



# Mekong River Commission

## Regional Flood and Drought Management Centre

### Weekly Dry Season Situation Report for the Mekong River Basin

Prepared on: 19/05/2020, covering the week from 12 to 18 May 2020

### Weather Patterns, General Behaviors of the Mekong River and Outlook Situation

#### General weather patterns:

From 12 to 18 May 2020, there were some rainfall in the LMB. The weather outlook bulletins (3 months weather forecast: May-Jun-Jul) and maps issued by the Thailand Meteorology Department (TMD) were used to verify the weather condition in the LMB. They stated that from May-Jun-Jul 2020, the low-pressures of air mass cells are developed around the Mekong Region that cause some depressions and tropical cyclones, resulting summer thunderstorms and rain in this period. Moreover, coldly high-pressure air masses from China will meet hot air masses already prevailing over LMB, resulting in abnormal rainfall in May-Jun.

According to the Asian Specialized Meteorological Centre (ASMC), the predicted below normal rainfall in the Mekong region is showed in May 2020. **Figure 1** presented the weather map on 18 May 2020 and **Figure 2** showed the predicted rainfall in May-Jun-Jul 2020.

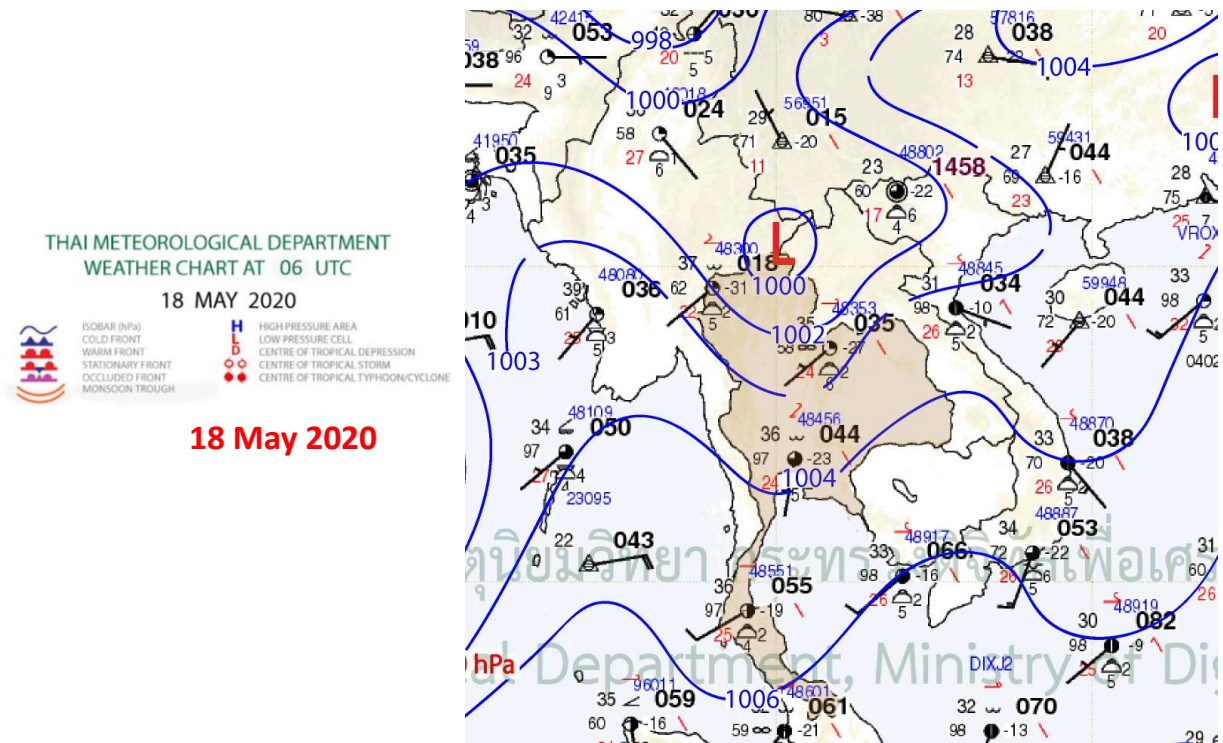
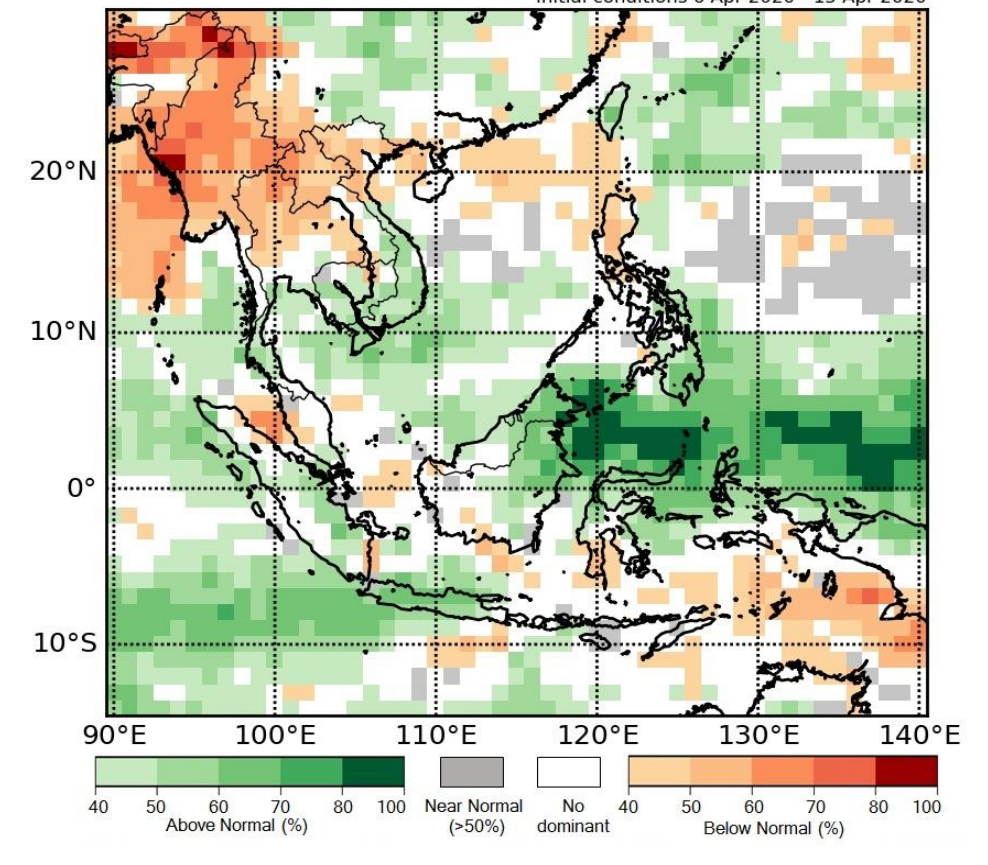


