Weekly Flood Situation Report for the Mekong River Basin

Prepared at: 23/10/2018, covering the week from the 15th to 22th October 2018

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

General weather patterns

This weekly report is prepared from 15th to 22th 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 17th October and 21th October 2018 as presented in the **Figures 1 & 2** as follows:

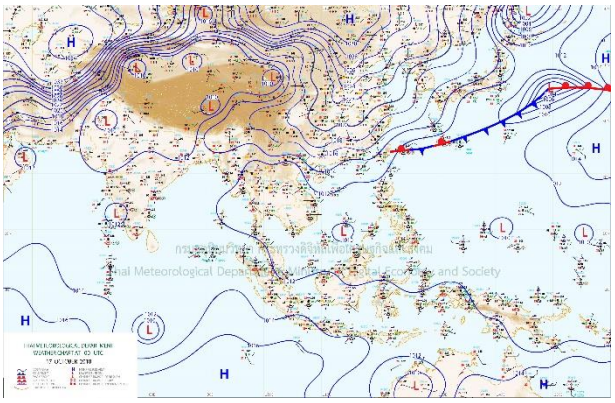


Figure 1: Weather map for 17th Oct 2018

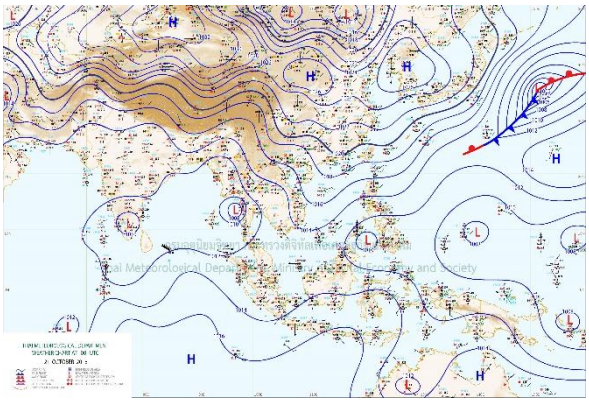


Figure 2: Weather map for 21th Oct 2018

Moderate South-West (SW) Monsoon

During the last week, the low pressure was nominated in the upper part of the Lower Mekong Basin (LMB) which resulted in moderate rainfall occurring. **Figure 1** and **2** shown the effected weather in the LMB.

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

Last week, there was no notified storm or Typhoon effected but still influent by the South – Monsson, however small rain occurred over Lower Mekong Basin.

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 15th Oct to 22th 2018 is shown in **Figure 3** and daily rainfall at key stations in the Lower Mekong Basin are shown **Table A2**.

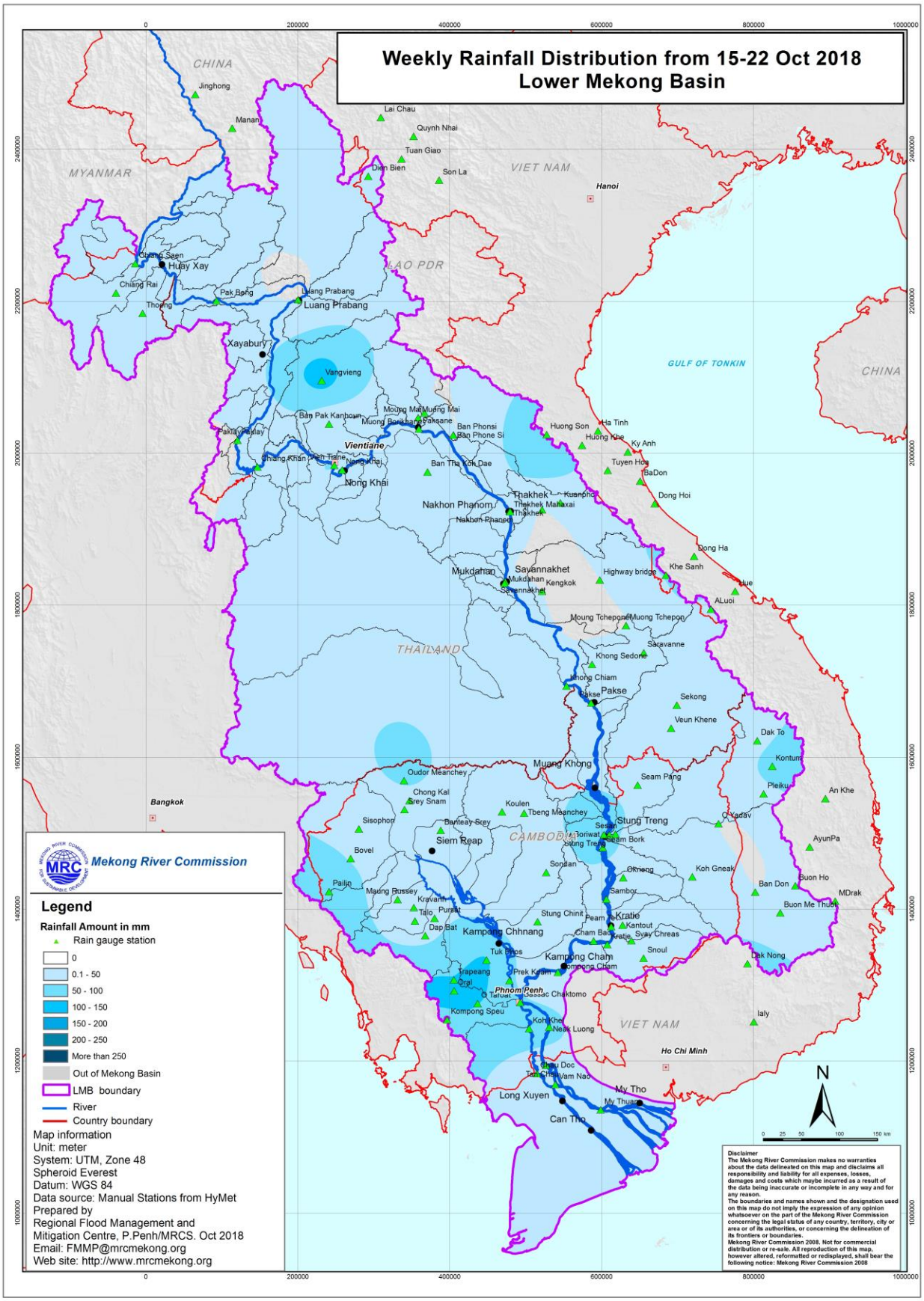


Figure 3: Weekly Rainfall Distribution over the LMB from 15th to 22th October 2018

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 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 rise close to their LTAs, resulting from the upstream inflows.

For stations from Nakon Phanom/Thakhet to Mukdaha/Sovannakhet

Water levels from Nakhon Phanom/Thakhet to Mukdahan/Sovannakhet stations were continued to decrease since last week. The water levels at some stations were dropped below 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
15/10/2018	537.31	5.06	10.02	9.32	5.41	6.06	7.13	4.68	5.90	4.60	4.50	5.23	3.83	4.76	12.41	8.68	7.53	6.57	6.48	5.72	7.59	2.93	2.78
16/10/2018	537.53	5.01	9.74	9.28	5.65	6.42	7.43	4.71	5.94	4.57	4.45	5.10	3.65	4.66	12.12	8.43	7.31	6.35	6.40	5.56	7.45	2.82	2.67
17/10/2018	537.68	4.90	9.86	9.06	5.56	6.40	7.65	4.90	6.21	4.66	4.40	5.06	3.64	4.51	11.93	8.24	7.18	6.16	6.30	5.42	7.33	2.73	2.57
18/10/2018	537.70	4.96	9.66	9.04	5.40	6.21	7.67	5.10	6.30	4.82	4.72	5.13	3.70	4.62	11.74	8.02	7.03	6.00	6.20	5.30	7.24	2.65	2.50
19/10/2018	537.23	4.98	9.54	8.96	5.43	6.23	7.57	5.16	6.36	4.97	4.90	5.27	3.80	4.61	11.76	7.92	6.88	5.85	6.05	5.16	7.15	2.59	2.49
20/10/2018	536.93	4.89	9.72	8.86	5.32	6.10	7.56	5.13	6.34	5.00	4.91	5.40	3.76	4.55	11.70	7.87	6.83	5.79	5.98	5.10	7.07	2.61	2.54
21/10/2018	536.92	4.60	9.58	8.80	5.15	5.98	7.47	5.09	6.30	4.95	4.85	5.46	3.98	4.43	11.57	7.78	6.71	5.62	5.90	5.02	6.96	2.58	2.51
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

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
15/10/2018	0.50	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	3.20	nr	nr	nr	nr	nr		3.00	nr	nr	nr	nr
16/10/2018	5.00	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	1.00
17/10/2018	0.00	0.00	nr	0.00	30.60	0.00	nr	42.50	11.30	0.00	nr	0.00	5.00	nr	nr	nr	1.60		nr	31.20	nr	nr	nr
18/10/2018	0.00	0.00	nr	5.10	nr	13.00	31.50	0.00	nr	0.00	nr	0.00	nr	62.00	7.40	nr	nr		nr	nr	nr	nr	3.00
19/10/2018	0.00	0.00	nr	0.00	nr	0.00	1.40	2.10	4.40	14.40	nr	5.90	0.50	2.00	nr	0.20	12.70		0.60	0.00	nr	19.90	14.00
20/10/2018	0.00	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	1.80	nr	nr	5.40	41.10		75.00	26.20	56.40	0.50	2.00
21/10/2018	0.00	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	0.00	nr	nr	nr	nr	1.60		0.60	0.00	nr	2.50	2.00
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	14.60	nr	nr	nr

