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

Prepared at: 30/10/2018, covering the week from the 22th to 29th October 2018

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

## **General weather patterns**

This weekly report is prepared from 22<sup>th</sup> to 29<sup>th</sup> October 2018, the weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather maps were referenced from Thailand Meteorology Department (TMD) on 23<sup>th</sup> October and 28<sup>th</sup> October 2018 as presented in the **Figures 1 & 2** as follows:

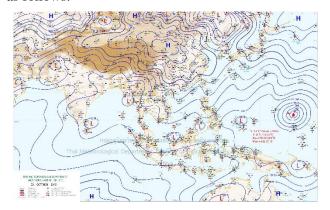




Figure 1: Weather map for 23th Oct 2018

Figure 2: Weather map for 28th Oct 2018

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

During the last week, the low pressure was not nominated in the Lower Mekong Basin (LMB) which resulted in no rainfall occurring at the upper part of the LMB. **Figure 1** and **2** shown the effected weather in the LMB based on TMD.

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

Last week, there was no notified of any Storm or Typhoon in the LMB. However small rain occurred over the floodplain area of the Mekong delta.

#### Other weather phenomena that affect the discharge

According to the Thai Meteorological Department (TMD), during last week, the weather phenomena influenced over Mekong region by the prevailing southwest monsoon and low pressure was hit to Northern part of Viet Nam. (see **Fig.1** and **Fig.2**).

## **Over weather situation**

During last week, the weather was scattered thundershowers with small rainfall of the Southwest monsoon. Consequently. In this week there was moderate rainfall occurred from at Tan Chau and Chau Doc (Viet Nam). The average of accumulation observed rainfall at mainstream stations showed small rainfall between 50 mm to 140 mm. The weekly rainfall distribution from 22<sup>th</sup> to 29<sup>th</sup> Oct 2018 is shown in **Figure 3** and daily rainfall at key stations in the Lower Mekong Basin are shown **Table A2**.

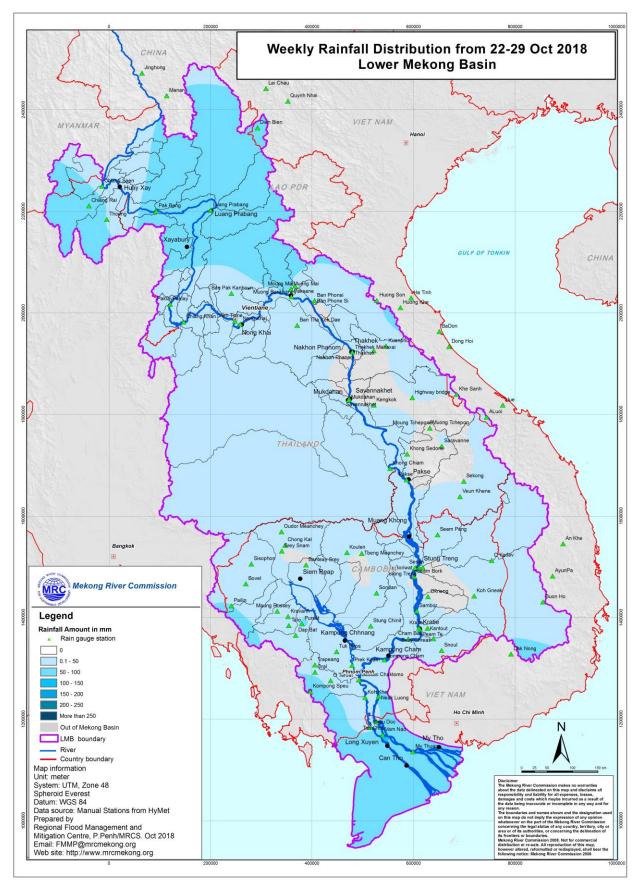


Figure 3: Weekly Rainfall Distribution over the LMB from 22<sup>th</sup> to 29<sup>th</sup> October 2018

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

During the last week, the water levels at all mainstream stations along LMB were fluctuated by flow from upper of LMB; at upper part of LMB (from Chiang Saen to Paksane) has been fluctuating, form middle part to downstream of LMB has been decreasing.

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

During last week, the water level at Chiang Sean and Luang Prabang stations has been fluctuated over their LTAs. This was considered by the inflow from upstream hydropower operation.

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

From Chiang Khan, Vientiane, Nong Khai to Paksane, during last week, water levels were fluctuated over their LTAs, influencing from upstream inflows.

#### For stations from Nakon Phanom/Thakhet to Mukdaha/Sovannakhet

Water levels from Nakhon Phanom/Thakhet to Mukdahan/Sovannakhet stations were continued to slightly increase. The water levels at some stations were close to their LTAs.