Figure 1 Summary of weather condition over the LMB on 18 May 2020

### MJJ 2020 Rainfall (tercile summary), NCEP

Initial conditions 6 Apr 2020 - 15 Apr 2020



**Figure 2** The 3 months predicted rainfall over Asian Countries by ASMC

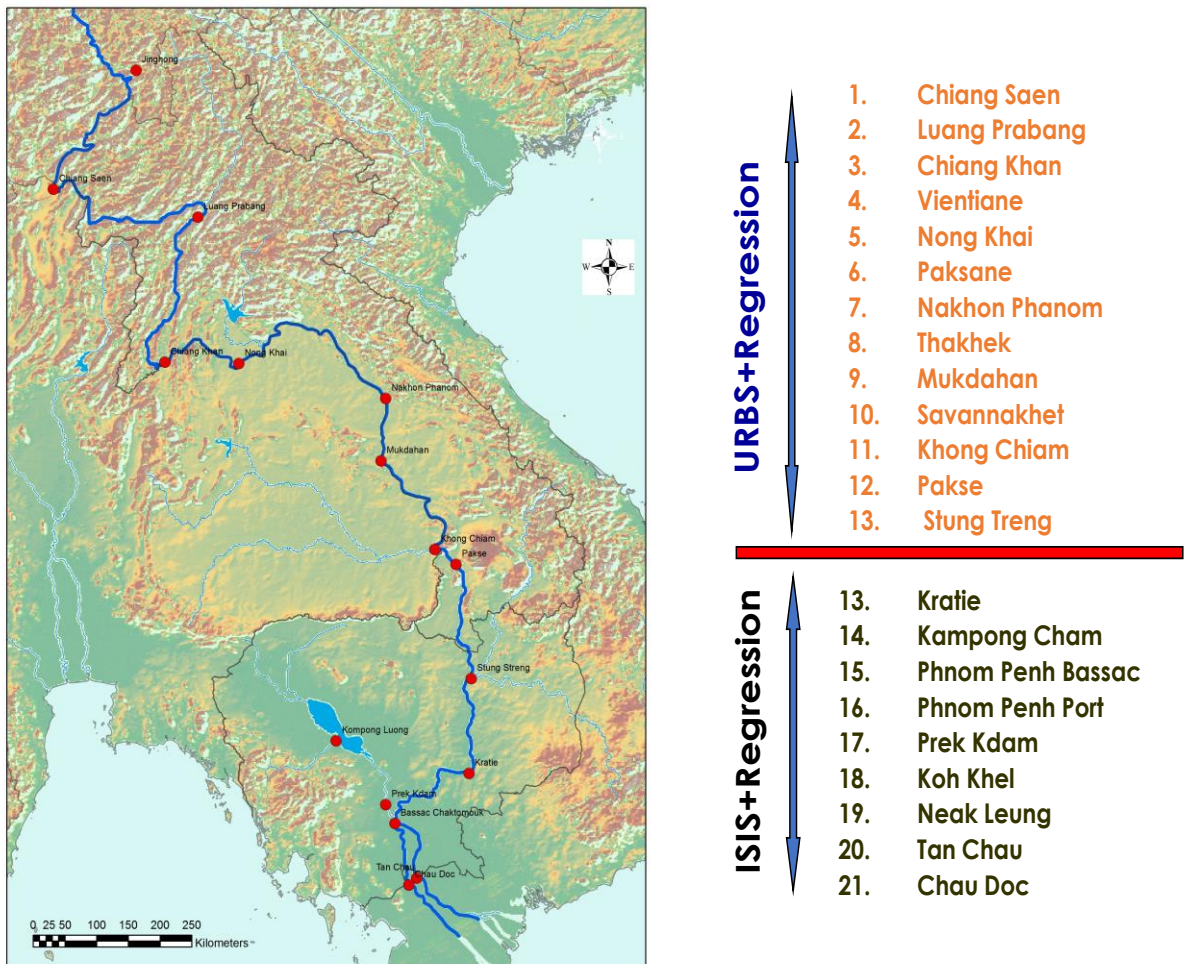
#### **General Situation on water levels of the Mekong River:**

This week from 12 to 18 May 2020, water levels at the upper most station of Chiang Sean were decreased, varied from -0.07 m to -0.28 m (data from 12 to 18 May 2020). This decreased water levels at this station were due to the low inflow from upstream and no rainfall within this week.

Water levels at Luang Prabang and Chiang Khan are likely impacted by hydropower dam at Xayaburi and upstream hydropower dams. At Lung Prabang, water levels were fluctuated close to its maximum levels, followed the same trend as 2018-2019. Water levels at Chaing Khan (downstream of Xayaburi) were decreased, varied from -0.02 m to -0.07 m. Water levels at stations in the middle part of LMB from Lao's Vientiane to Thailand's Nakhon Phanom were followed the same trends from upstream, which currently water levels at these stations are below their LATs.

Follow the same trend, water levels at Thailand's Mukdahan to Laos's Pakse are also below their LTAs. This week water levels at stations of Stung Treng and Kratie are matched with their LTAs, while at Kompong Cham, Chaktomuk, Phnom Penh Port and Prekdam were below their LTAs.

For the 2 tidal stations at Tan Chau and Chau Doc, water levels are having been fluctuating below their LTAs due to the daily tidal effect from the sea. The attached hydrograph at each key station is showed in **Annex B. Figure 3** presented the stations for river monitoring with model application for river monitoring.



**Figure 3** Stations for River Monitoring with Models Application

***For stations from Chiang Saen and Luang Prabang***

Water levels from 12 to 18 May 2020 at Chiang Saen station were decreased, varied from -0.07 m to -0.28 m. At Luang Prabang station, water levels were also decreased but still stay close to its historical maximum levels. Water levels at this station are likely impacted by hydropower dam at Xayaburi and upstream hydropower dams.

***For stations from Chiang Khan, Vientiane-Nong Khai and Paksane***

Water levels from 12 to 18 May 2020 at Chiang Khan station were likely nominated by upstream hydropower dam of Xayaburi, which decreasing from -0.02 m to -0.07 m that caused low inflow of downstream reach at Vientiane, Nong Khai and Paksane. The current observed water levels at these stations are below their LTAs.

***For stations from Nakhon Phanom to Pakse***

Water levels from 12 to 18 May 2020 at Nakhon Phanom to Pakse stations were decreased which followed the same trend from upstream of last week, varied from -0.02 m to -0.05 m due to the low inflows and less rainfall from upper sub-catchments. This week water levels at these stations were below their LTAs.