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

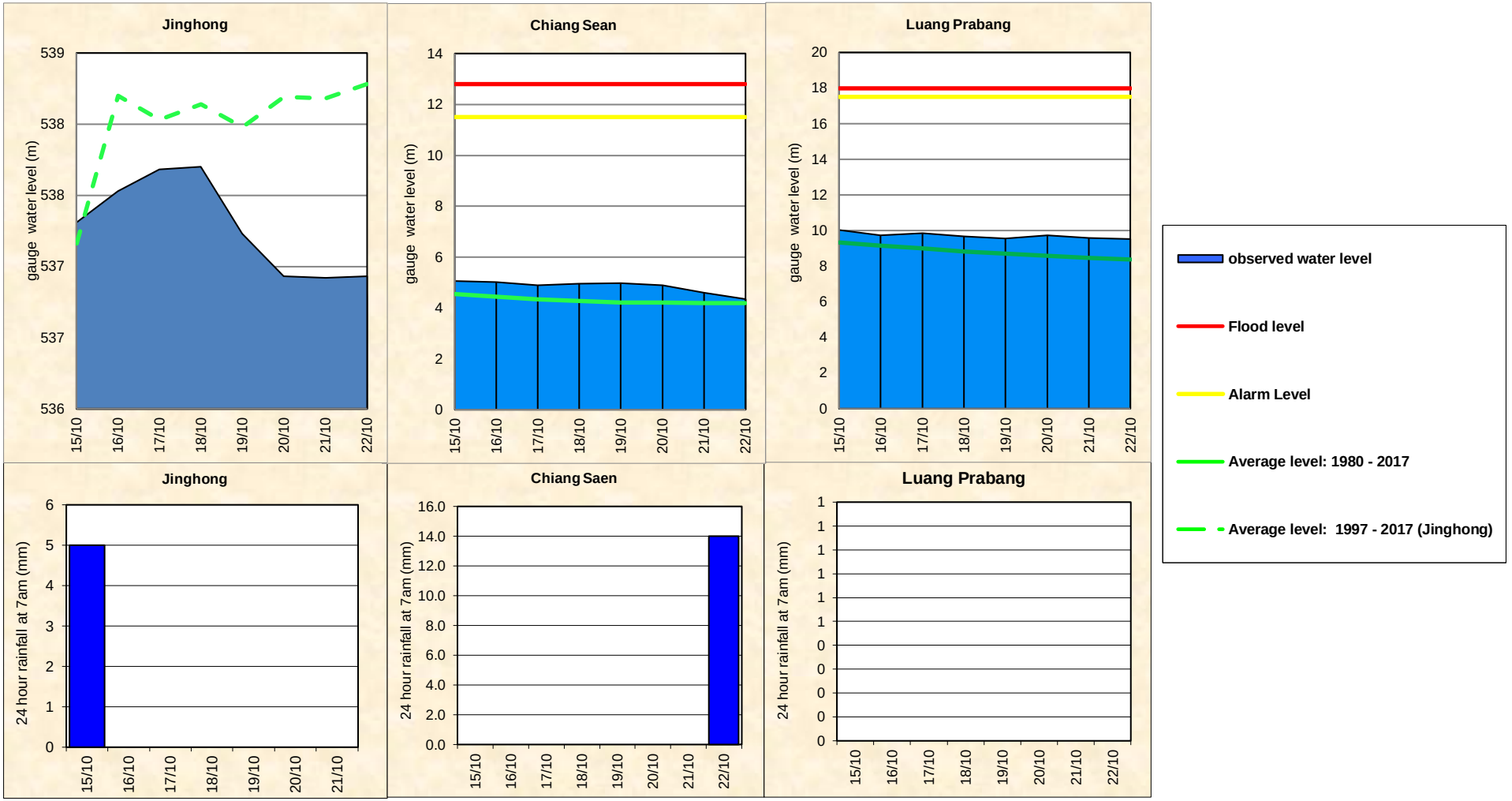


Figure A2: Observed water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

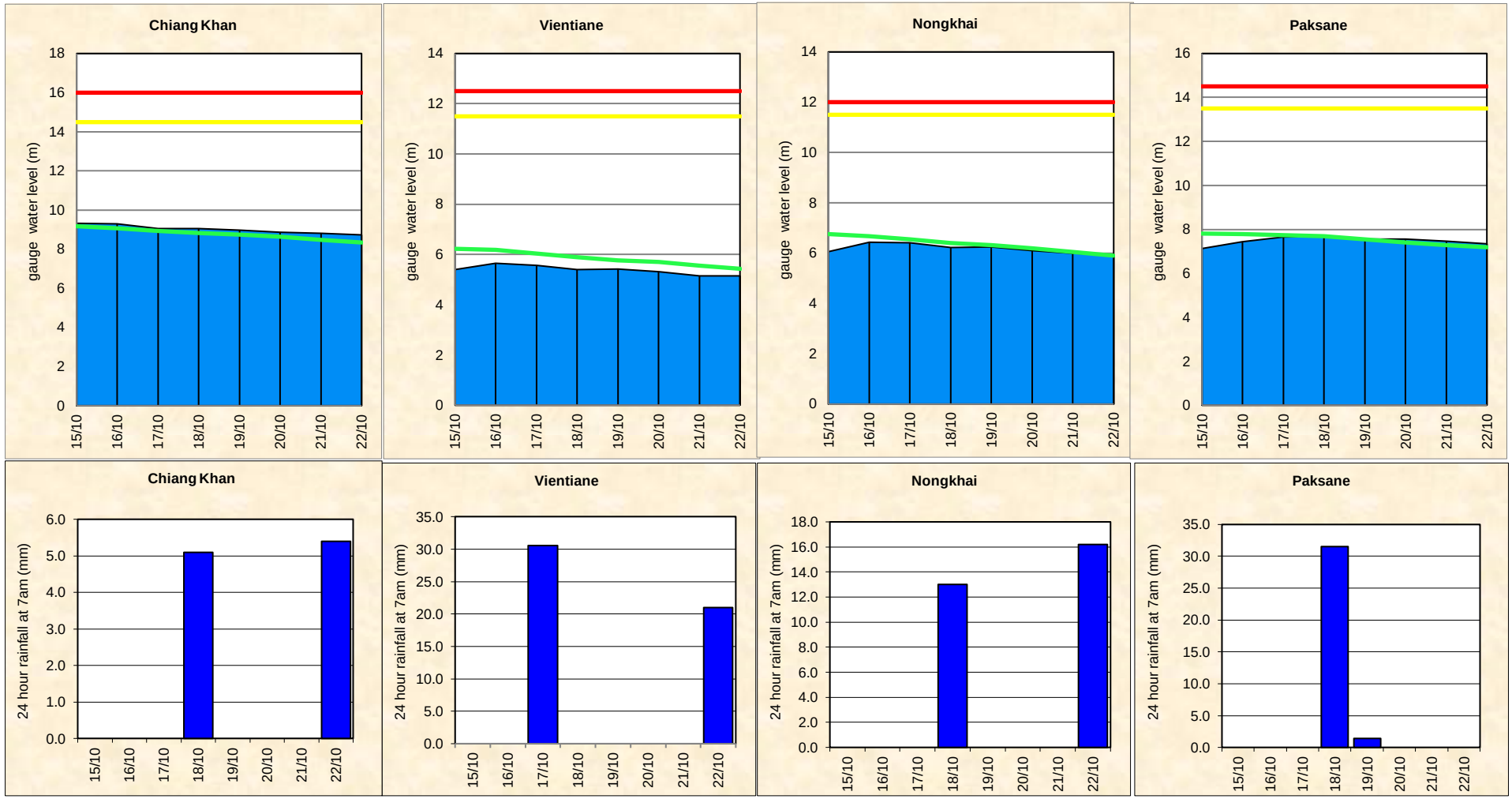


Figure A3: Observed water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

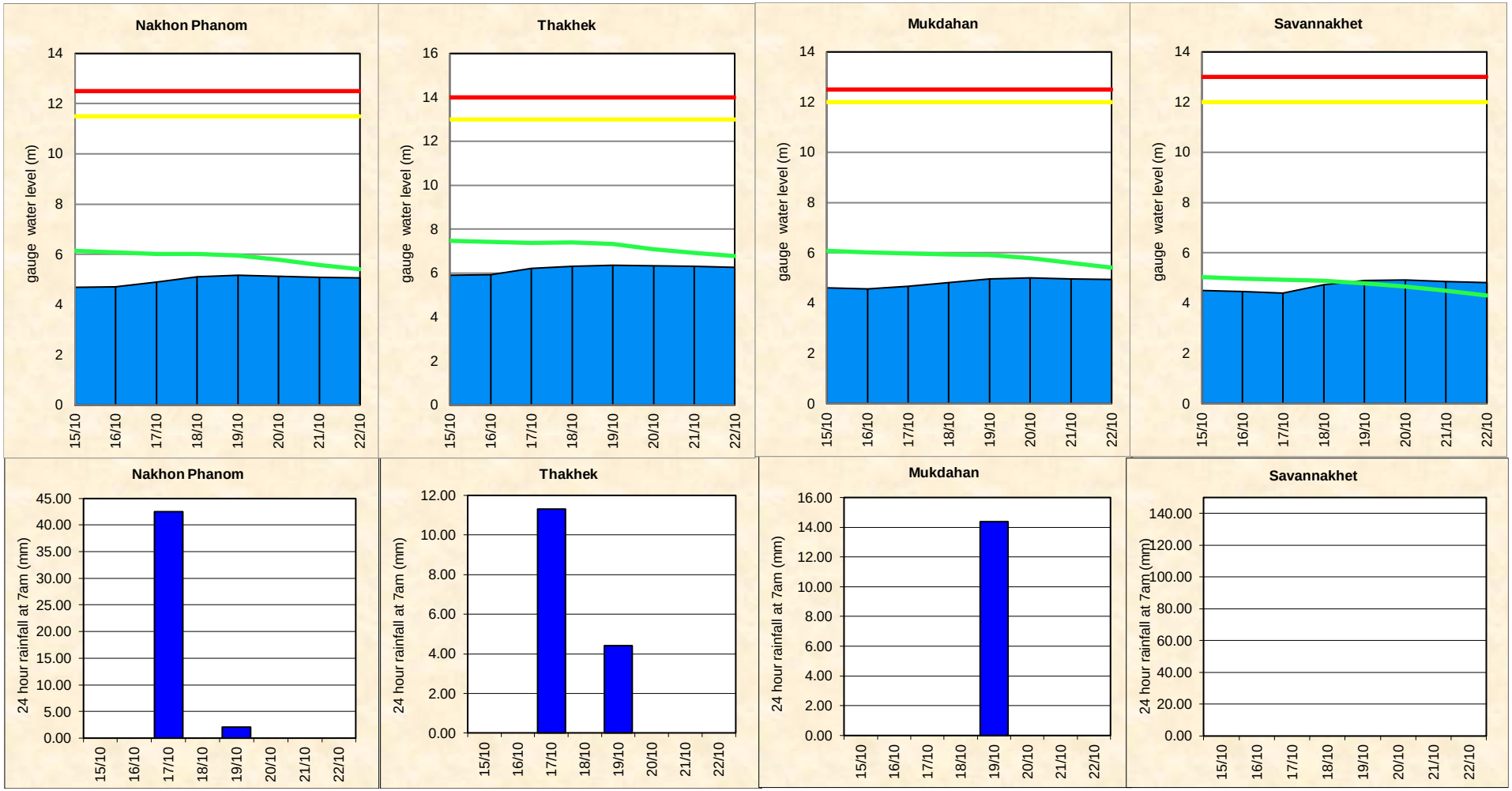


Figure A4: Observed water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