#### For stations from Khong Chiam to Pakse

The same trend as upstream stations, water levels from Khong Chiam to Pakse stations were continued to decrease, referred to the inflows from upstream and tributaries. However, water levels at these stations were below their Long-Term Averages (LTAs).

#### For stations from Stung Treng to Kompong Cham/ Phnom Penh to Koh Khel/Neak Luong

Water levels at Stung Treng, Kratie, Kompong Cham and Phnom Penh stations were also continued to decrease bellow their LTAs since last week.

#### Tan Chau and Chau Doc

Water level at these 2 tidal stations were fluctuated over their LTAs since last week, although rainfall were continued in these 2 stations.

*Note:* For more detail the flood situation during the last week, please see the hydrographic in Annex C.

#### **Flood Situation**

This week the water levels decreased significantly from upstream to downstream of the Mekong River.

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
- 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
22/10/2018	536.93	4.34	9.52	8.72	5.15	5.92	7.35	5.06	6.26	4.93	4.82	5.45	3.82	4.56	11.39	7.60	6.58	5.61	5.80	4.90	6.88	2.54	2.47
23/10/2018	537.04	4.40	9.49	8.62	5.10	5.86	7.29	4.99	6.21	4.91	4.80	5.42	3.98	4.65	11.56	7.56	6.51	5.54	5.78	4.83	6.86	2.56	2.51
24/10/2018	536.87	4.49	9.59	8.60	5.00	5.82	7.23	4.90	6.11	4.81	4.72	5.38	3.95	4.70	11.72	7.65	6.53	5.57	5.75	4.86	6.81	2.56	2.54
25/10/2018	536.87	4.72	9.74	8.54	4.93	5.75	7.17	4.83	6.06	4.78	4.62	5.30	3.88	4.50	11.78	7.73	6.55	5.57	5.79	4.85	6.78	2.51	2.47
26/10/2018	536.89	4.78	9.52	8.56	4.91	5.70	7.05	4.78	5.99	4.68	4.58	5.24	3.84	4.57	11.55	7.65	6.52	5.54	5.76	4.84	6.73	2.44	2.38
27/10/2018	536.88	4.91	10.30	8.50	4.90	5.72	6.88	4.70	5.91	4.64	4.50	5.17	3.80	4.51	11.58	7.57	6.46	5.48	5.75	4.80	6.67	2.37	2.27
28/10/2018	536.88	4.64	10.69	8.71	4.84	5.64	6.89	4.61	5.83	4.60	4.47	5.12	3.77	4.47	11.44	7.53	6.40	5.41	5.67	4.76	6.61	2.29	2.21
29/10/2018	536.92	4.46	10.89	8.84	5.03	5.76	6.80	4.55	5.79	4.53	4.40	5.04	3.68	4.40	11.25	7.41	6.32	5.31	5.58	4.71	6.55	2.22	2.12

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
22/10/2018	0.00	14.00	nr	5.40	21.00	16.20	nr	0.00	nr	0.00	nr	0.00	1.00	nr	nr	nr	nr	nr	nr	14.60	nr	nr	nr
23/10/2018	3.00	0.00	18.60	13.50	3.20	1.50	15.40	0.00	nr	0.00	nr	1.10	0.80	2.00	nr	nr	nr	nr	0.00	1.30	13.60	0.00	10.00
24/10/2018	5.00	15.60	54.80	4.70	nr	14.30	0.80	0.00	nr	0.00	nr	15.60	0.50	nr	nr	3.40	nr	nr	31.20	31.60	nr	41.30	23.00
25/10/2018	10.50	1.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	nr	nr	5.00	9.50	nr	5.00	0.00	nr	1.10	nr
26/10/2018	6.50	0.20	nr	5.90	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	nr	nr	nr	12.10	nr	1.50	3.60	9.50	nr	nr
27/10/2018	0.00	0.00	12.60	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr
28/10/2018	3.00	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	5.50	nr	nr	16.10	nr	nr	1.60	nr	3.80	0.30
29/10/2018	0.00	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr

