

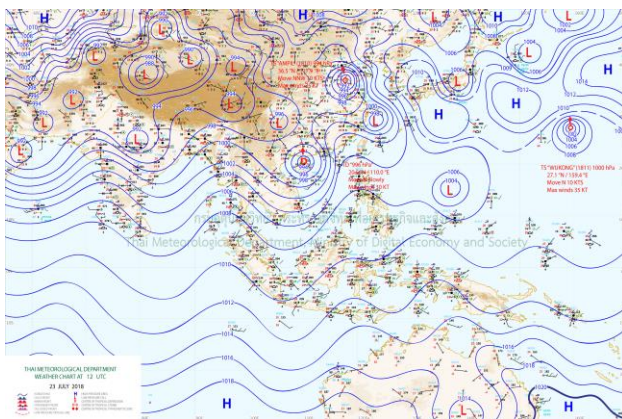
### Weekly Flood Situation Report for the Mekong River Basin

Prepared at: 31/07/2018, covering the week from the 23<sup>th</sup> to 30<sup>th</sup> July 2018

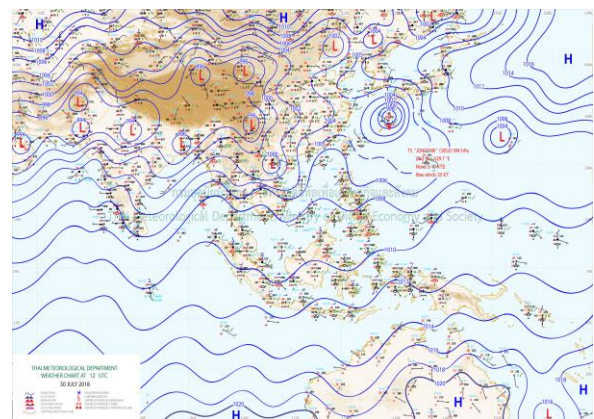
### Weather Patterns, General Behaviour of the Mekong River and Flood Situation

#### General weather patterns

The general weather situation in the week of 23<sup>th</sup> to 31<sup>th</sup> July 2018 was considered based on the weather bulletins issued by the Thai Meteorological Department (TMD). The weather maps of the 23<sup>th</sup> and – 30<sup>th</sup> July 2018 are presented in the **Figures 1 & 2**.



**Figure 1: Weather map for 23<sup>th</sup> July 2018**



**Figure 2: Weather map for 30<sup>th</sup> July 2018**

#### Moderate South-West (SW) Monsoon

From 23<sup>th</sup> to 30<sup>th</sup> July 2018, low pressure was hit some parts in the LMB which caused of heavy rainfall. This week heavy rainfall was affected from Luang Prabang to Nakhon Phanom catchment areas and some part of Sebang Fai in the Pakse area.

#### Tropical depressions (TD), tropical storms (TS) or typhoons (TY)

These low pressures caused by the typhoon SON TINH were presented in **Figure 1** and **2**.

#### Other weather phenomena that affect the discharge

According to the Thai Meteorological Department (TMD), there will influence the prevailing southwest monsoon over Mekong region, including the Gulf of Thailand to become more rainfall. Low pressure was hit the Mekong region, during that time.

#### Over weather situation

During the last week, the weather caused by heavy rain in the Northern part of LMB. Consequently, there was heavy rainfall between Luang Prabang and Vientiane and between Nakhon Phanom and Khong Chiam catchment areas. Other rainfall was concentrated in the 3S area, which inflows into Stung Treng. The weekly rainfall distribution from 23<sup>th</sup> to 30<sup>th</sup> July 2018 is shown in **Figure 3**.