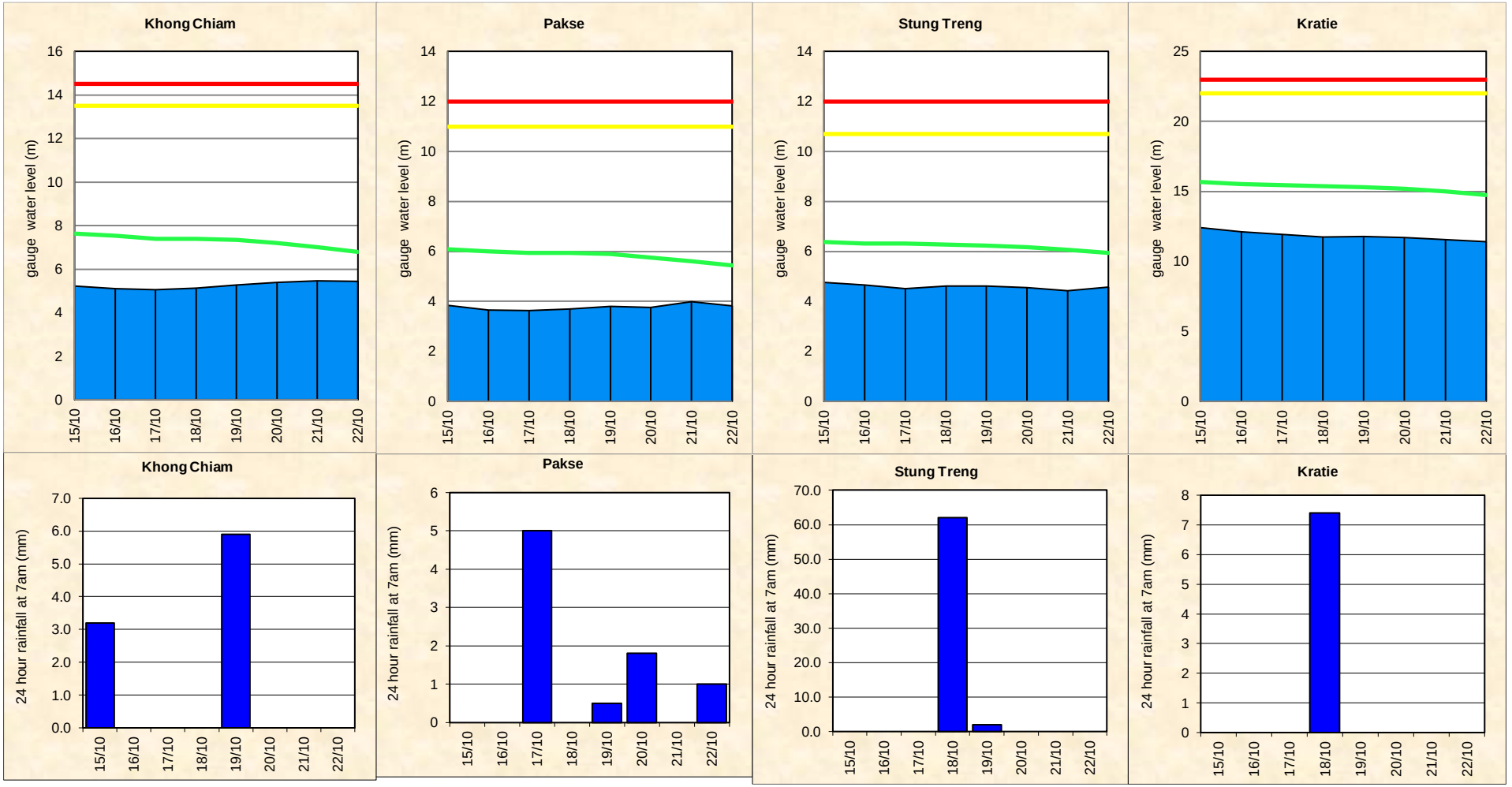


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

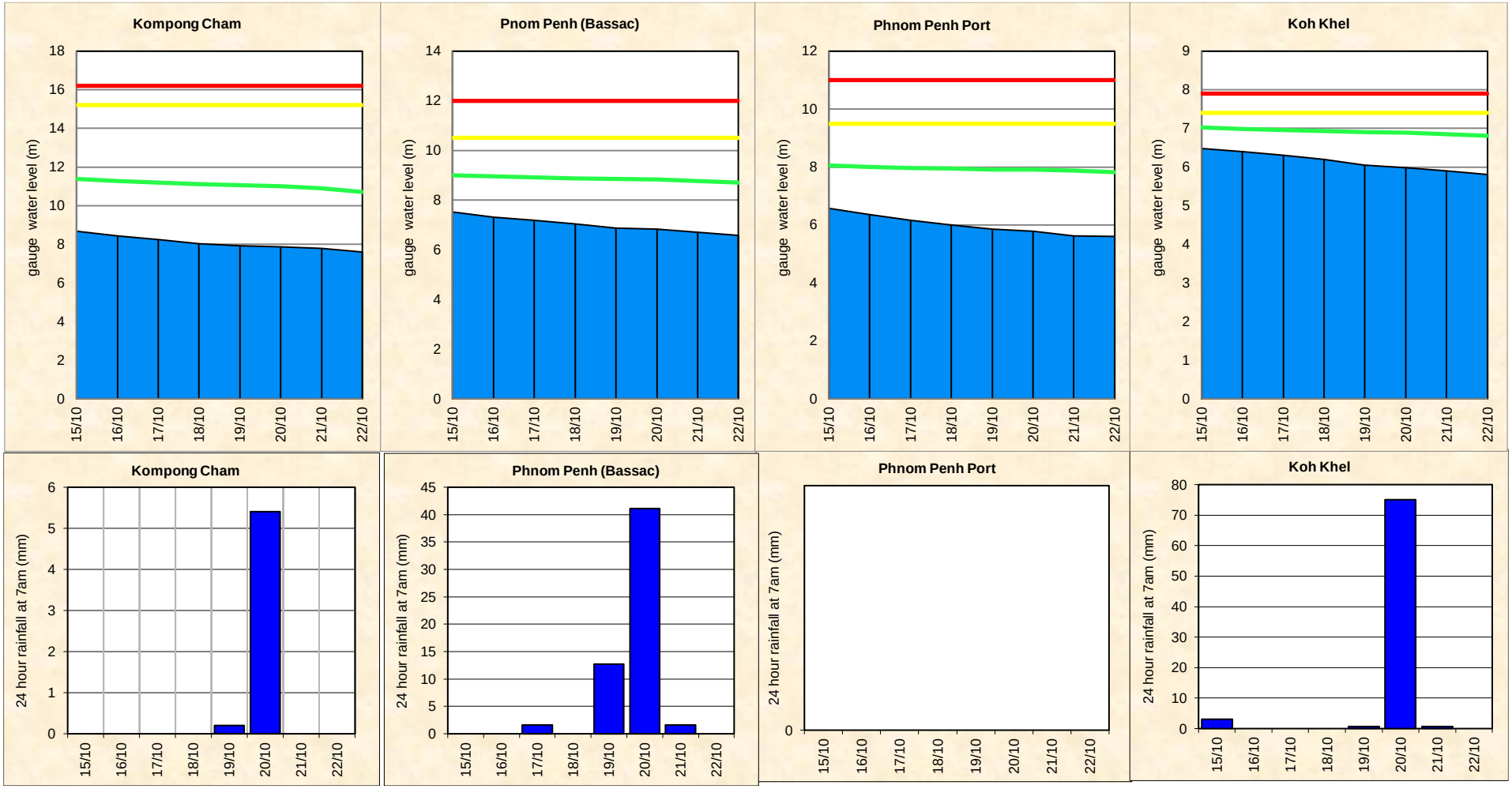
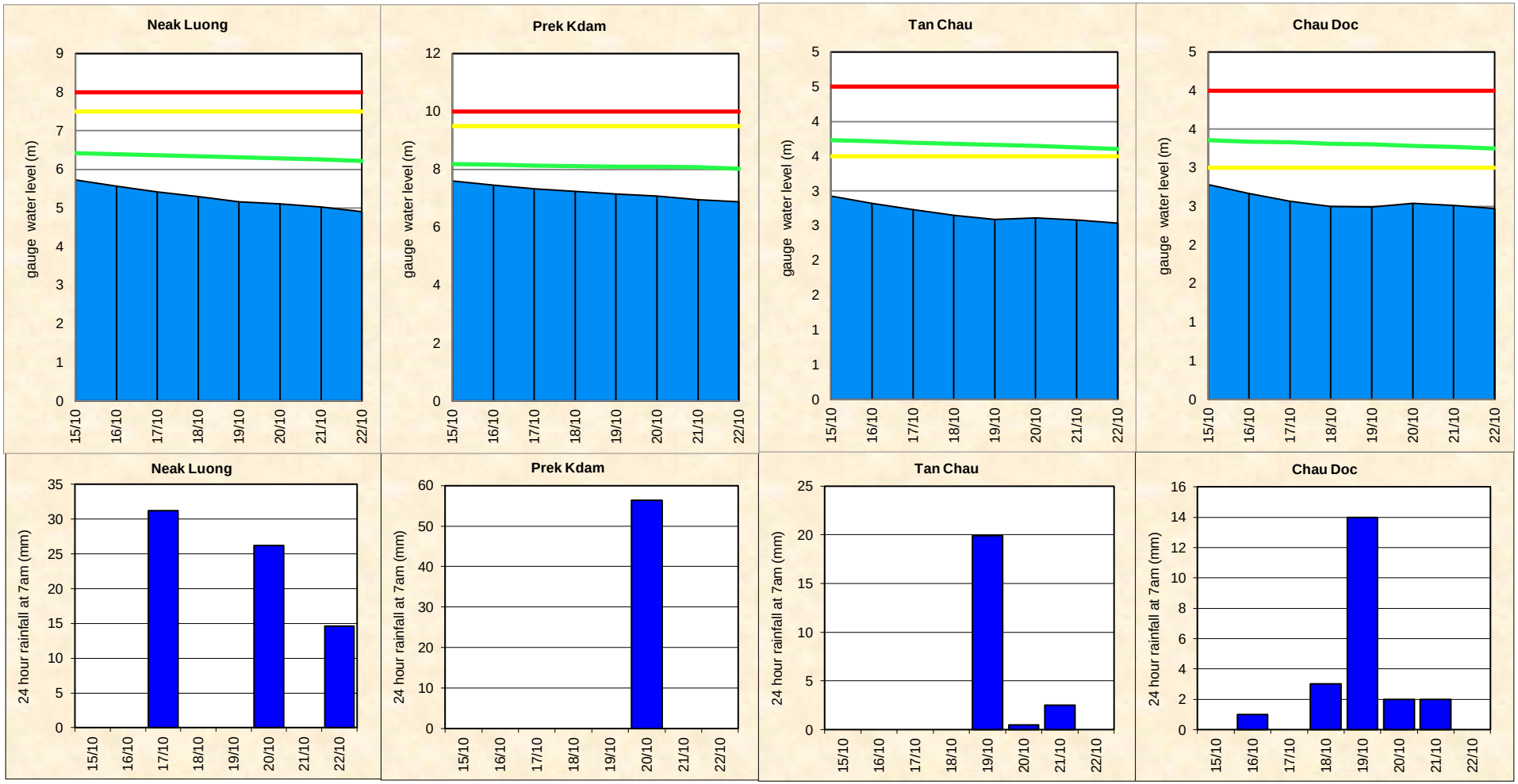


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



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, Luang Prabang and Nong Khai stations 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.