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

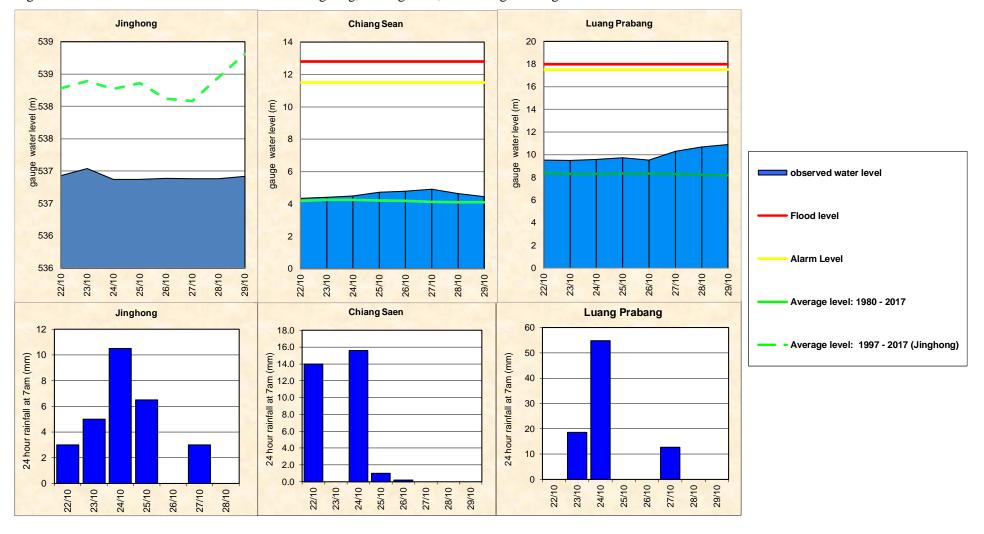


Figure A2: Observed water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

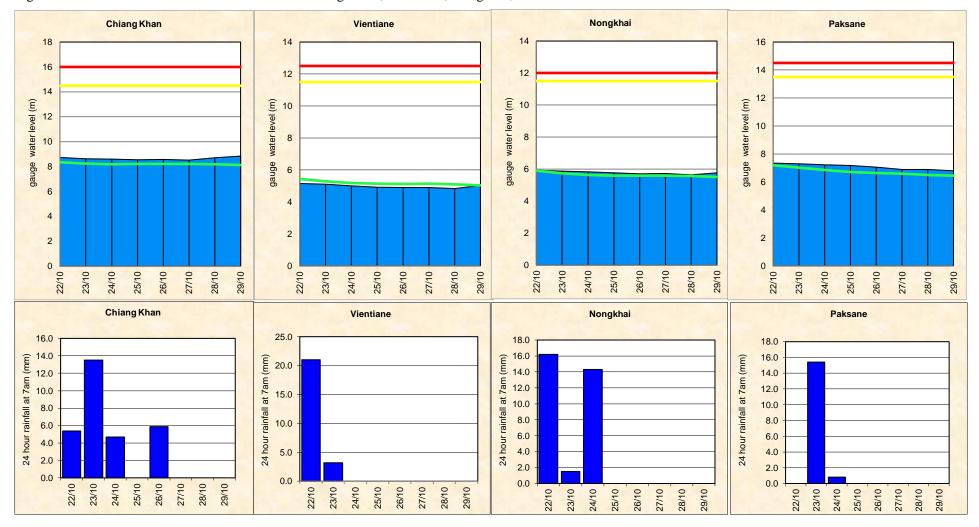


Figure A3: Observed water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