***For stations from Stung Treng to Kampong Cham/ Phnom Penh to Koh Khel/ Neak Luong***

This week from 12 to 18 May 2020, water levels at stations of Stung Treng and Kratie were matched with their LTAs, while at Kampong Cham, Chaktomuk, Phnom Penh Port and Prekdham were dropped but stay close to their LTAs. As observing water levels at Neak Luong on the Mekong, Chaktomuk on the Bassac and Koh Khel on the Bassac were influencing by tidal from the sea due to the low water level of

the Mekong from November 2019 to March 2020 (these water levels are followed the same trends of 2015-2016).

### ***Tan Chau and Chau Doc***

From 12 to 18 May 2020, water levels at the 2 tidal stations at Tan Chau and Chau Doc were increased but still below their LTAs due to the strong tidal effect from the sea.

According to the Japan Meteorological Agency (JMA), Sea surface temperature (SST) variability in the tropics Neutral, which has no major impact in to the South China Sea from March to May 2020.

### **Discussion and Conclusion**

From 12 to 18 May 2020, the trend of water levels at Chiang Sean were decreased based on the inflows from upstream. Water level at Chiang Sean is relied from inflow at Jinghong Hydropower Station on Lancang and its catchment rainfall.

Luang Prabang stations is likely nominated by hydropower dam operation from upstream (tributaries) and downstream (Xayaburi) in which their water levels always fluctuated above their LTAs during the dry season 2020. It was observed that water levels at this station have been affected, since the impounding reservoir at Xayaburi last year 2019 (October 2018 to May 2019).

Analysis of the Mekong River Commission's data revealed that the rises of water levels at some stations on the Mekong mainstream (Chiang Sean and Luang Prabang) were the result of the upstream rainfall and dam operation, including major tributaries inflows upstream.

Water levels at stations in the middle part of LMB from Vientiane to Paksane were decreased, following the trend inflows from upstream and less rainfall from sub-catchments. The recent water levels at these stations are below their LTAs. This low flow indicated the low inflow from upstream and less rainfall from catchments network.

From Stung Treng to Kratie, water levels are currently matched with their LTAs, while at Kampong Cham, Phnom Penh Port to Prekdam on the Tonle Sap river and Chaktomuk and Koh Khel on the Bassac river the water levels were dropped below their LTAs. Water levels of these stations are expected to increase at the end of May, due to inflows from upstream and rainfall from sub-catchments.

The Mekong river flow depends not only on the flow from the upstream, but also on the rainfall from sub-catchment inflows. 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 South China Sea. By far the major contribution comes from the two majors 'left-bank' (eastern) tributaries between Vientiane – Nakhon Phanom and Pakse – Stung Treng, which together contribute more than 40% of the flows.

Since the beginning of this year, there were very low water level in the lower Mekong River, due to low rainfall in the basin in 2019. Like many parts of the world, the Mekong region has been affected by the prolonged El Nino phenomenon, the phenomenon that usually causes extreme heat and insufficient rain in 2019. The cause of below average water levels in the Mekong mainstream in Jan-Feb-Mar 2020 is likely due to unusual low rainfall in 2019 and the effected El Nino process over the Mekong region 2019.

