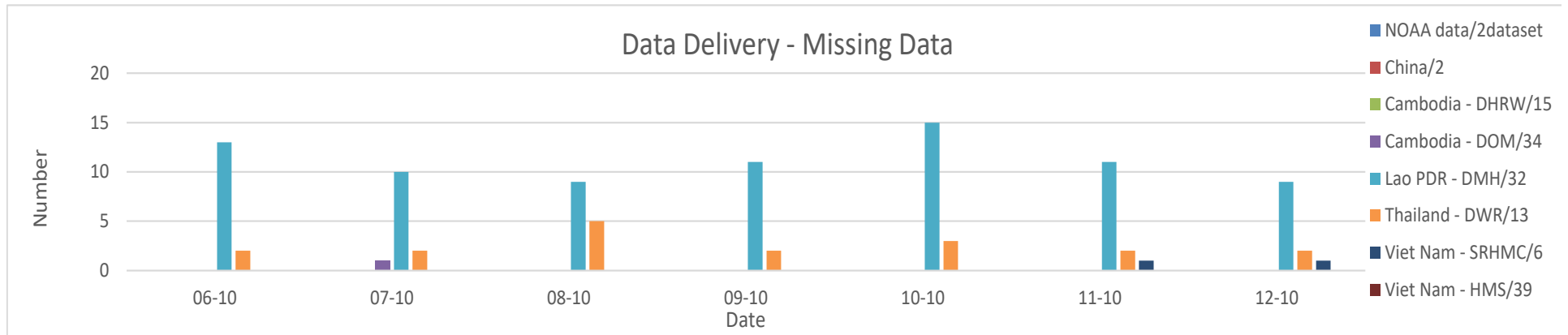


Fig. B5: Missing data for the past 7 days from 6-12 October 2020

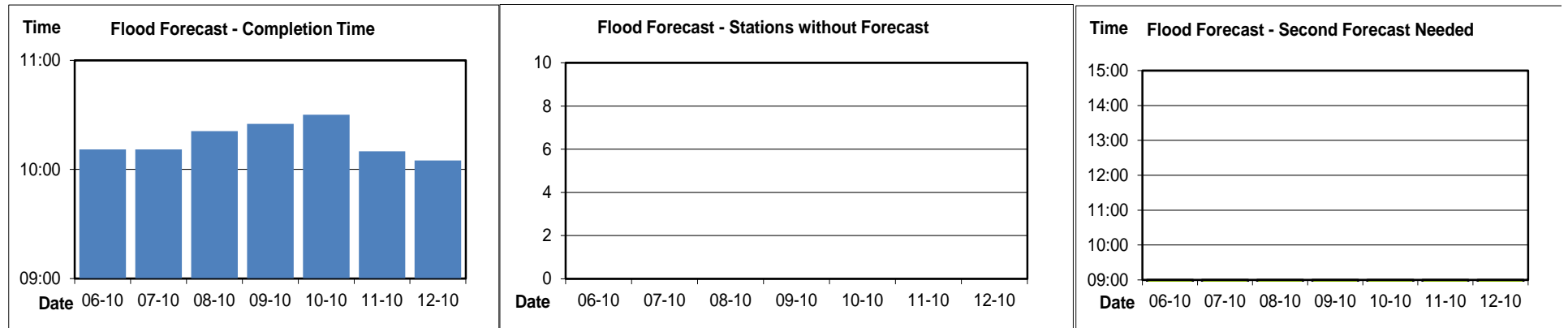


Fig. B6: Flood forecast completion time, stations without forecasts, and second forecasts need from 6-12 October 2020



Mekong River Commission Secretariat

P. O. Box 6101, 184 Fa Ngoum Road, Unit 18 Ban Sithane Neua, Sikhottabong District, Vientiane 01000, Lao PDR
Tel: +856 21 263 263. Fax: +856 21 263 264 www.mrcmekong.org

© Mekong River Commission 2020