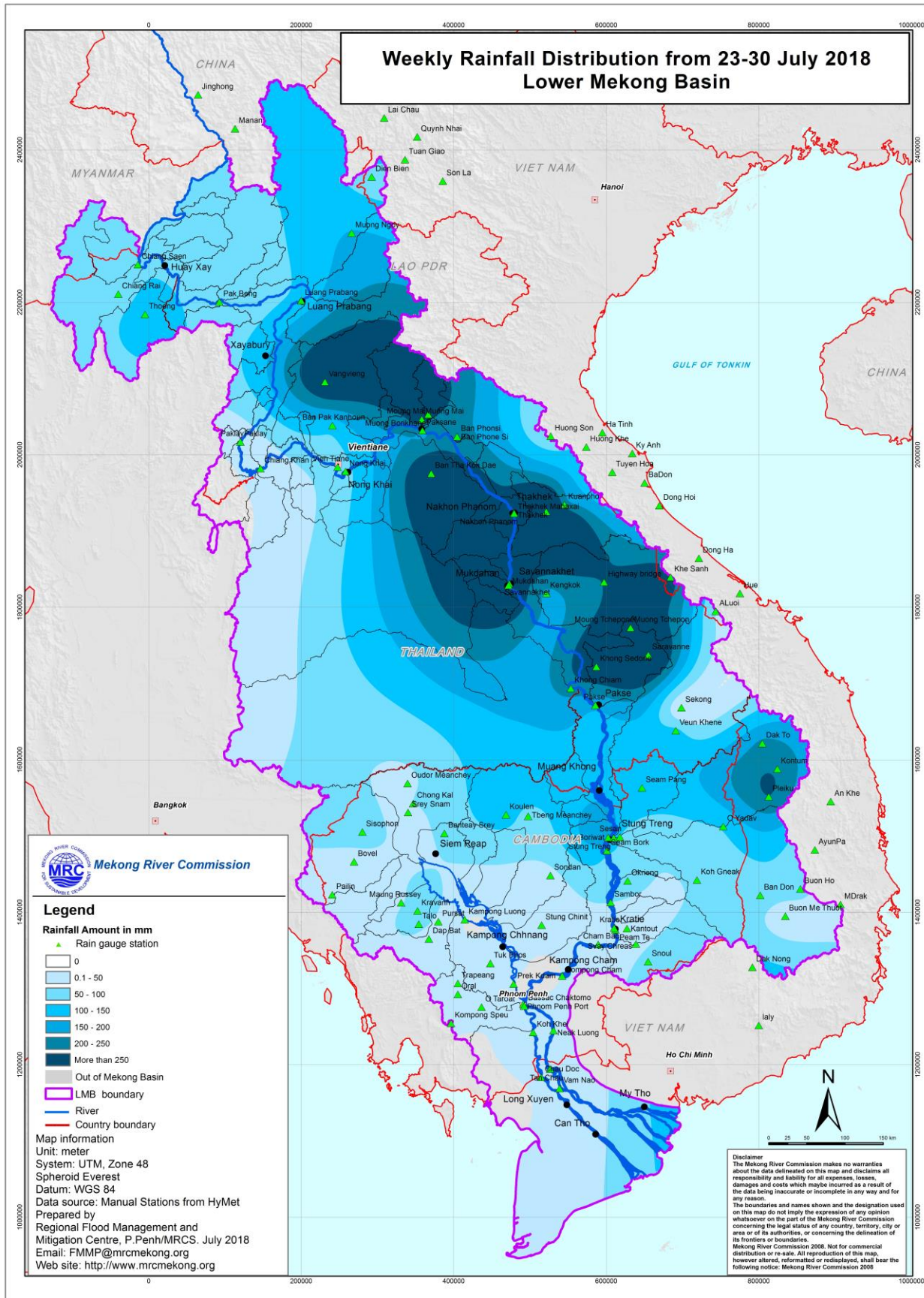


Figure 3: Weekly Rainfall Distribution over the LMB from 23<sup>th</sup> – 30<sup>th</sup> July 2018

## **General behaviour of the Mekong River**

During the last week, the water levels at stations from upper to middle part of LMB has been decreasing due to inflow operation upstream part, while at downstream part has been slightly rising.

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

Water levels from 23<sup>th</sup>-30<sup>th</sup> July 2018 at Chiang Saen station were raised from 5.44m to 6.98 m from 28<sup>th</sup> to 30<sup>th</sup> July which was above the LTA, while at Luang Prabang station water levels were drastically plug from 13.32 m to 14.86m that higher than the recorded value in 2000 at the same period from 23<sup>th</sup> to 30<sup>th</sup> July.

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

From Chiang Khan to Paksane, observed water levels were increased sharply above their LTAs from 23<sup>th</sup> to 30<sup>th</sup> July 2018.

### ***For stations from Nakhonphanom/Thakhet to Mukdahan/Sovannakhet***

Water levels from Nakhon Phanom/Thakhet to Mukdahan/Sovannakhet stations were drastically increased from from 23<sup>th</sup> to 30<sup>th</sup> July 2018. These levels had reached alarm levels at Nakhon Phanom on 30<sup>th</sup> July 2018. This caused rising water level was due to the heavy rainfall from Middle part of LMB. Water levels of these stations raised above their LTAs.

### ***For stations from Khong Chiam to Pakse***

Water levels from Khong Chiam to Pakse stations were rapidly increased also, which raised up to alarm levels at Khong Chiam on 29<sup>th</sup> July and at Pakse on 28<sup>th</sup> July 2018. Water levels were continued to rise up to flood levels on 30<sup>th</sup> July at Khong Chiam and Pakse (the issued daily bulletin has been uploaded daily in the MRC's webpage).

### ***For stations from Stung Treng to Kompong Cham***

Water levels from Stung Treng to Kompong Cham were also raised up, and due to the Dam break at the Xe-Pian Xe-Nam Noy Hydropower project in Attapue Province of Lao PDR, water level at Stung Treng was raised up to alarm level on 30<sup>th</sup> July 2018 at 10.75m. Water levels at Kratei and Kompong Cham were also raised up, but still not reached to their alarm levels.

### ***For stations from Phnom Penh to Koh Khel/Neak Luong***

Water levels at Phnom Penh to Koh Khel and Neak Luong were raised up due to the inflows from upstream and rainfall. Water level at Koh Khel was nearly reached alarm level at 7.40m on 30<sup>th</sup> July 2018.

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

Compared to the long-term average (LTA), water levels at these two tidal stations were fluctuated around their LTAs and having the same trends of the daily record in the year 2017.

**Note:** For areas between forecast stations, please refer to the nearest forecast station.

## **Flood Situation**

- Flood stage or alarm stage:
  - ✓ The alarm and flood levels were already reached at Nakhon Phanom, Mudahan, Khong Chiam, Pakse and Stung Treng on 30<sup>th</sup> July 2018 (referred the flood bulletin on 30<sup>th</sup> July 2018).
  - ✓ There will be expecting to reach alarm and flood levels at Nong Khai and Paksane on 3rd Aug, Nakhon Phanom on 31st Damage or victims:

No damage or loss of life due to river flooding was recorded anywhere along the Mekong River during the last week.

For more details see the following annexes:

- tables and graphs for water level and rainfall for the last week in Annex A
- a graph for accuracy in Annex B
- a table of forecast achievement in Annex B

Tuesday, 31<sup>th</sup> July 2018

- tables and graphs for performance in Annex B
- the water level graphs showing the observed water level for the season in Annex C

## Annex A: Graphs and Tables

Table A1: observed water levels

Unit in m

2018	Jinghong	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
23/07/2018	535.97	4.04	13.32	12.83	7.70	8.30	10.19	9.85	10.99	8.97	9.90	11.82	9.90	8.90	19.52	13.06	7.74	6.78	6.72	5.58	6.28	2.36	1.87
24/07/2018	535.99	3.99	13.32	12.98	7.70	10.30	10.95	9.88	10.99	8.97	9.92	11.94	9.90	9.25	19.46	12.96	7.72	6.76	6.68	5.52	6.25	2.41	1.97
25/07/2018	535.99	4.20	11.42	11.74	9.05	10.19	11.73	10.16	11.29	9.03	10.12	11.98	10.13	9.61	19.78	13.12	7.74	6.78	6.72	5.54	6.31	2.44	2.00
26/07/2018	536.00	4.41	12.14	11.24	8.06	9.26	11.65	10.41	11.52	9.38	10.48	12.70	10.62	9.82	20.16	13.41	7.90	6.95	6.83	5.66	6.45	2.47	1.98
27/07/2018	536.00	4.82	12.80	11.32	7.70	8.88	11.63	10.69	11.80	9.82	10.94	12.98	10.80	10.11	20.48	13.70	8.15	7.19	6.97	5.82	6.61	2.52	1.94
28/07/2018	535.60	5.44	12.55	11.64	7.92	9.04	11.56	10.80	12.00	10.30	11.38	13.31	11.24	10.27	20.77	13.95	8.30	7.34	7.11	5.95	6.72	2.54	1.91
29/07/2018	535.51	6.30	13.99	11.82	8.15	9.26	11.90	11.27	12.38	10.80	11.85	14.30	11.95	10.42	20.96	14.13	8.44	7.48	7.20	6.06	6.82	2.56	1.85
30/07/2018	535.59	6.98	14.86	12.62	8.63	9.62	12.06	11.50	12.60	11.25	12.32	14.96	12.43	10.75	21.27	14.36	8.54	7.57	7.28	6.18	6.95	2.61	1.89