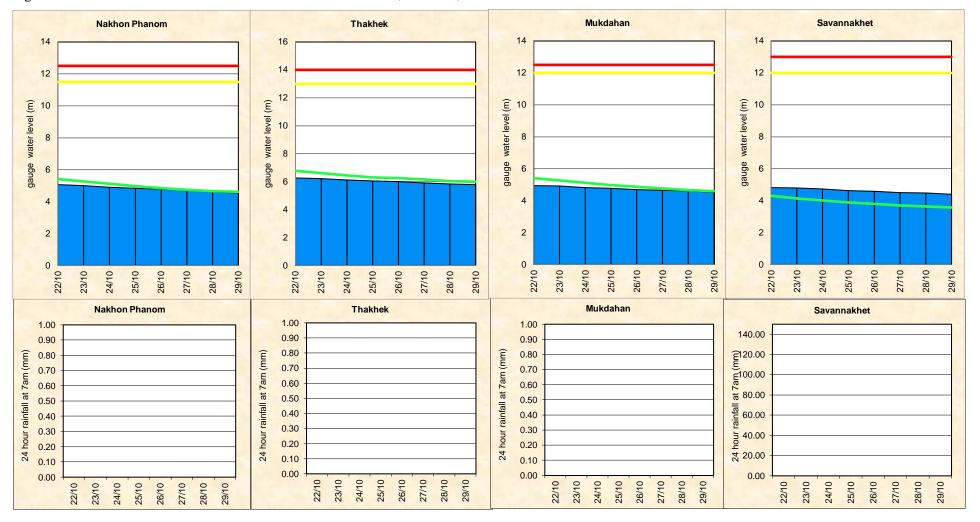


Figure A4: Observed water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

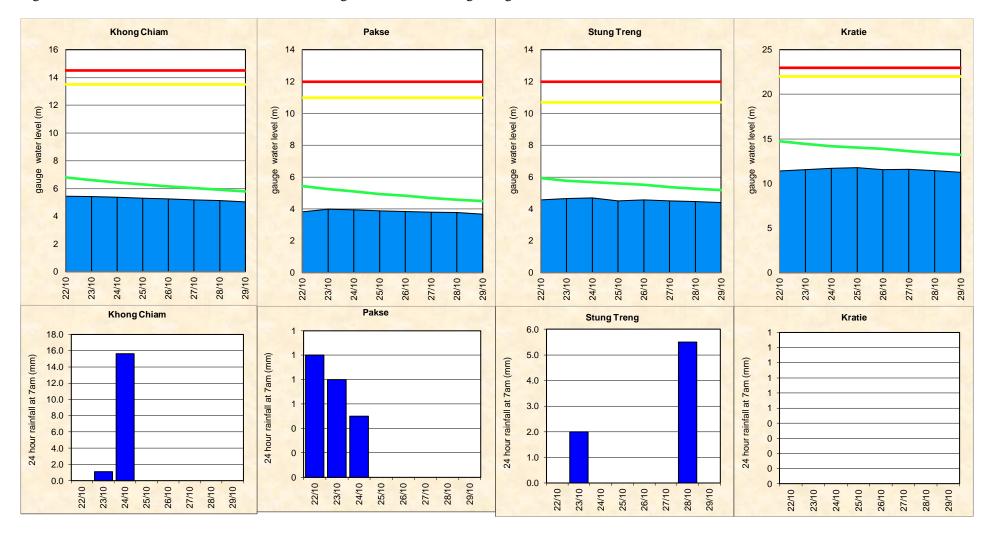


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

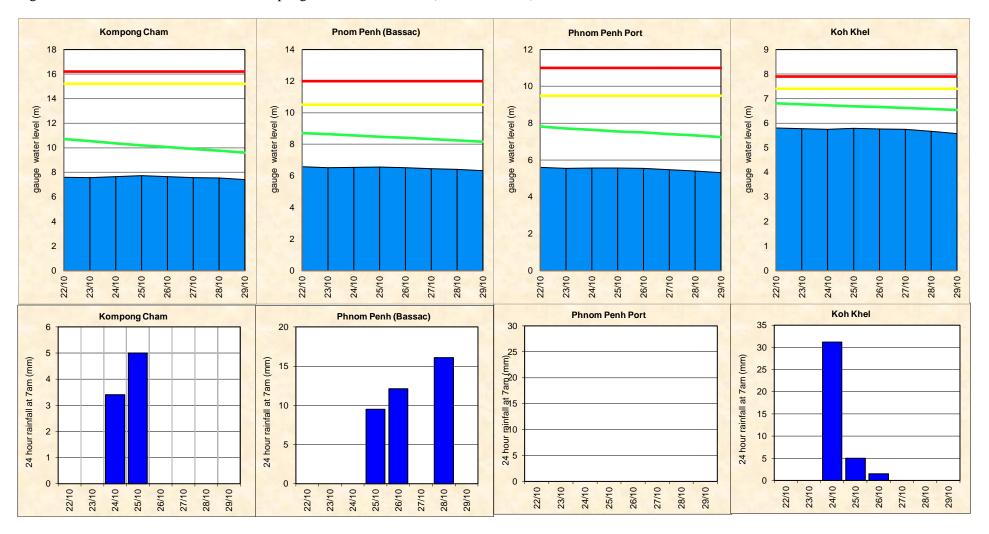
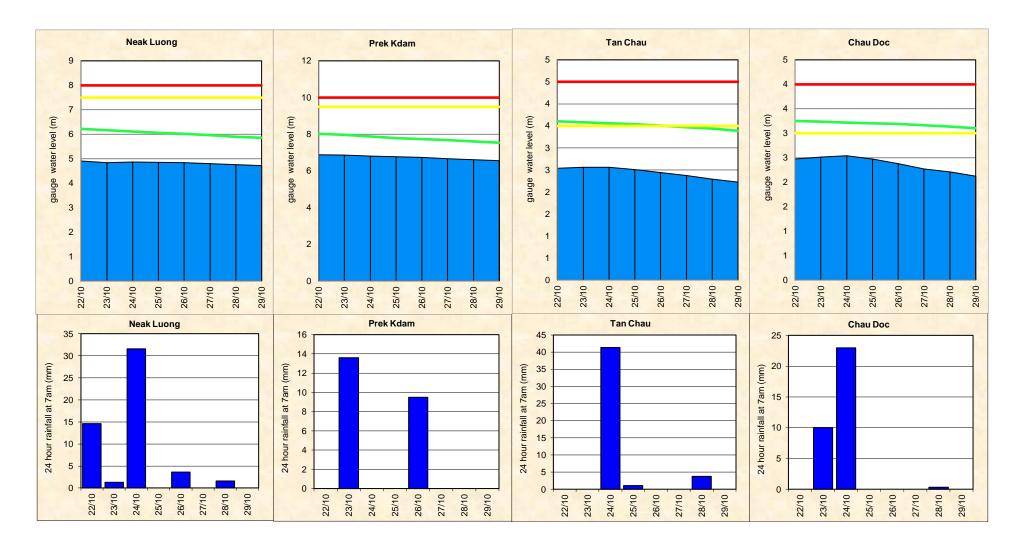