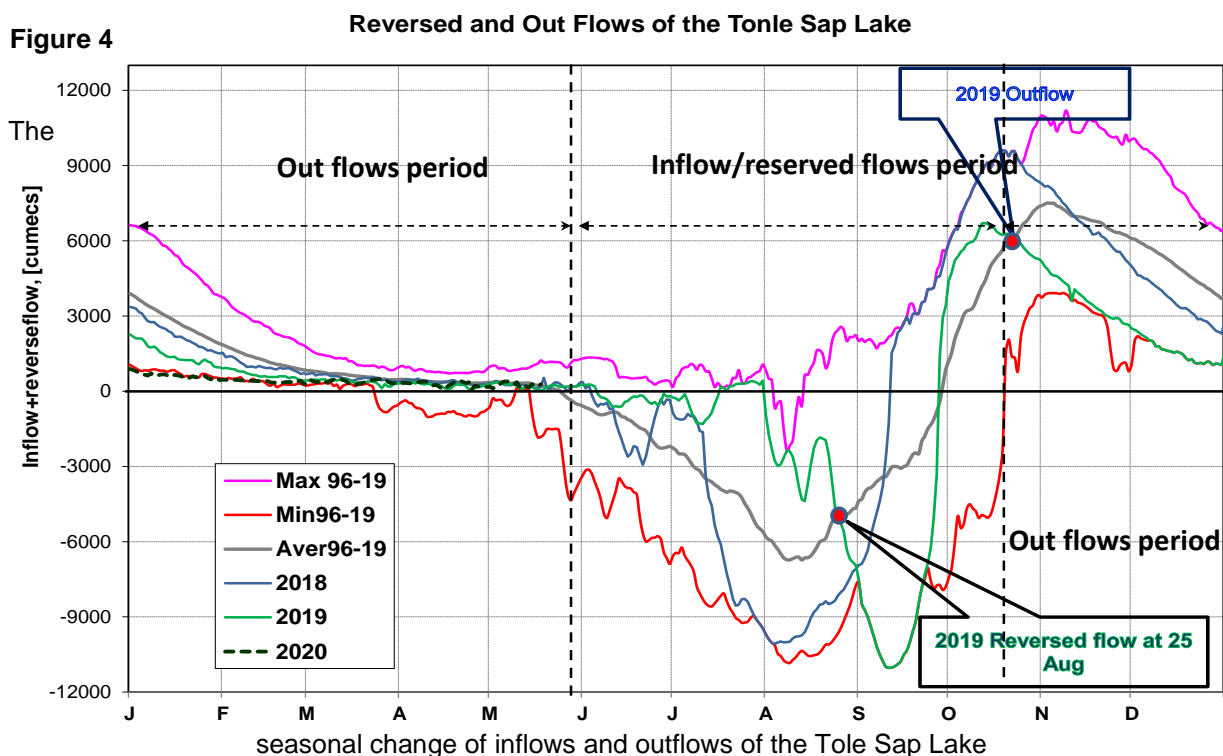
The amount of water flowing from Jinghong dam in China could also be a potential contribution of the low flow at the upper part of the LMB (Chaing Saen-Vientiane). According to the notification from China, were decreased about 0.76m, due to the test of equipment of hydropower dam at Jinghong from 27 Dec 2019 to 4 Jan 2020.

Another potential important reason of low flow in the mainstream (Jan-Feb-Mar) was the contribution from major tributary dams. Potentially, there were storing waters that contributed to the Mekong river basin in time of no or low rainfall. This has impacted the basin situation. However, we do not have any official data to quantify their contribution.

### **The Tonle Sap Flow**

At the end of wet season when the inflow of the Mekong is receded, the flow of the Tonle Sap Lake (TLS Lake) is being flow out. **Figure 4** showed the seasonal change of inflow/reversed flows and outflows. It was indicated that the outflows of the Tonle Sap Lake are matched to their LTAs, since early April 2020. **Table 1** showed the monthly change in volume of the Tonle Sap Lake, comparing the flow between its LTA, 2018, 2019 and the recent year 2020 (up to 18 May). The low inflow from the Mekong and the less rainfall in the surrounding sub-catchments caused the outflow from the TLS Lake in 2020 very low. The low outflow from the Tonle Sap Lake could affect the Mekong Delta of low water levels during the dry season, which could face of water shortage for agricultural production in that area. Since last week, the recent outflows for the Tonle Sap Lake is returned to normal situation due to the rainfall from catchments.

The low outflow from the Tonle Sap could also affect the expanding unsaturated soil that may cause bank erosion and increase salinity intrusion from the sea in the Mekong Delta.



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

Month	Average (97-19)	Volume2018	Volume2019	Volume2020
Jan	16452.95	13633.41	10285.31	5906.80
Feb	9392.13	7784.12	6057.31	4264.19
Mar	5868.92	5037.06	4387.48	3560.35
Apr	4502.51	3978.57	3667.47	2992.61
May	4154.68	3838.63	3266.43	2653.32
Jun	5919.22	5814.46	3508.31	
Jul	12179.21	11628.51	3979.76	
Aug	19275.58	21784.36	7364.72	
Sep	42196.41	53310.21	23434.07	
Oct	49773.40	48716.52	30680.83	
Nov	39996.78	31540.68	19471.72	
Dec	26537.70	18656.94	10697.45	
	Low-flow condition, compared with LTA (Long term average)			
	Normal condition, compared with LTA (Long term average)			

## **The Trend of water level and its Outlook**

From 19 to 25 May 2020, water levels along the lower Mekong River from Thailand's Chiang Saen to Lao PDR's Luang Prabang will slightly increase that can be varied from 0.10 m to 0.21 m. From Lao PDR's Vientiane and Thailand's Nong Khai, water levels will also increase, followed the same trend from upstream vary from 0.04 m to 0.15 m. From Thailand's Nakhon Phanom to Lao PDR's Pakse, water levels will increase from 0.02 m to 0.06 m.