Table A2: observed rainfall

Unit in mm

2018	Jinghong	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	
23/07/2018	0	0	nr	0	nr	0	0.2	25.9	18.4	4.6	5.6	3.1	1.5	nr	nr	nr	1	-	nr	4.3	nr	nr	nr	3
24/07/2018	2.5	15.8	nr	1.2	2.8	0	3.6	13.6	9.8	1.6	nr	13.7	14.7	5.5	3.9	nr	nr	-	nr	nr	nr	nr	1.8	nr
25/07/2018	16	17.8	34.8	4.5	1.2	3.8	5.6	20.6	22.2	8.8	14.8	23.2	16	5.6	nr	nr	2	-	nr	nr	nr	nr	nr	nr
26/07/2018	11.5	10.5	12.4	2	1.5	7.3	46.4	34	36.6	27.8	nr	32.2	28	4	1.6	nr	nr	-	nr	0	nr	nr	nr	0.1
27/07/2018	30	10.5	12.4	2	1.5	7.3	46.4	34	36.6	27.8	nr	32.2	28	4	1.6	nr	nr	-	nr	0	nr	nr	nr	0.1
28/07/2018	18	6.1	34.8	0.7	0.8	1.8	22.3	79.5	13.2	48.5	54.4	48.6	nr	9	nr	nr	nr	-	14.8	9.2	nr	nr	nr	nr
29/07/2018	41.5	1	10.8	3	36.5	18	22.7	37.3	40.2	66.7	103.3	21.7	34.2	28	0.1	nr	nr	-	nr	nr	nr	nr	0.6	nr
30/07/2018	3.5	25.5	13.8	3.7	34.5	42.8	70.8	36.5	45.1	70.1	76	36.1	13.5	112.5	3	nr	nr	-	nr	nr	nr	nr	nr	nr

Figure A1: Observed water level and rainfall for Jinghong, Chiang Saen, and Luang Prabang