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



## 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 reaches of the LMB stations at Chiang Saen to Luang Prabang for 4-

day to 5-day forecast were considered little large. For more detail evaluation performance forecasting base on new benchmark and old benchmark are shown on Table B1 and Table B2.

The above differences due to three main factors: (1) the effect by manmade (hydro-power operation: without provided information)

(2) 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; (3) the adjustment by utilizing the practical knowledge and experience of flood forecaster-in-charge; and (4) the forecasted accumulated rainfall was not well represented.

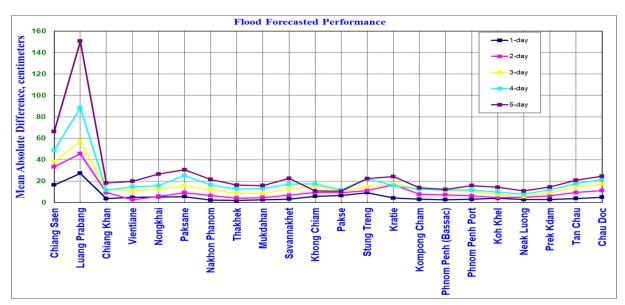


Figure B1: Average flood forecast accuracy along the Mekong mainstream

## **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 22<sup>th</sup> to 29<sup>th</sup> Oct 2018) base on New Benchmark (%).

	U: Evaluation performance forceasting (from 22 to 25 oct 2016) base on New Benchmark (%).															Ur	nit in %						
Lead time Forecast	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kom pong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc	A verage
1-day	85.71	57.14	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	85.71	71.43	100.00	100.00	100.00	100.00	85.71	85.71	100.00	71.43	71.43	91.56
2-day	83.33	66.67	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	83.33	100.00	66.67	<u>50.00</u>	93.18
3-day	80.00	60.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	80.00	100.00	100.00	60.00	60.00	92.73
4-day	<u>50.00</u>																			100.00		<u>25.00</u>	89.77
5-day	66.67	33.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	<u>33.33</u>	<u>33.33</u>	89.39

Unit in cm Lead time Forecast **Phnom Penh Port** Nakhon Phanom Kompong Cham Luang Prabang Phnom Penh (Bassac) Khong Chiam Savannakhet Saen Chiang Khan Stung Treng Neak Luong Mukdahan Prek Kdam Nongkhai Vientiane Chau Doc Tan Chau Koh Khel Paksane Thakhek Chiang Pakse Kratie 1-day 2-day 3-day 4-day 5-day

Table B2: Evaluation performance forecasting (from 22th to 29th Oct 2018) base on Old Benchmark (%).

Unit in % ead time Forecast anol \_ Prabanç Savannakhet P e n h ر. e n h Saen Luong Chiar ž p o n g ukdahan Khel h a u Δ. n tia n e akhek 6 h o h Khong 0 0 assac ≘ a n g  $\leq$ 0 K oh 100.00 100.00 100.00 57.14 100.00 100.00 85.71 85.71 100.00 100.00 100.00 100.00 100.00 85.71 57.14 100.00 85.71 100.00 100.00 92.86 1-day 85.71 100.00 100.00 66.67 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 83.33 83.33 100.00 83.33 83.33 2-day 83.33 83.33 50.00 83.33 83.33 66.67 50.00 86.36 3-day **40.00** 100.00 80.00 80.00 100.00 100.00 100.00 100.00 100.00 80.00 80.00 80.00 100.00 60.00 80.00 80.00 20.00 75.45 80.00 80.00 40.00 80.00 0.00 50.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 25.00 25.00 86.36 **50.00** 100.00 75.00 100.00 100.00 4-day 75.00 5-day 0.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 66.67 100.00 100.00 33.33 86.36 33.33 66.67