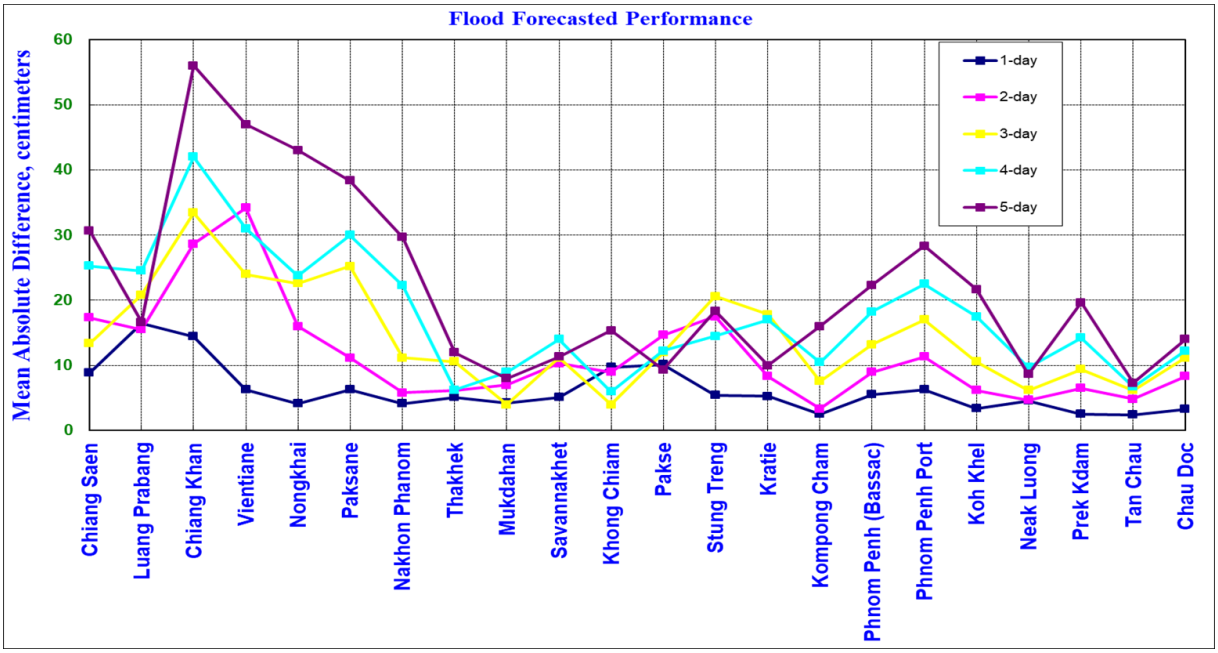


Figure B1: Average flood forecast accuracy along the Mekong mainstream

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 15th to 22th Oct 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	100.00	100.00	85.71	100.00	100.00	100.00	100.00	100.00	100.00	100.00	85.71	85.71	100.00	100.00	100.00	85.71	85.71	85.71	85.71	100.00	85.71	85.71	***94.16***
2-day	100.00	100.00	83.33	83.33	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	66.67	***96.97***
3-day	100.00	100.00	80.00	80.00	80.00	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	80.00	***96.36***
4-day	100.00	100.00	75.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	***96.59***
5-day	100.00	100.00	66.67	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	100.00	100.00	***96.97***

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 15th to 22th Oct 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	100.00	71.43	85.71	85.71	100.00	71.43	100.00	85.71	85.71	85.71	57.14	57.14	85.71	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	***89.61***
2-day	100.00	100.00	83.33	50.00	66.67	100.00	100.00	100.00	100.00	100.00	100.00	100.00	66.67	100.00	100.00	83.33	50.00	83.33	100.00	100.00	100.00	66.67	***88.64***
3-day	100.00	100.00	80.00	80.00	80.00	60.00	80.00	100.00	100.00	100.00	100.00	80.00	60.00	100.00	100.00	20.00	20.00	40.00	100.00	60.00	80.00	40.00	***76.36***
4-day	100.00	100.00	75.00	75.00	75.00	75.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	75.00	0.00	100.00	100.00	100.00	25.00	***80.68***
5-day	100.00	100.00	66.67	66.67	66.67	66.67	66.67	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	33.33	100.00	100.00	100.00	100.00	100.00	***89.39***

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	25	25	25	25	25	25	25	25	25	25	25	25	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
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	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 7 days including the current report date

	FF time sent				Arrival 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	*09:57*	*00:00*	-	-	*08:15*	*07:10*	*07:13*	*08:06*	*08:58*	*08:10*	*07:01*	*08:14*	*0*	*0*	*0*	*0*	*90*	*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*	*437*	*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.

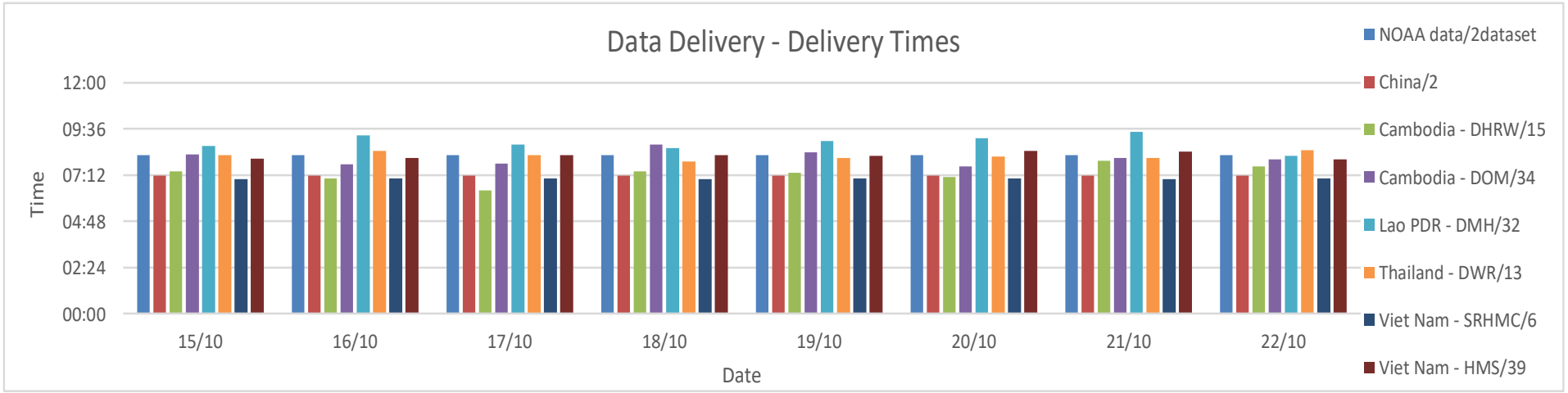


Figure B2: Data delivery times for the past 8 days including the current report date