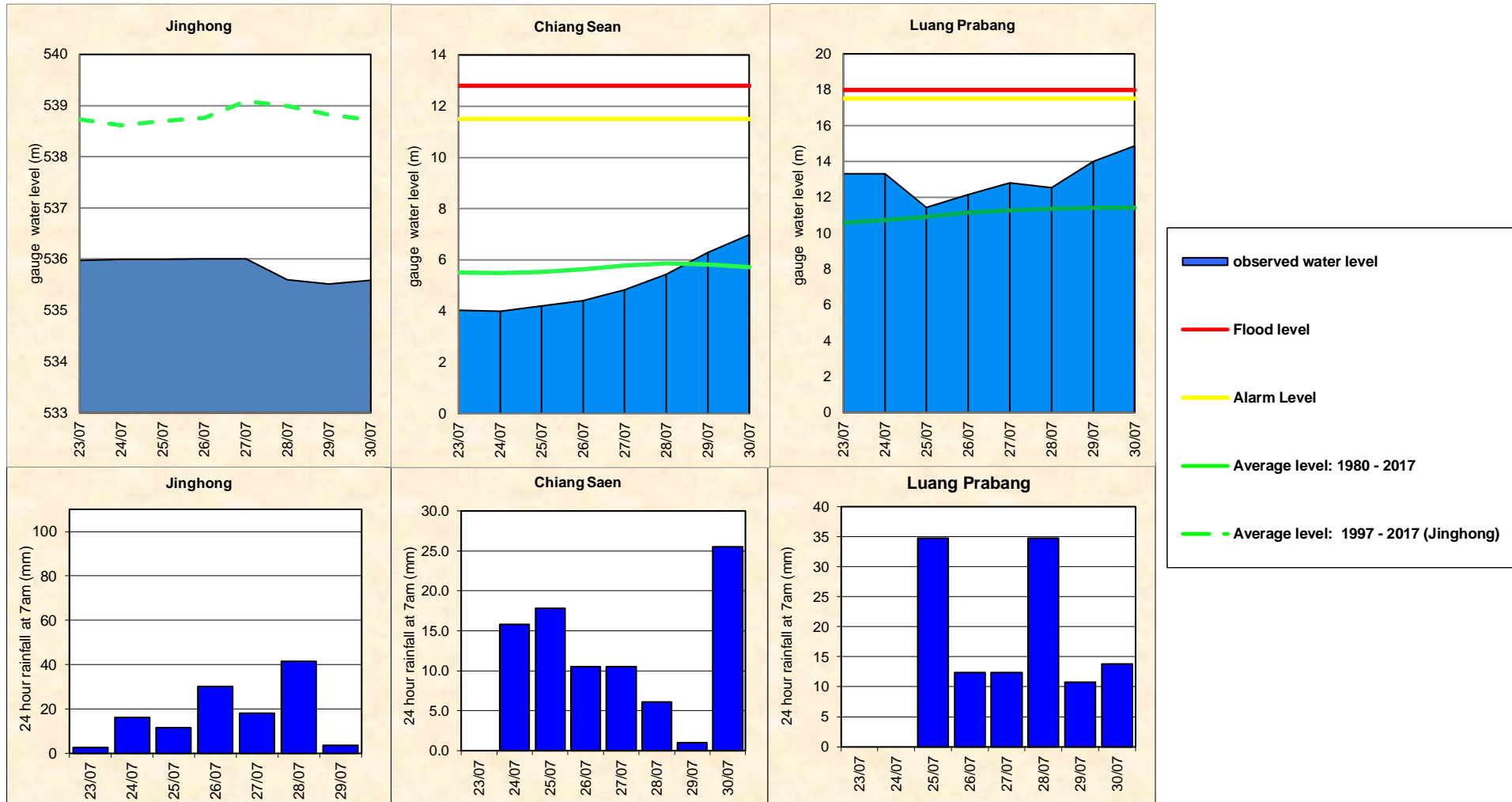


Figure A2: Observed water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

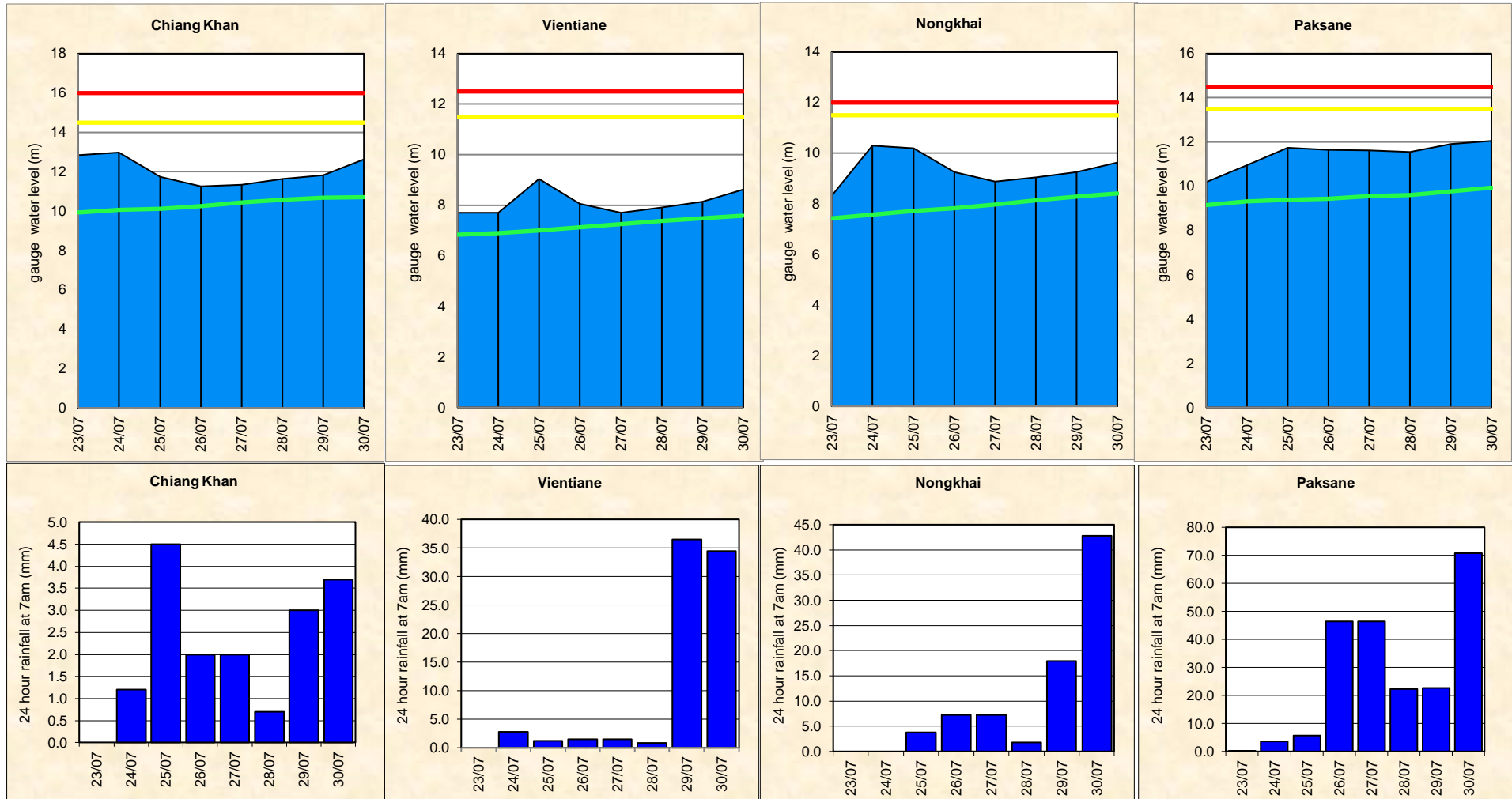


Figure A3: Observed water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

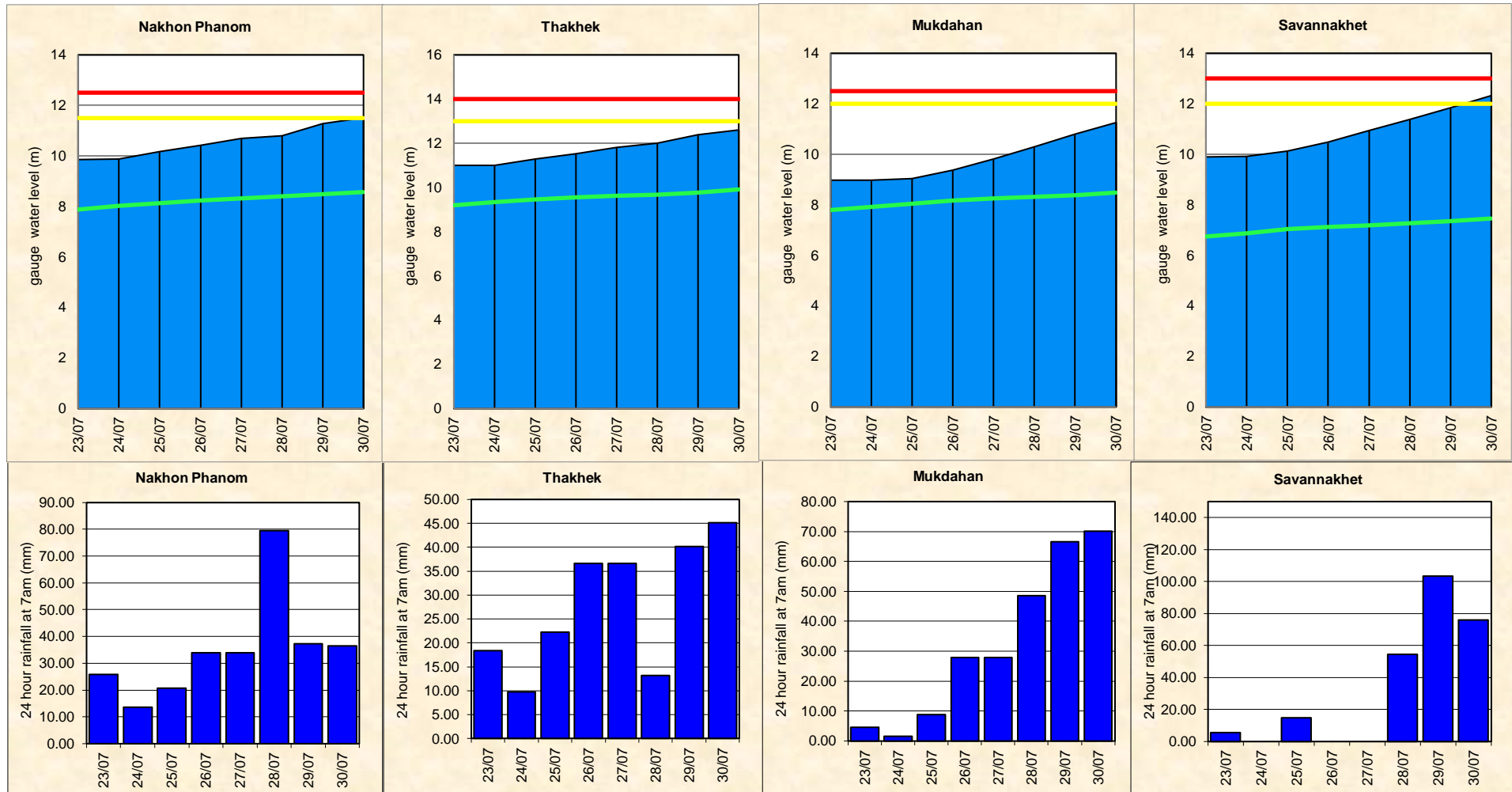




Figure A4: Observed water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

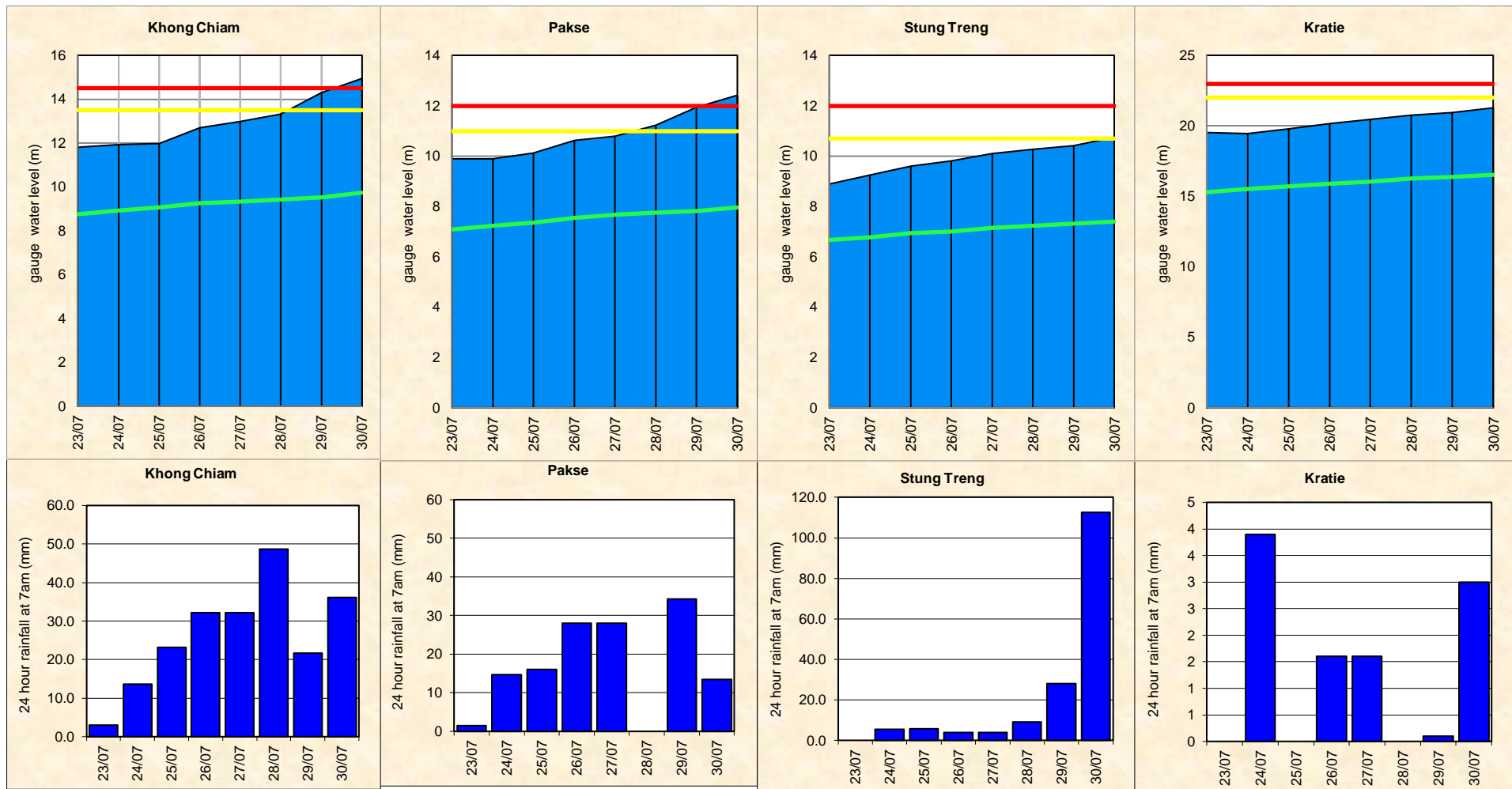


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

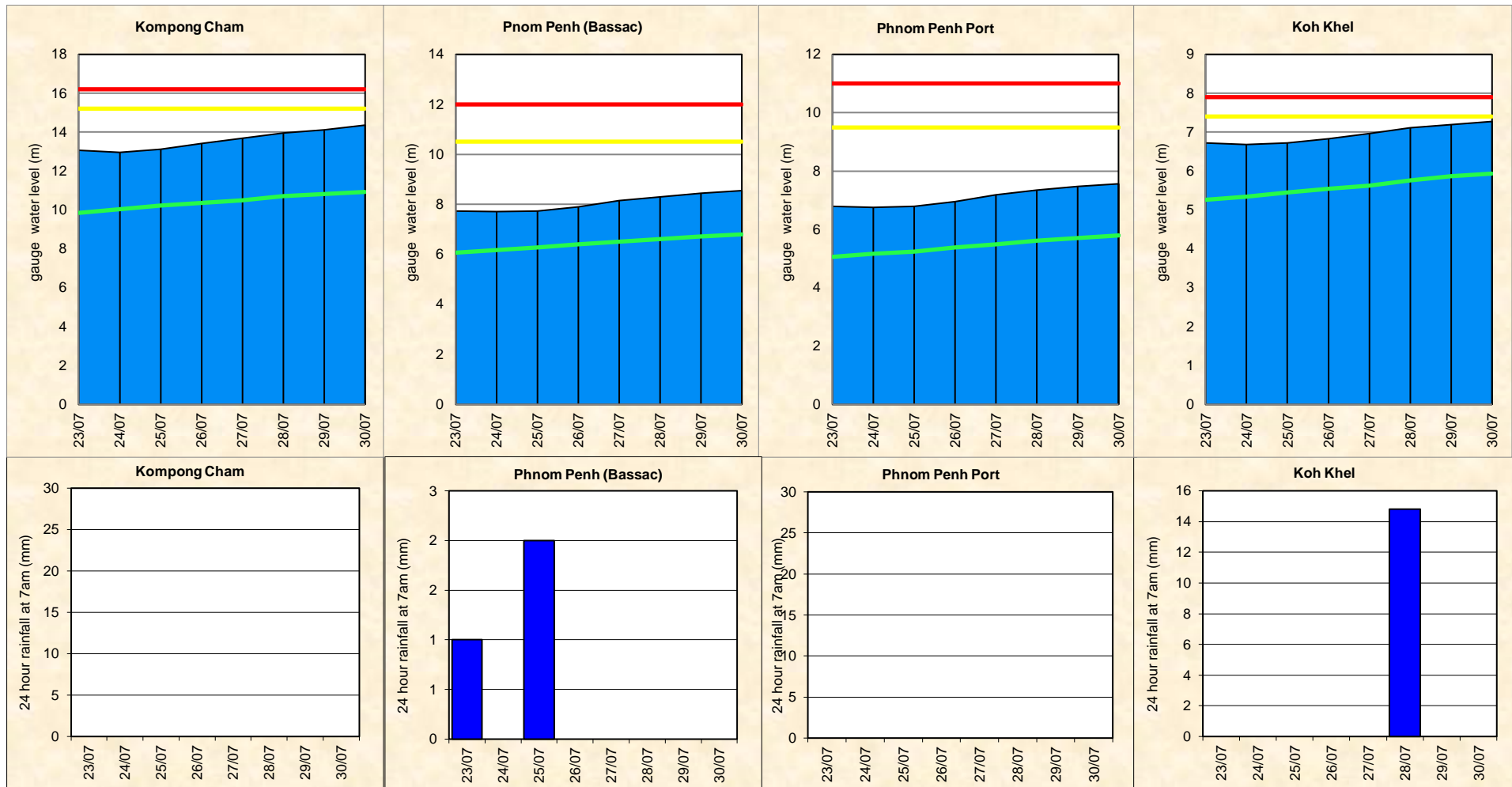
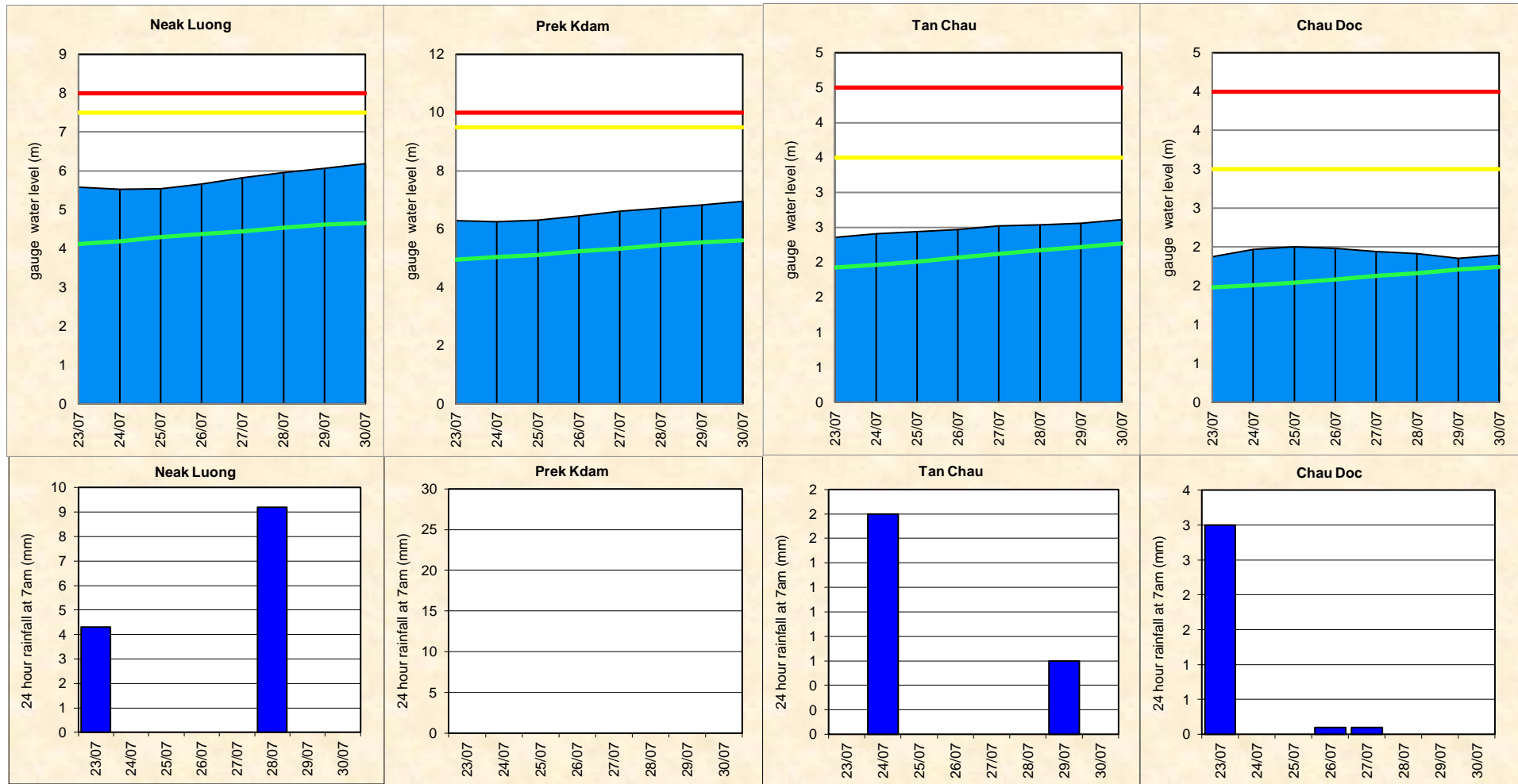


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



## Annex B: Accuracy and performance

### Accuracy

“Accuracy” describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster in Charge taking into consideration known biases in input data and his/her knowledge of the response of the model system and the hydrology of the Mekong River Basin. The information is presented as a graph below, showing the average flood forecasting accuracy along the Mekong mainstream.

In general, the overall accuracy is fair for 1-day to 5-day forecast lead time at stations in the upper and lower parts of the LMB. However, the

accuracies at upper and middle reaches of the LMB stations at Luang Prabang and from Kratie to Chau Doc stations for the forecasted 4-day to 5-day forecast were considered large.

The above differences due to three main factors: (1) internal model functionality in forecasting; for which the parameter adjustment in the model is not possible especially at stations in the upper part and in the Mekong delta where are affected by tidal; (2) the adjustment by utilizing the practical knowledge and experience of flood forecaster-in-charge; and (3) the forecasted accumulated rainfall was not well represented.