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
2-day	50	50	50	<b>2</b> 5	25	25	25	25	25	25	25	25	25	25	25	10	10	10	10	10	10	10
3-day	50	50	50	25	<b>2</b> 5	<b>2</b> 5	25	25	25	25	25	25	<b>2</b> 5	25	25	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
5-day	75	75	50	50	50	50	50	50	50	50	50	50	50	50	50	25	25	25	25	25	25	<b>2</b> 5

**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 7 days including the current report date

		FF t	time sent	t			Arr	ival time	of input	data		Missing data (number-mainstream and trib.st.)								
2018	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	10:11	00:00	-	-	08:15	07:10	07:15	07:53	08:54	08:06	07:01	08:26	0	0	1	0	105	0	0	0
month	10:16	00:00	_	-	08:14	07:10	07:24	07:55	08:24	08:08	07:01	08:12	0	0	1	0	438	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.

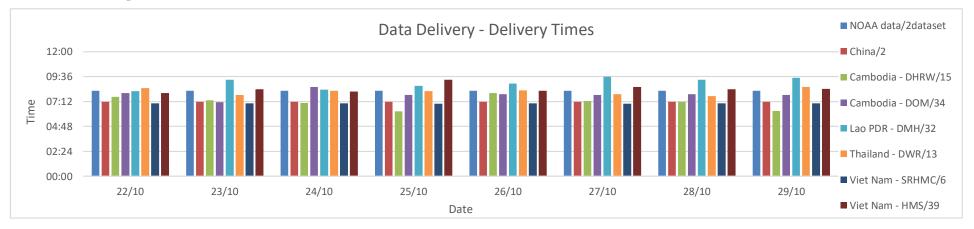


Figure B2: Data delivery times for the past 8 days including the current report date

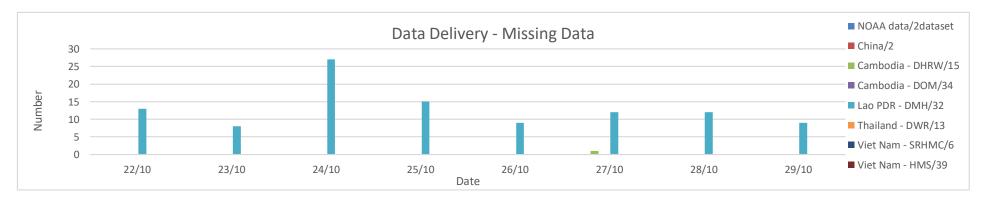


Figure B3: Missing data for the past 8 days including the current report date

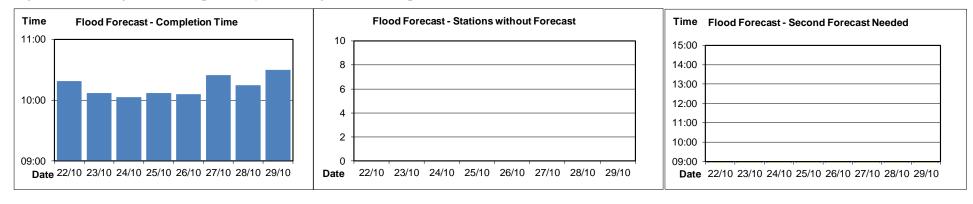


Figure B4: Flood forecast completion time

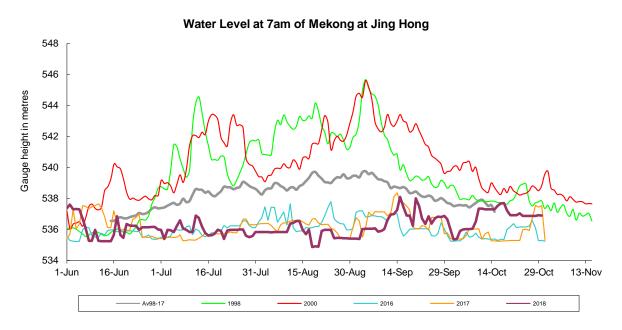
Figure B5: Flood forecast stations without forecast