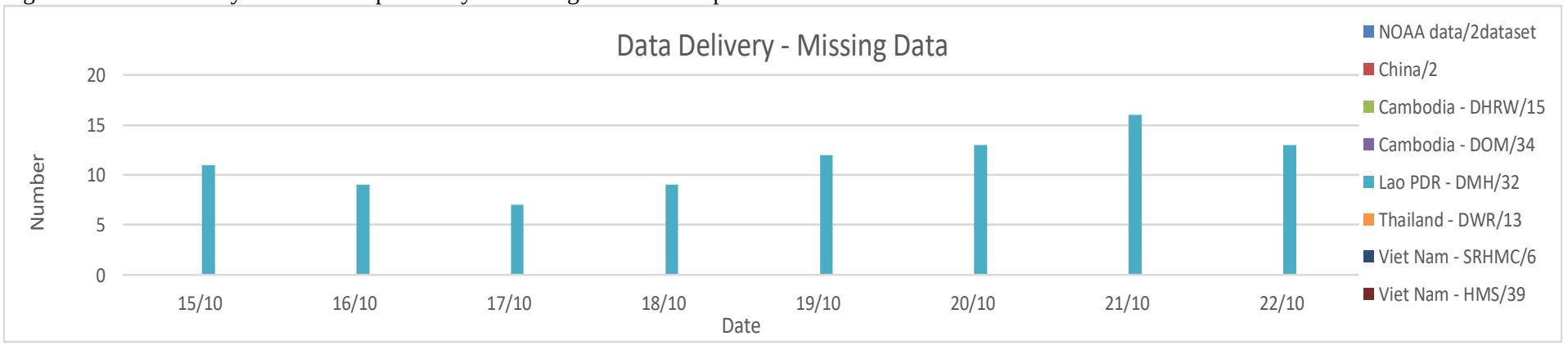


Figure B3: Missing data for the past 8 days including the current report date

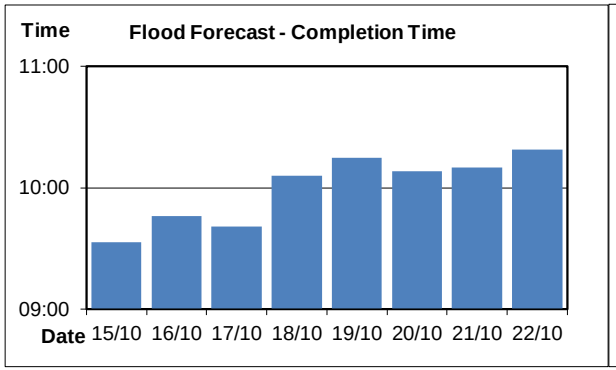


Figure B4: Flood forecast completion time

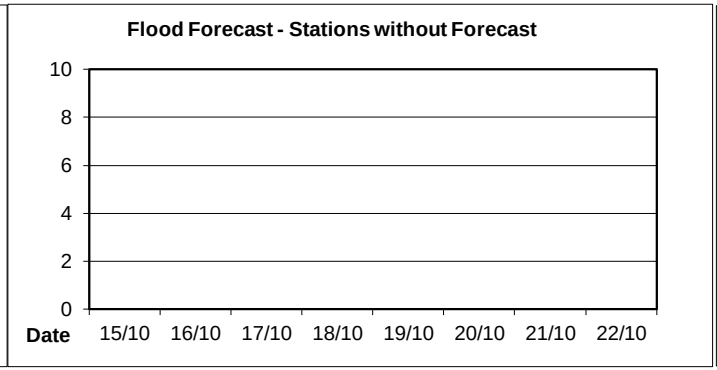


Figure B5: Flood forecast stations without forecast

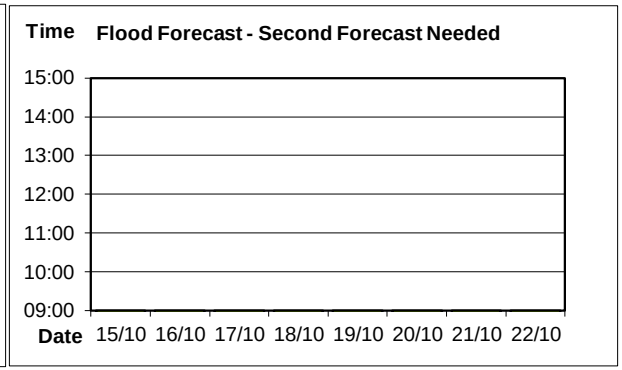
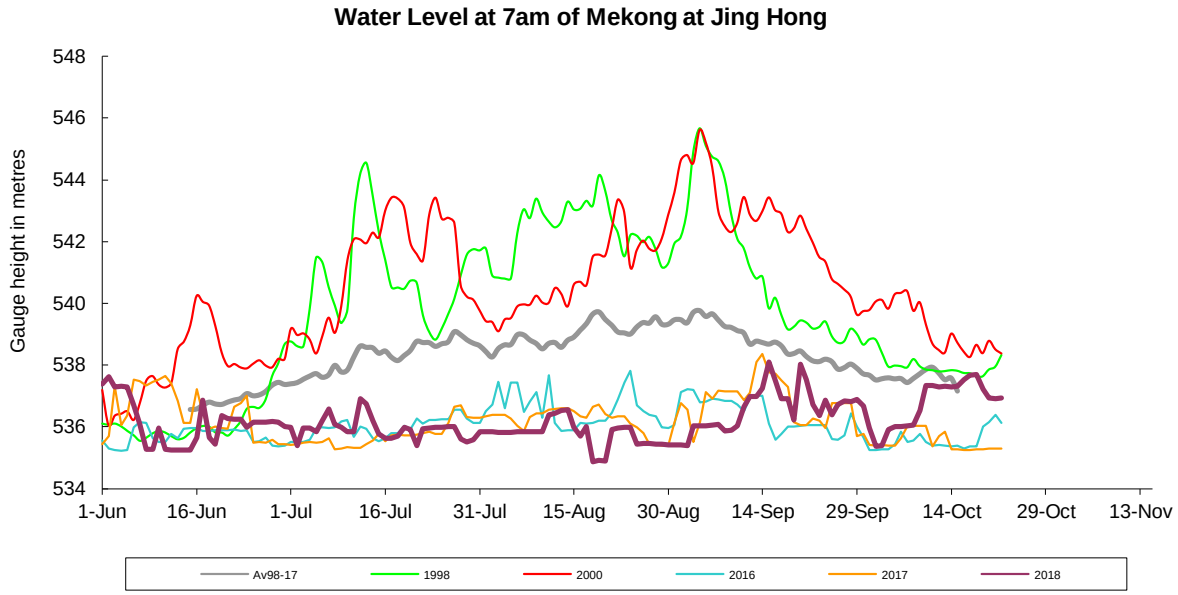


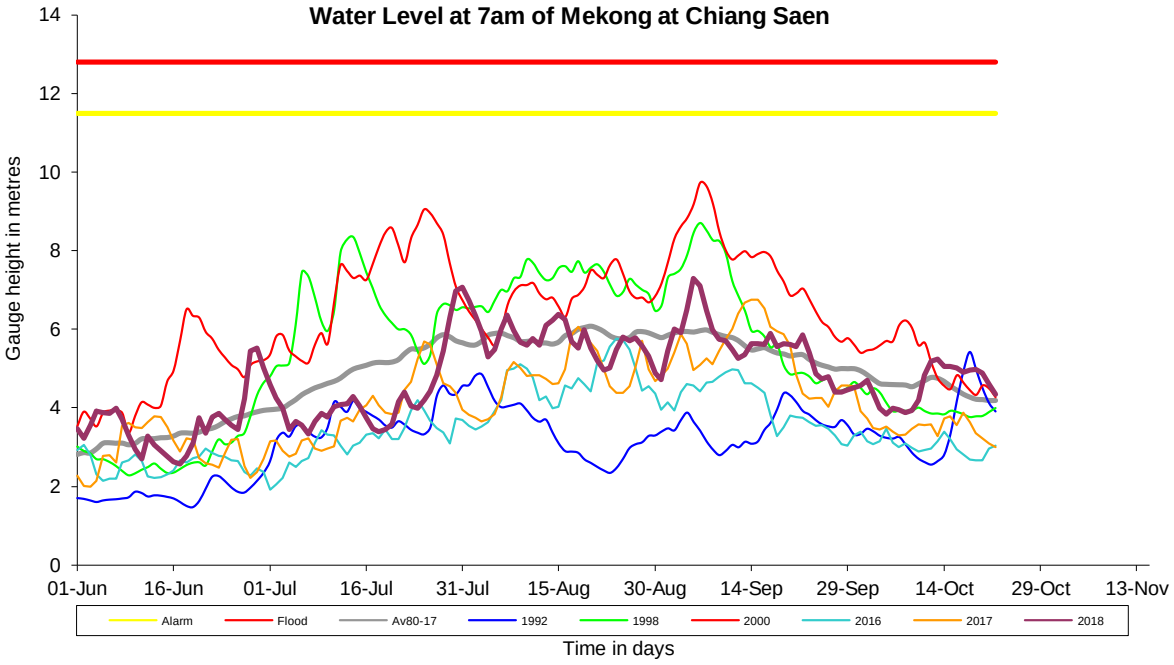
Figure B6: Second forecast needed

Annex C: Season Water Level Graphs

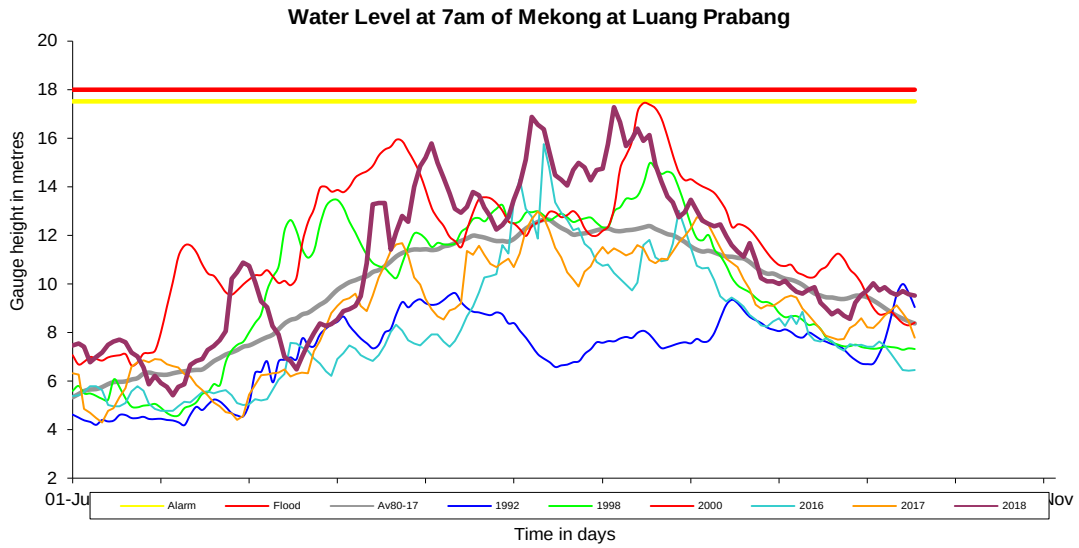
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

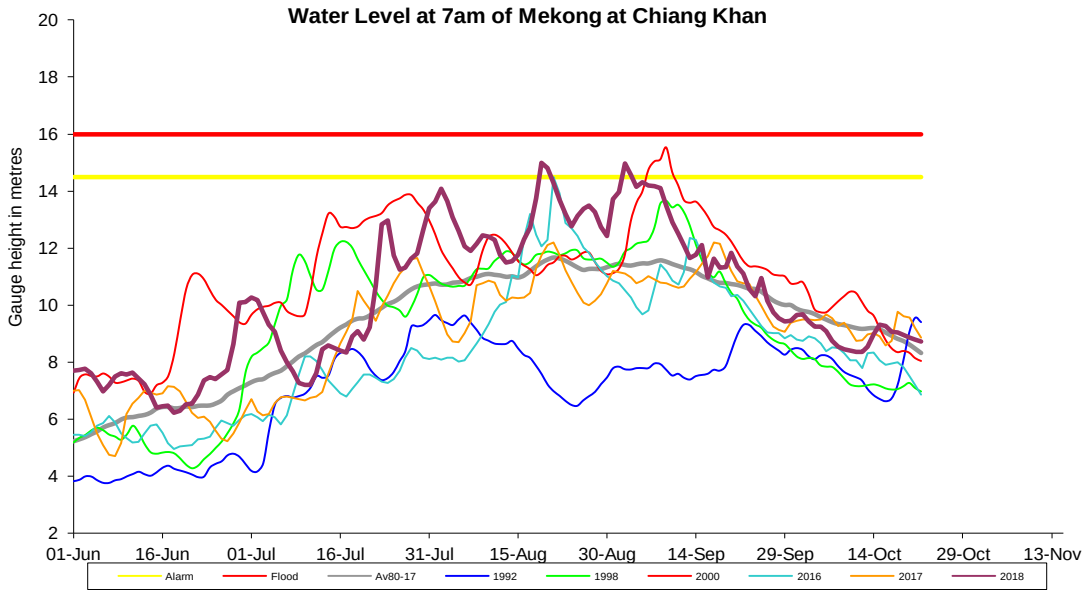
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