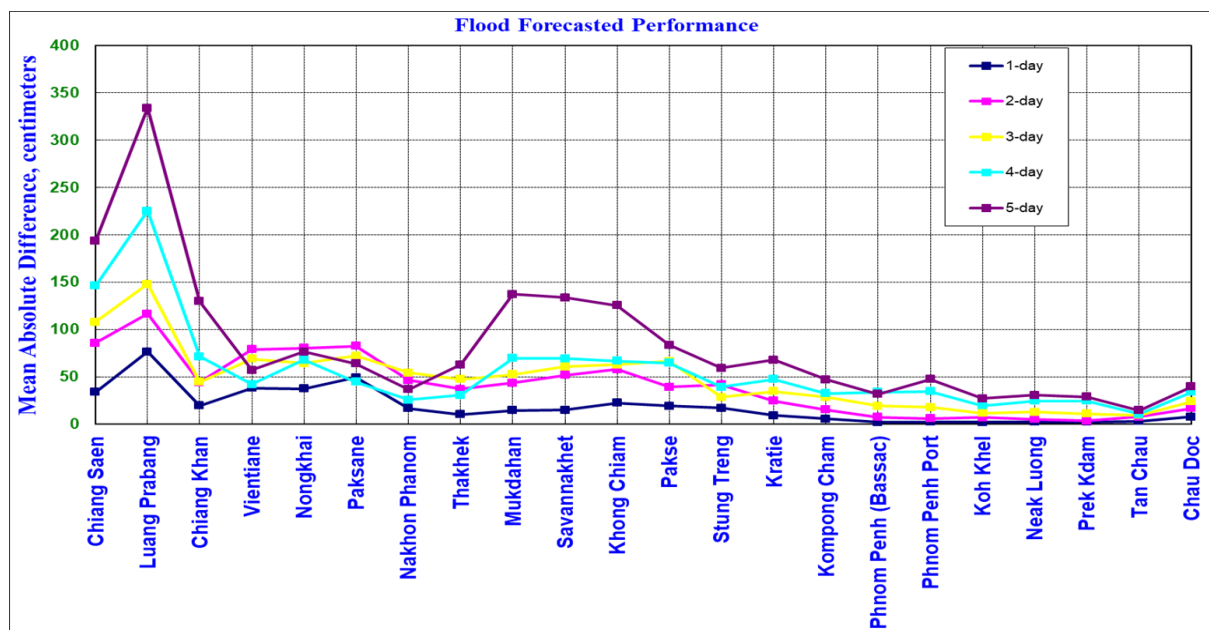


Figure B1: Average flood forecast accuracy along the Mekong mainstream

**Forecast Achievement**

The forecast achievement indicates the % of days that the forecast at a particular station for a lead-time is successful against a respective benchmark (Table B2).

Table B1: Evaluation performance forecasting (from 23-30 July 2018) base on New Benchmark (%).

Unit in %

Lead time Forecast	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	42.86	14.29	71.43	42.86	42.86	14.29	42.86	85.71	71.43	71.43	71.43	71.43	71.43	100.00	100.00	100.00	100.00	85.71	100.00	100.00	71.43	28.57	68.18
2-day	16.67	33.33	66.67	33.33	33.33	0.00	33.33	33.33	50.00	50.00	33.33	33.33	50.00	83.33	83.33	100.00	100.00	100.00	100.00	100.00	66.67	16.67	55.30
3-day	20.00	0.00	80.00	60.00	60.00	40.00	60.00	60.00	60.00	40.00	60.00	40.00	80.00	100.00	100.00	80.00	80.00	60.00	60.00	80.00	80.00	20.00	60.00
4-day	25.00	0.00	25.00	75.00	50.00	75.00	100.00	100.00	50.00	50.00	75.00	50.00	75.00	100.00	100.00	75.00	75.00	50.00	50.00	75.00	100.00	25.00	63.64
5-day	0.00	0.00	33.33	100.00	66.67	66.67	66.67	33.33	0.00	33.33	66.67	66.67	66.67	66.67	66.67	66.67	66.67	33.33	33.33	66.67	100.00	0.00	50.00

Unit in cm

Lead time Forecast	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	22	31	22	23	23	23	20	20	20	20	24	22	18	28	20	9	9	6	7	9	6	6
2-day	39	55	41	42	43	42	38	39	39	38	46	41	33	52	38	18	18	12	14	17	11	11
3-day	51	76	57	59	59	58	54	54	55	54	65	58	46	73	54	26	26	18	20	24	16	16
4-day	60	93	70	72	74	72	68	68	70	68	82	73	57	92	69	34	34	22	26	31	20	21
5-day	66	107	81	84	86	85	81	81	83	80	98	87	67	109	82	41	41	27	31	38	24	24

Table B2: Evaluation performance forecasting (from 23-30 July 2018) base on Old Benchmark (%).

Unit in %

Lead time Forecast	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	57.14	0.00	71.43	28.57	42.86	14.29	42.86	42.86	28.57	28.57	57.14	42.86	57.14	71.43	71.43	100.00	100.00	100.00	100.00	100.00	100.00	100.00	71.43	60.39
2-day	33.33	33.33	66.67	0.00	16.67	0.00	33.33	33.33	50.00	50.00	33.33	33.33	33.33	66.67	83.33	66.67	100.00	83.33	100.00	83.33	66.67	66.67	16.67	49.24
3-day	20.00	0.00	80.00	20.00	40.00	20.00	20.00	40.00	20.00	20.00	40.00	0.00	60.00	20.00	80.00	40.00	20.00	60.00	60.00	60.00	80.00	80.00	20.00	37.27
4-day	25.00	0.00	25.00	75.00	25.00	75.00	75.00	100.00	50.00	50.00	50.00	25.00	75.00	75.00	100.00	0.00	50.00	50.00	50.00	75.00	25.00	25.00	0.00	48.86
5-day	0.00	0.00	0.00	33.33	0.00	33.33	66.67	33.33	0.00	0.00	0.00	0.00	33.33	33.33	33.33	33.33	33.33	33.33	33.33	66.67	100.00	0.00	25.76	

Unit in cm

Lead time Forecast	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	25	25	25	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
2-day	50	50	50	25	25	25	25	25	25	25	25	25	25	25	25	10	10	10	10	10	10	10	10
3-day	50	50	50	25	25	25	25	25	25	25	25	25	25	25	25	10	10	10	10	10	10	10	10
4-day	75	75	50	50	50	50	50	50	50	50	50	50	50	50	50	10	25	10	25	25	10	10	10
5-day	75	75	50	50	50	50	50	50	50	50	50	50	50	50	50	25	25	25	25	25	25	25	25

**Note:** An indication of the accuracy given in the Table B2 is based on the performance of the forecast made in 2008 from the new flood forecasting system and the configuration for the 2009 flood season and is published on the website of MRC (<http://ffw.mrcmekong.org/accuracy.htm>).