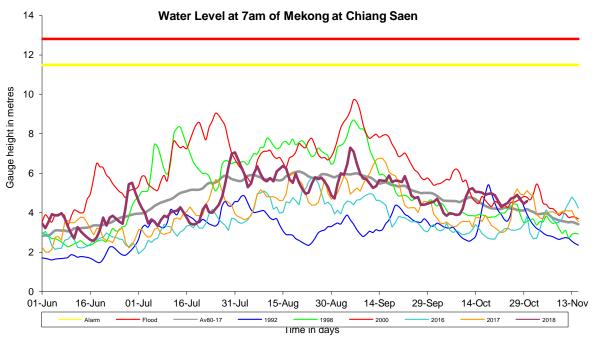
Figure B6: Second forecast needed

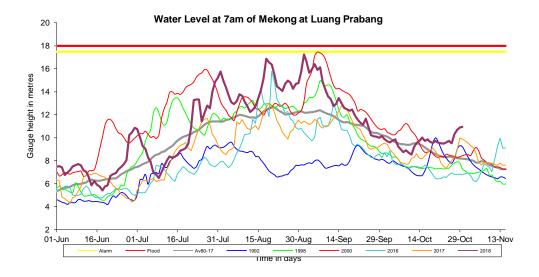
## **Annex C: Season Water Level Graphs**

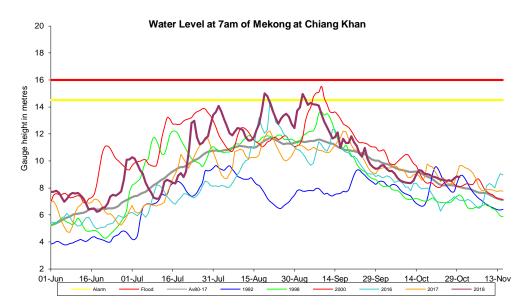
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

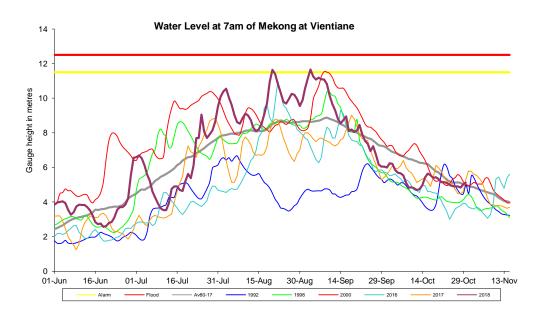
# HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