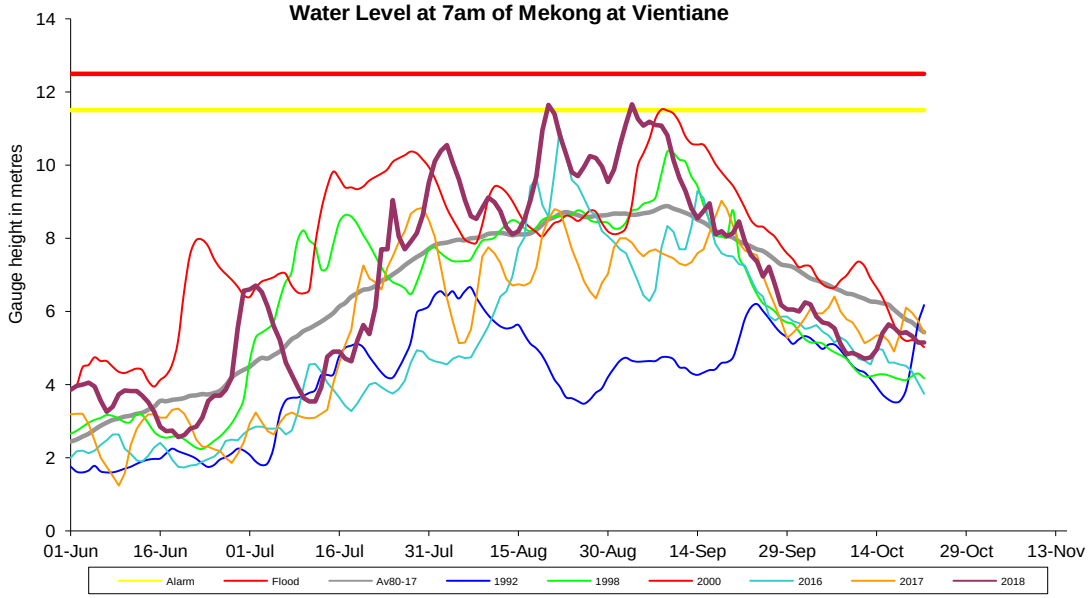




Tuesday,23th October 2018







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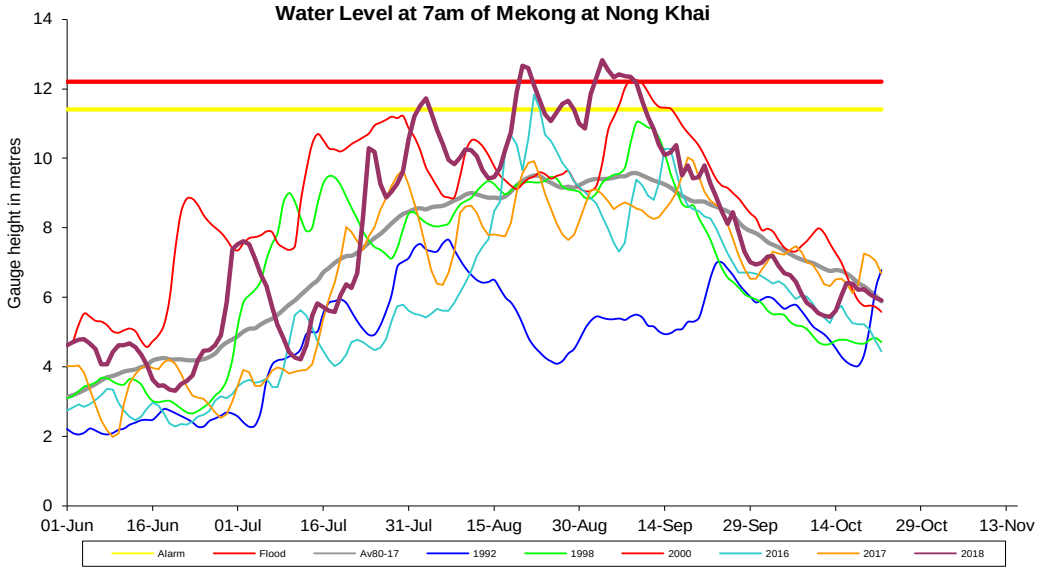

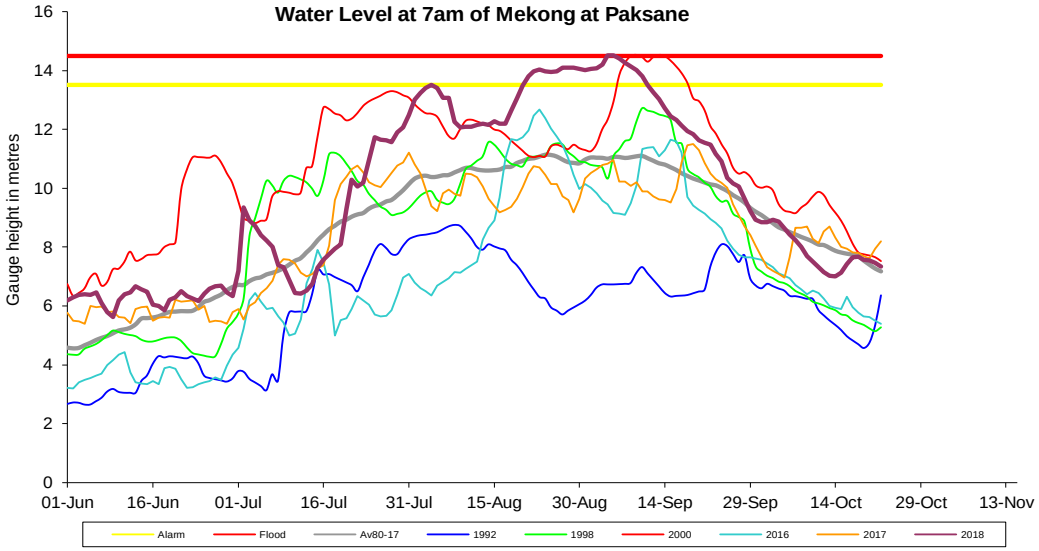

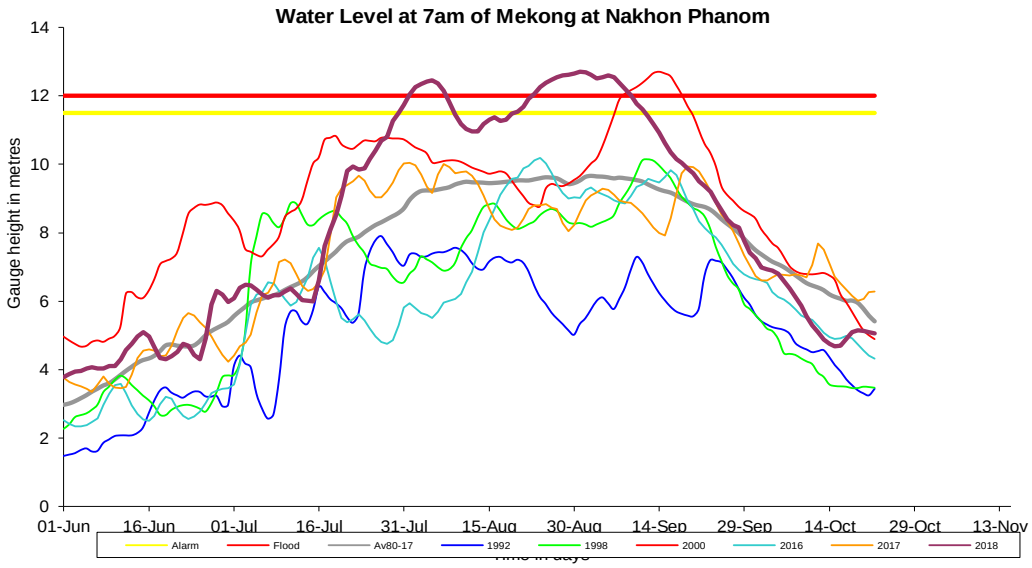

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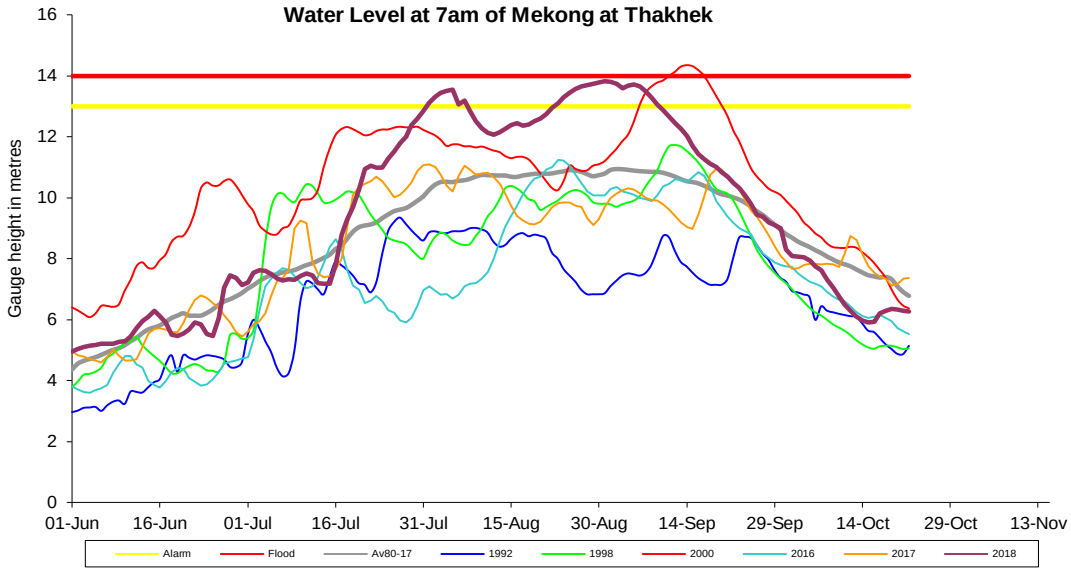