From Cambodia's Stung Treng to Neak Loung on the Mekong River, water will be slightly increased varies from 0.03 m to 0.12 m. The water levels of the Tonle Sap Lake at Prekdam will increase from 0.02 m to 0.09 m.

For Viet Nam's Tan Chau on the Mekong River and Chau Doc on the Bassac River, water levels will be increased and fluctuated above their LTAs, follow the daily effect tidal from the sea.

Perhaps even more expecting based on the historical hydrology phenomenon, the abnormal rainfall can be occurred at end of May and early June 2020, which can contribute to the flow in the Mekong River.

According to the Asian Specialized Meteorological Centre (ASMC), climatologically, the weather over the Mekong sub-region remained dry. Scattered hotspots were detected in Cambodia and Thailand, and isolated ones were also detected in Myanmar, Lao PDR and southern Viet Nam. With the prevailing dry weather over the Mekong sub-region forecast to persist, a further deterioration in the hotspot and smoke haze situation can be expected.

For details information on water levels and rainfall at each key station, **Annex A** and **Annex B** are presented as follows:

- Tables presents observed water levels and rainfall from last week (**Annex A**)
- The water levels hydrographs showing the observed water levels for the dry season (**Annex B**)

**Annex A: Graphs and Tables**

Table A1: observed water levels

Unit: m

2020	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
12-05-2020	-	2.29	8.02	3.98	1.70	1.46	3.28	1.65	2.08	1.26	2.65	7.15	2.75	1.83	1.90	1.18	1.05	-0.41	-0.36
13-05-2020	-	2.20	7.95	3.97	1.66	1.41	3.12	1.55	2.00	1.34	2.64	7.22	2.72	1.83	1.94	1.20	1.06	-0.36	-0.29
14-05-2020	-	2.20	7.92	3.90	1.63	1.43	3.14	1.43	1.92	1.40	2.68	7.16	2.68	1.91	1.92	1.25	1.05	-0.28	-0.21
15-05-2020	-	1.92	7.87	3.88	1.58	1.41	3.08	1.36	1.91	1.28	2.70	7.24	2.64	1.77	1.81	1.20	1.04	-0.25	-0.20
16-05-2020	-	1.94	7.82	3.86	1.52	1.39	3.05	1.32	1.89	1.34	2.7	7.25	2.66	1.75	1.68	1.22	1.03	-0.17	-0.09
17-05-2020	-	1.87	7.78	3.89	1.50	1.38	3.03	1.27	1.83	1.26	2.67	7.30	2.67	1.77	1.59	1.24	1.03	0.02	0.11
18-05-2020	-	1.90	7.72	4.18	1.48	1.38	3.06	1.26	1.82	1.18	2.61	7.24	2.68	1.66	1.52	1.32	1.02	0.34	0.43

Table A2: observed rainfall

Unit: mm

2020	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Mukdahan	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
12-05-2020	-	1.6	0	2.4	0	0	4.4	0	1	0	0	0	0	0	0	0	0	0	0
13-05-2020	-	0	0	0	0	0	0	0	0	0	0	3.5	0	0	0	0	7.4	0	0
14-05-2020	-	14.3	20.6	0	0	0	2.8	24	0	0	33	0	15.3	22.1	0	4.2	0	0	0
15-05-2020	-	0	2.6	4.5	0	0	0	0	0	0	0	0	0	0	0	0.7	0	0	0
16-05-2020	-	6.7	0	9.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
17-05-2020	-	0	0	13	0	17.3	0	0	0	0	0	0	0	0	0	0	0	0	0
18-05-2020	-	8.2	0	0.5	0.8	5	69	5.1	5.2	0	0	0	0	0	0	0	0	0	0

**Note: No data available from China during the Dry Season**

### Annex B: Season Water Level Hydrographs

This Annex showed water level hydrographs of each key station. These hydrographs distributed weekly water level for River Monitoring purpose.

#### HYDROGRAPH AT 7 AM OF MEKONG TONLE SAP AND BASSAC AT MAINSTREAM STATIONS IN DRY SEASON UP TO 18 MAY 2020