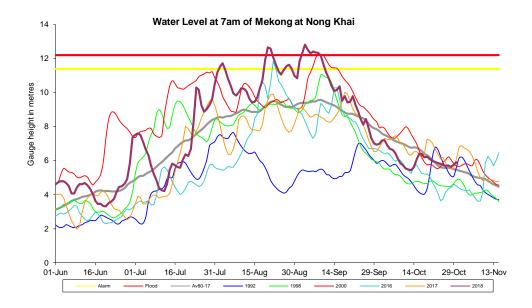


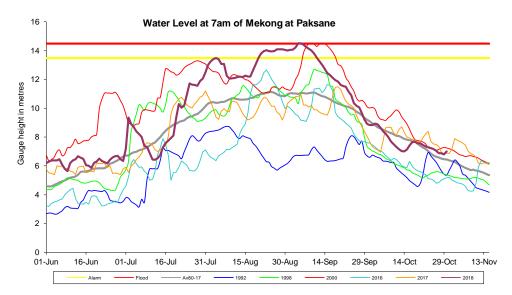


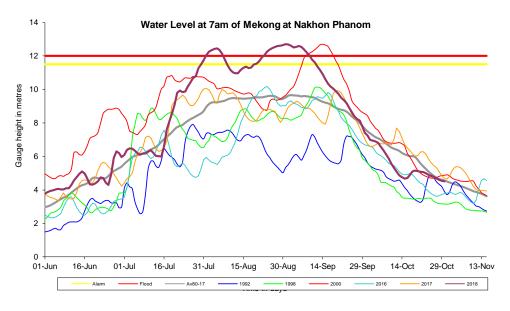


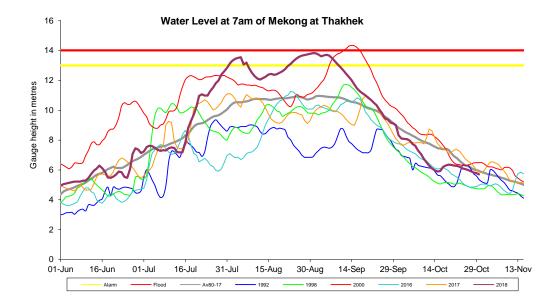


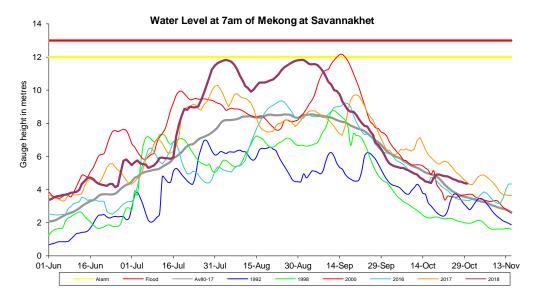


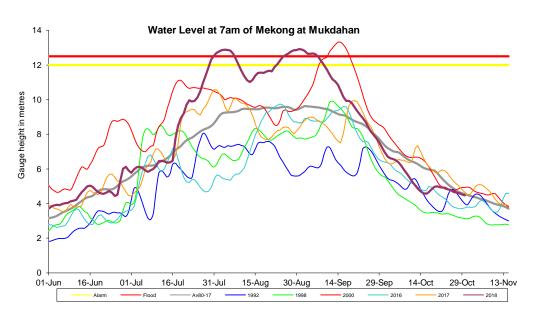


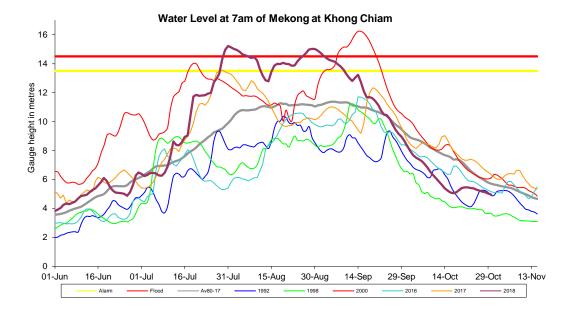


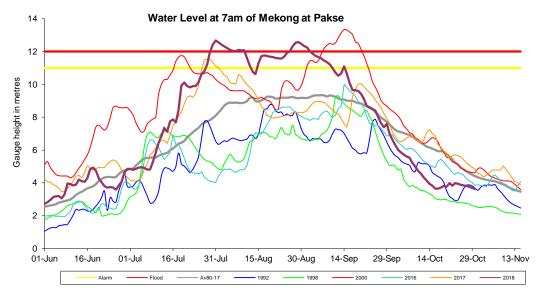


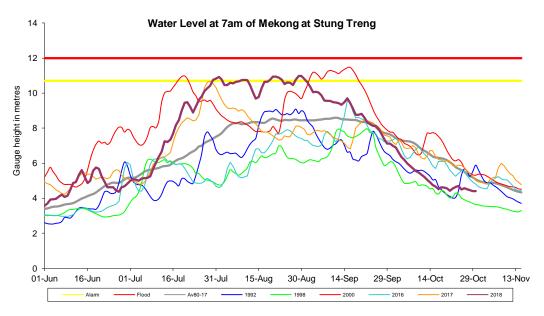












0 ↓ 01-J<u>un</u>

16-Jun

Alarm

01-Jul

- Flood

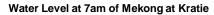
16-Jul

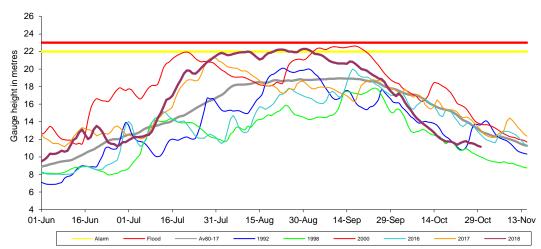
31-Jul

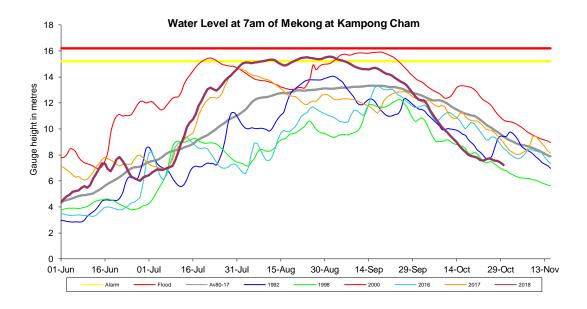
Av80-17

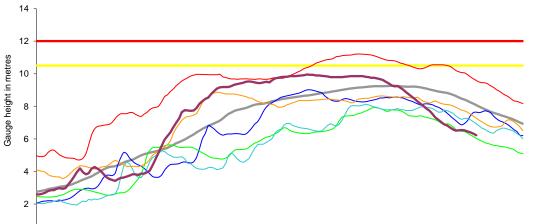
15-Aug

1992









30-Aug

1998

14-Sep

\_ 2000

29-Sep

2016

14-Oct

2017

29-Oct

13-Nov

- 2018

Water Level at 7am of Mekong at Phnom Penh Chaktomuk