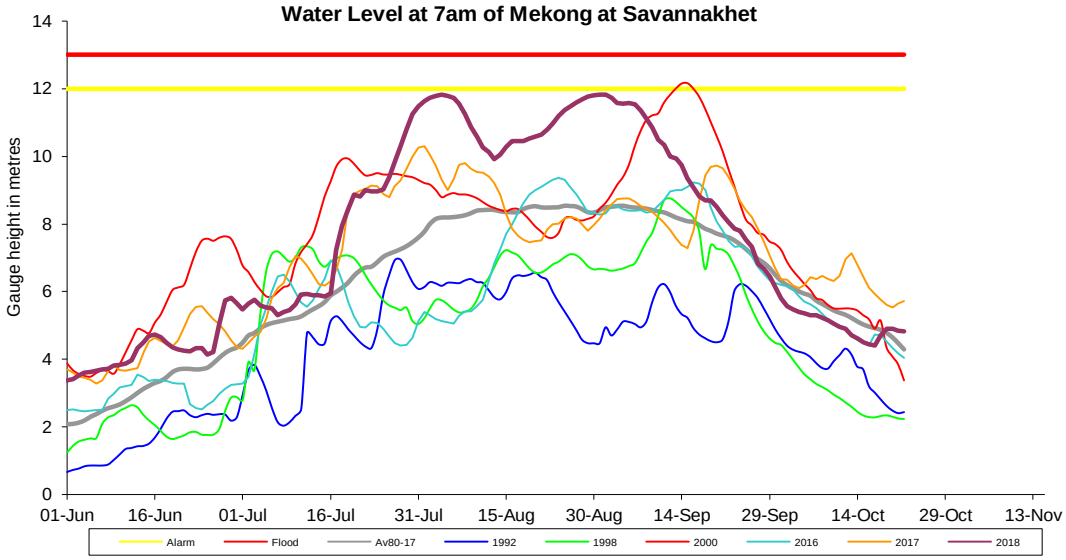

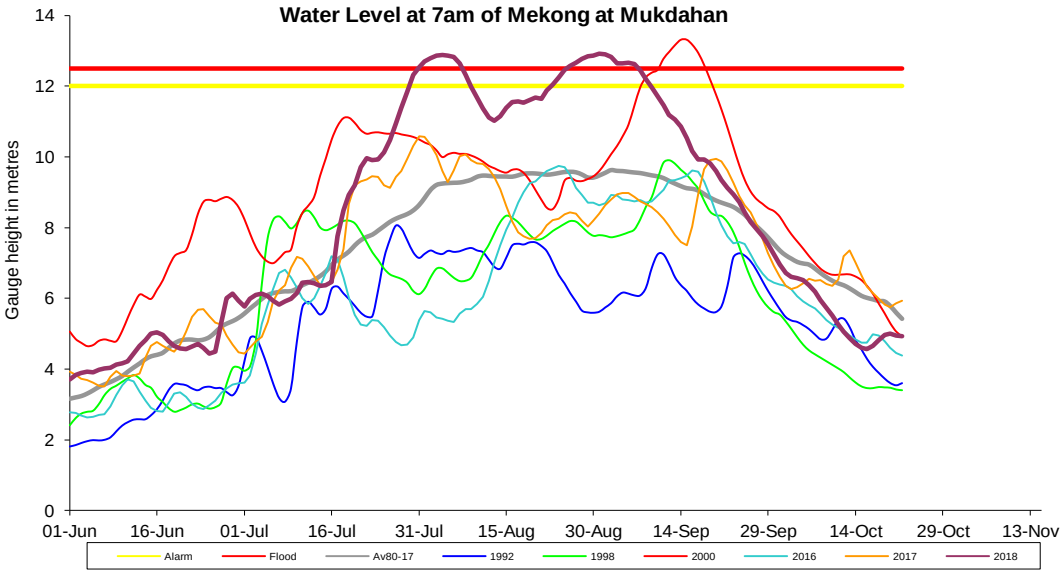

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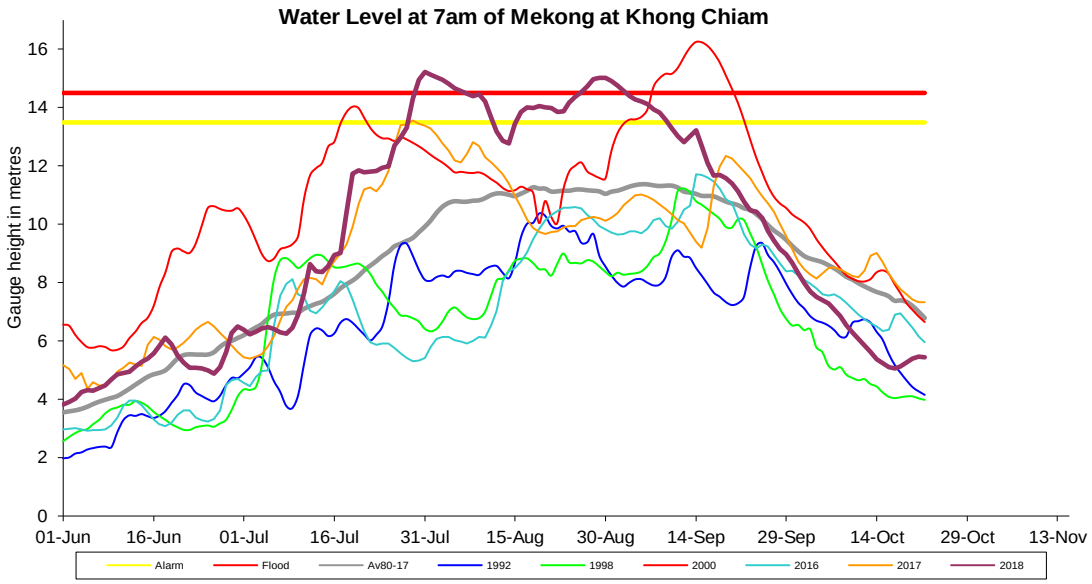