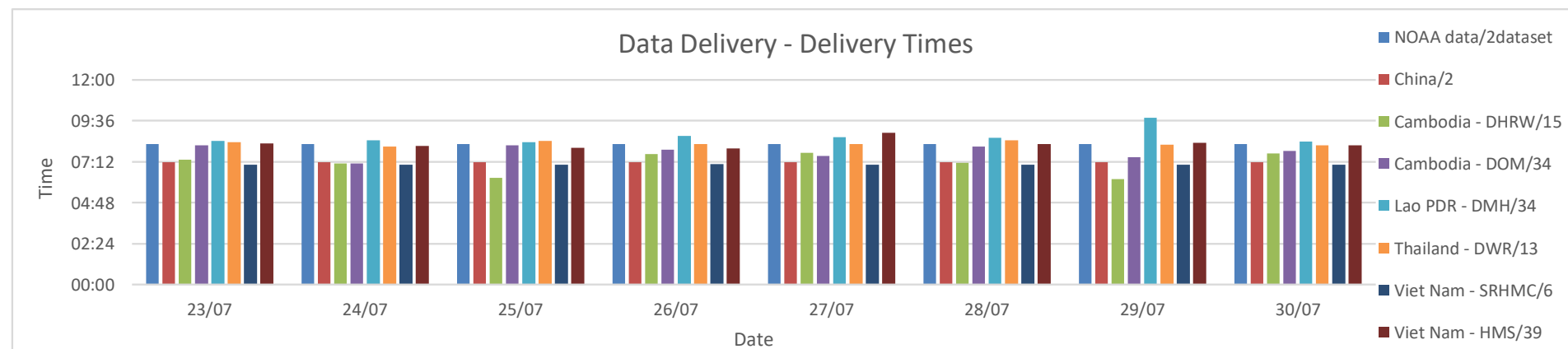
A new set of performance indicators that is established by combining international standards and the specific circumstances in the Mekong River Basin, is applied officially for the flood season of 2011 onward.

### Performance

Performance is assessed by evaluating a number of performance indicators, see table and graphs below:

Table B3: Overview of performance indicators for the past 8 days including the current report date

	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/34	Thailand - DWR/13	Viet Nam - SRHMC/6	Viet Nam - HMS/39	
<b>2018</b>																					
<i>week</i>	10:36	00:00	-	-	08:15	07:10	07:03	07:47	08:42	08:17	07:01	08:15	0	0	0	0	60	0	0	0	
<i>month</i>	10:16	00:00	-	-	08:14	07:10	07:24	07:55	08:24	08:08	07:01	08:12	0	0	1	0	387	0	2	0	



*Week* is the week for which this report is made; *Month* is actually the last 30 days (or less if the flood season has just begun); *Season* is the current flood season up to the date of this report.

Figure B2: Data delivery times for the past 8 days including the current report date

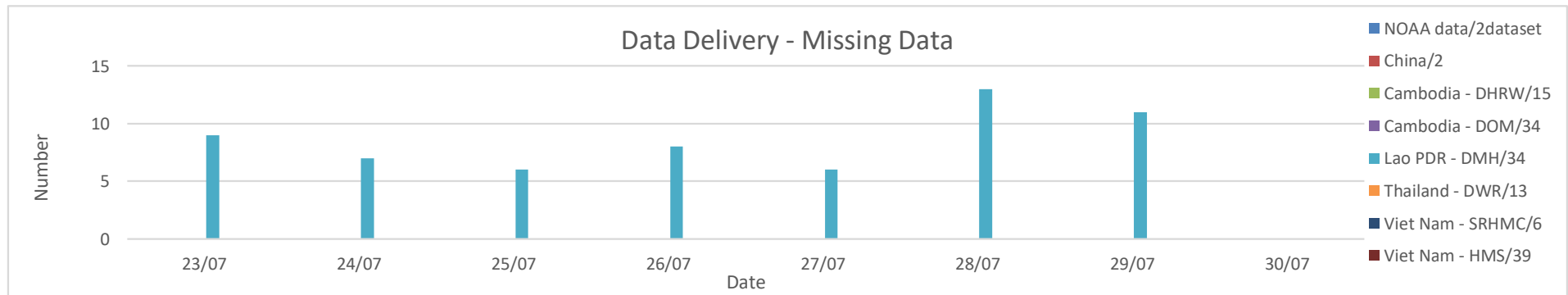


Figure B3: Missing data for the past 8 days including the current report date

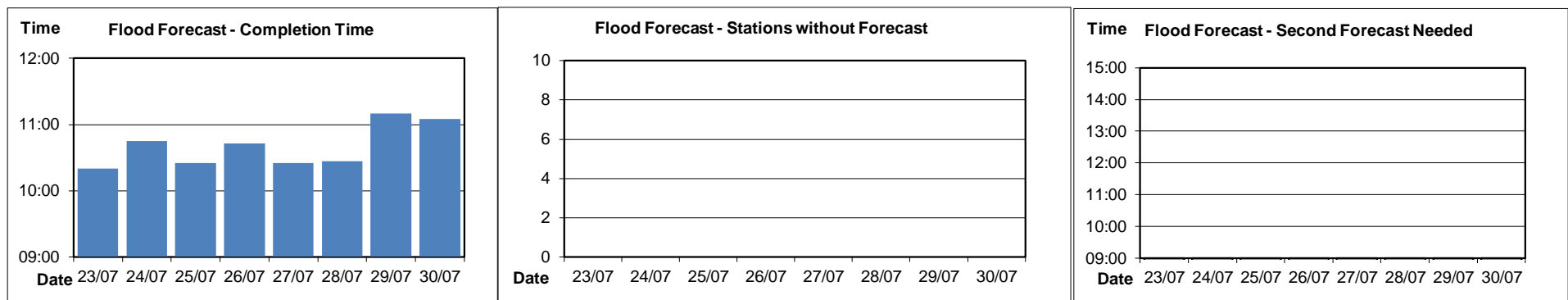


Figure B4: Flood forecast completion time

Figure B5: Flood forecast stations without forecast

Figure B6: Second forecast needed



## Annex C: Season Water Level Graphs

This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

### HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