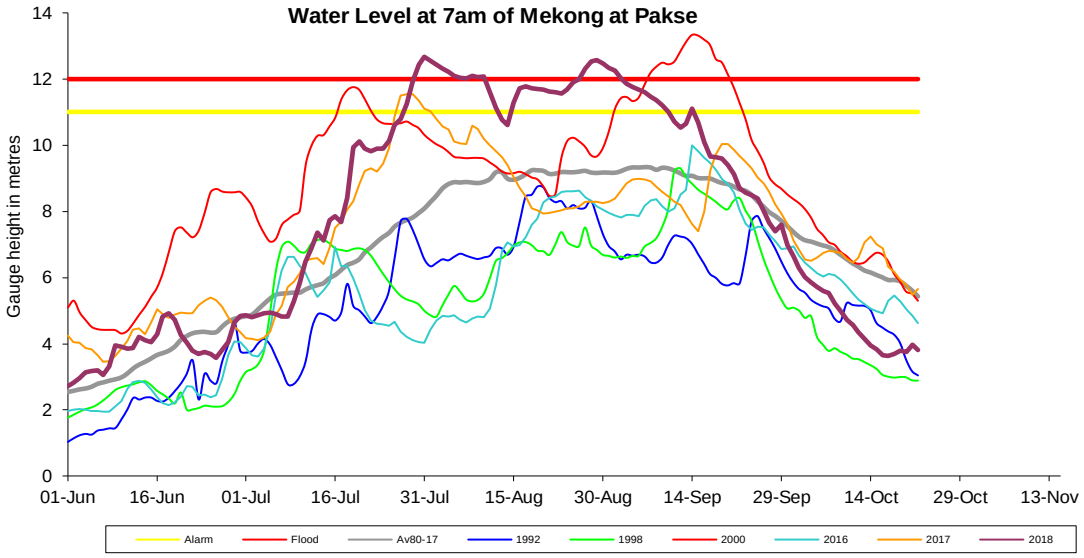

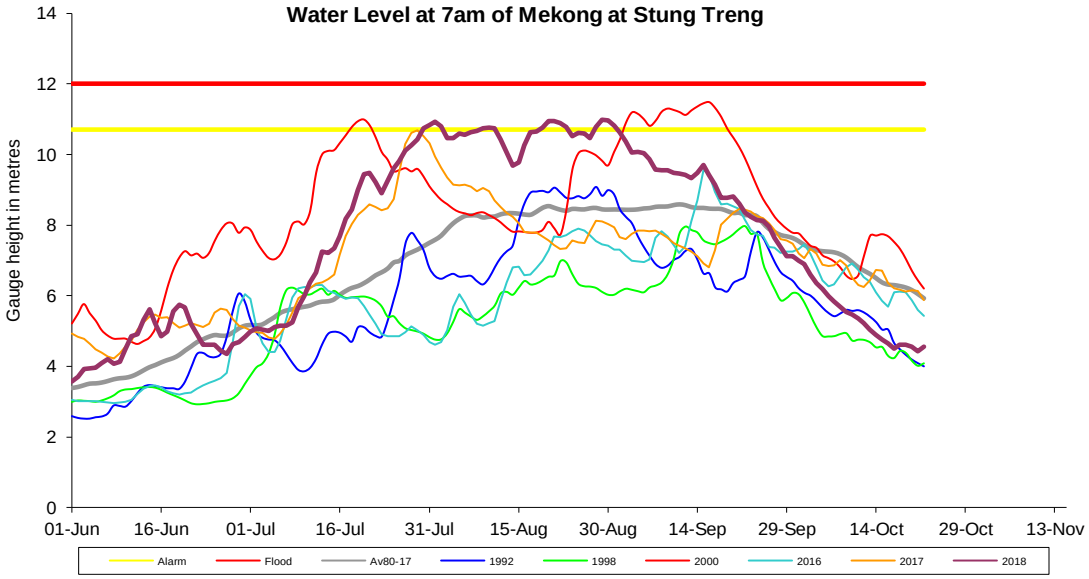

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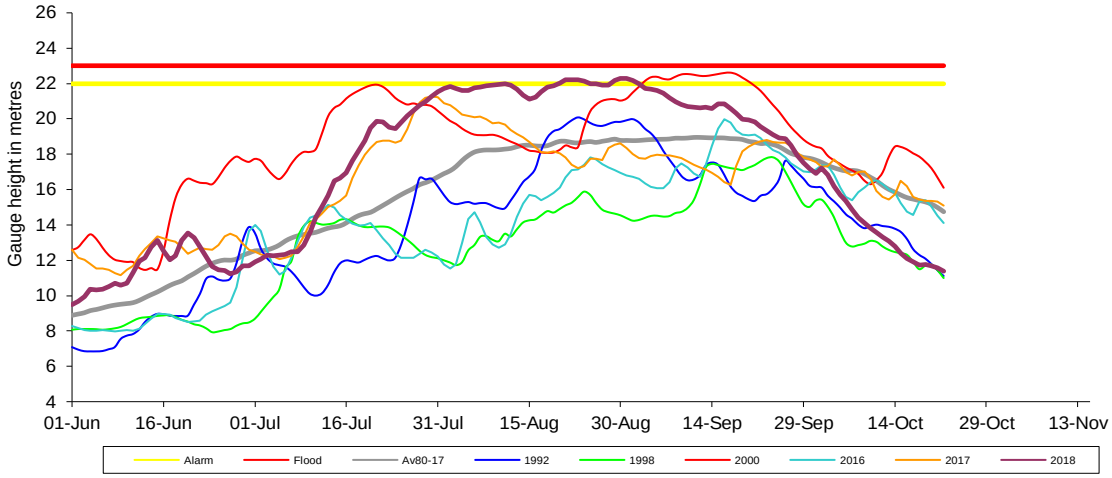
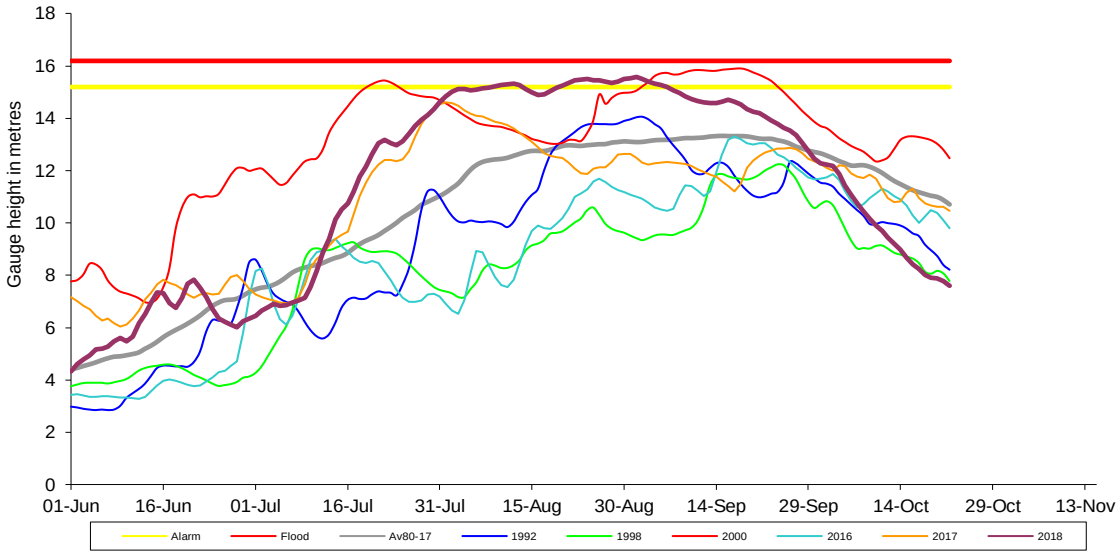
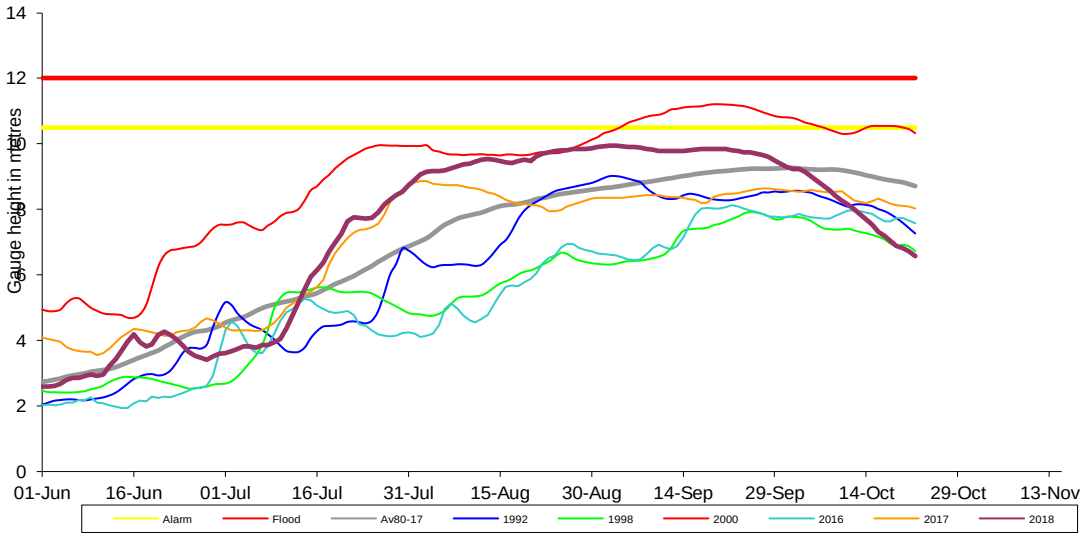
Water Level at 7am of Mekong at Kratie



Water Level at 7am of Mekong at Kampong Cham



Water Level at 7am of Mekong at Phnom Penh Chaktomuk



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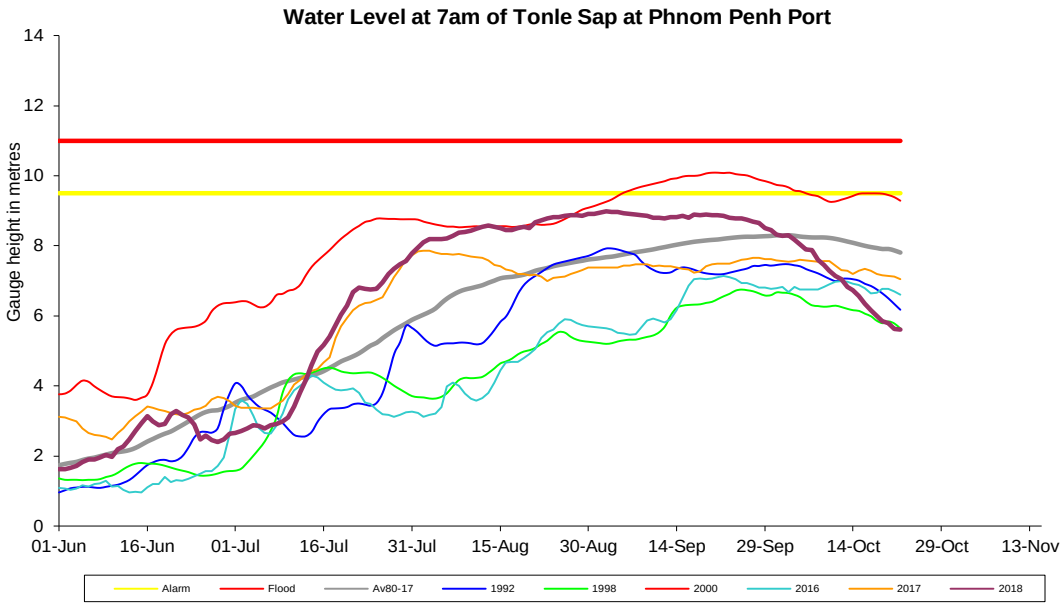

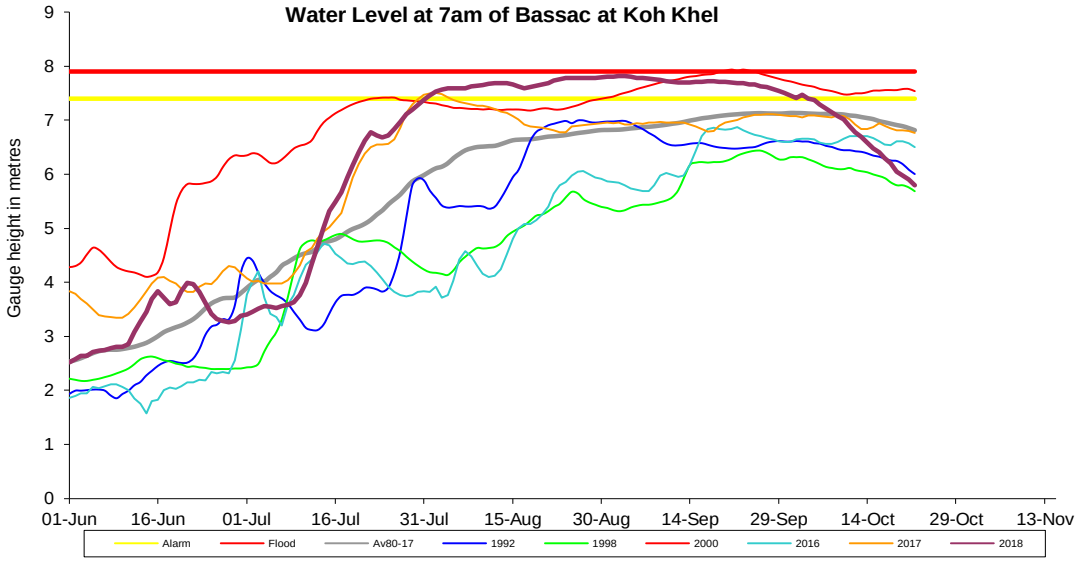

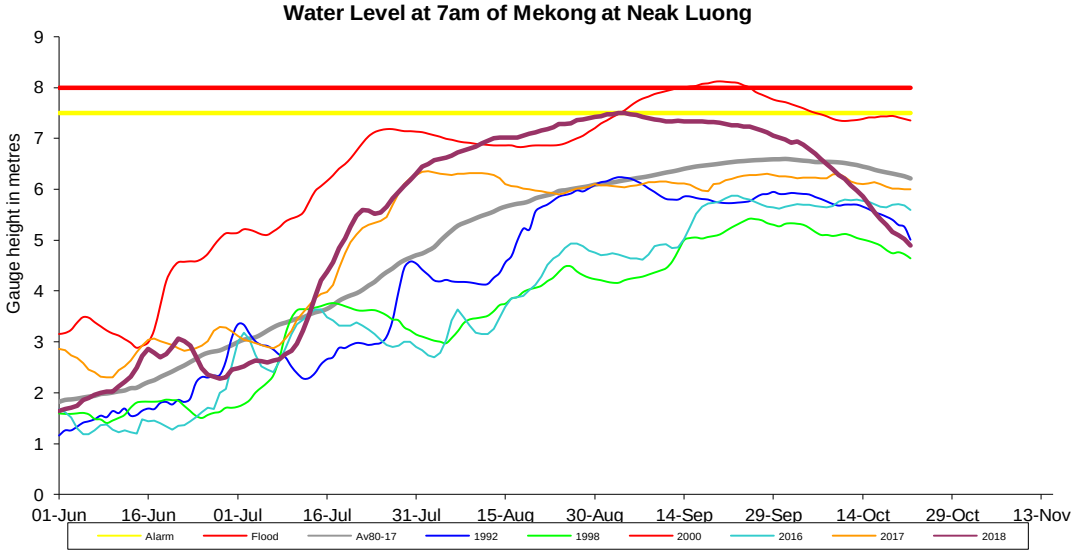

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