Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 10/10/2011, covering the week from the 3rd October to the 9th October, 2011

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

General weather patterns

During the week of the 3rd October to the 9th October 2011, six weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 3rd October and the 9th October bulletins are presented in the figures below:

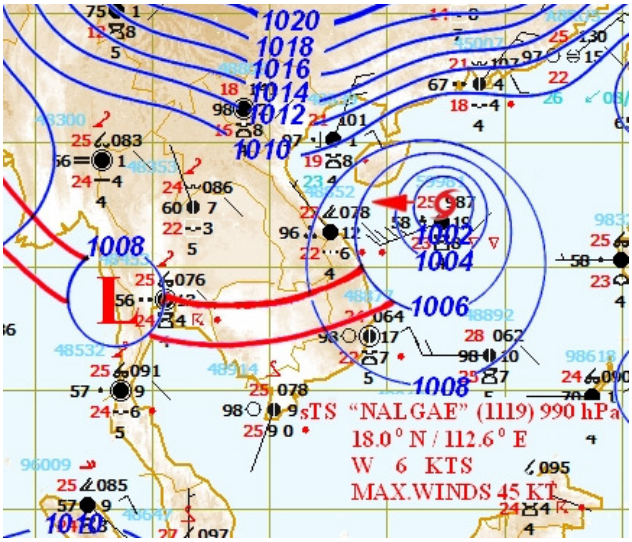


Figure 1: Weather map for 03rd October 2011

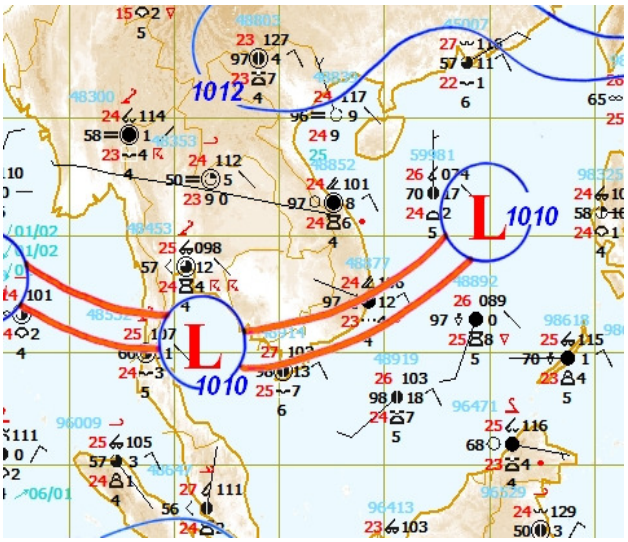


Figure 2: Weather map for 09th October 2011

Strong to moderate South-West (SW) Monsoon

Strong SW monsoon prevailed over Andaman Sea, the Gulf of Thailand, Thailand and Cambodia for almost all last week with moderate SW monsoon occurred one or two days in mid of the week (Figure 1 and 2).

Inter Tropical Convergence Zone (ITCZ)

ITCZ was observed starting from middle to the rest of last week. It lied across the central part of Thailand and Cambodia, lower parts of Laos PDR and Viet Nam.

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

A Tropical Storm named "NALGAE" (1119) moved westward to gulf of Tonkin during the beginning of last week, resolved into Tropical depression around mid of the week and finally dissipated into lower pressure (Figure 1and 2).

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Over weather situation

As the result of strong SW monsoon activity during the last week and Inter Tropical Convergence Zone that lied across the lower parts of Thailand, Viet Nam and middle of Cambodia, heavy rain occurred in the Eastern part of Thailand, Central part of Cambodia, Southern part of Viet Nam and Lao PDR. Figure 3 illustrates rainfall amount distribution over the LMB covered the whole week. During last week, heavy rain occurred in the lower part of LMB from Pakse to Tan Chau, especially some areas in the tributaries. The high amounts of rainfall covering last week were recorded at Kratie (144.7 mm); at Stung Treng (80.0 mm); at Bassac Chaktomuk (64.0 mm).

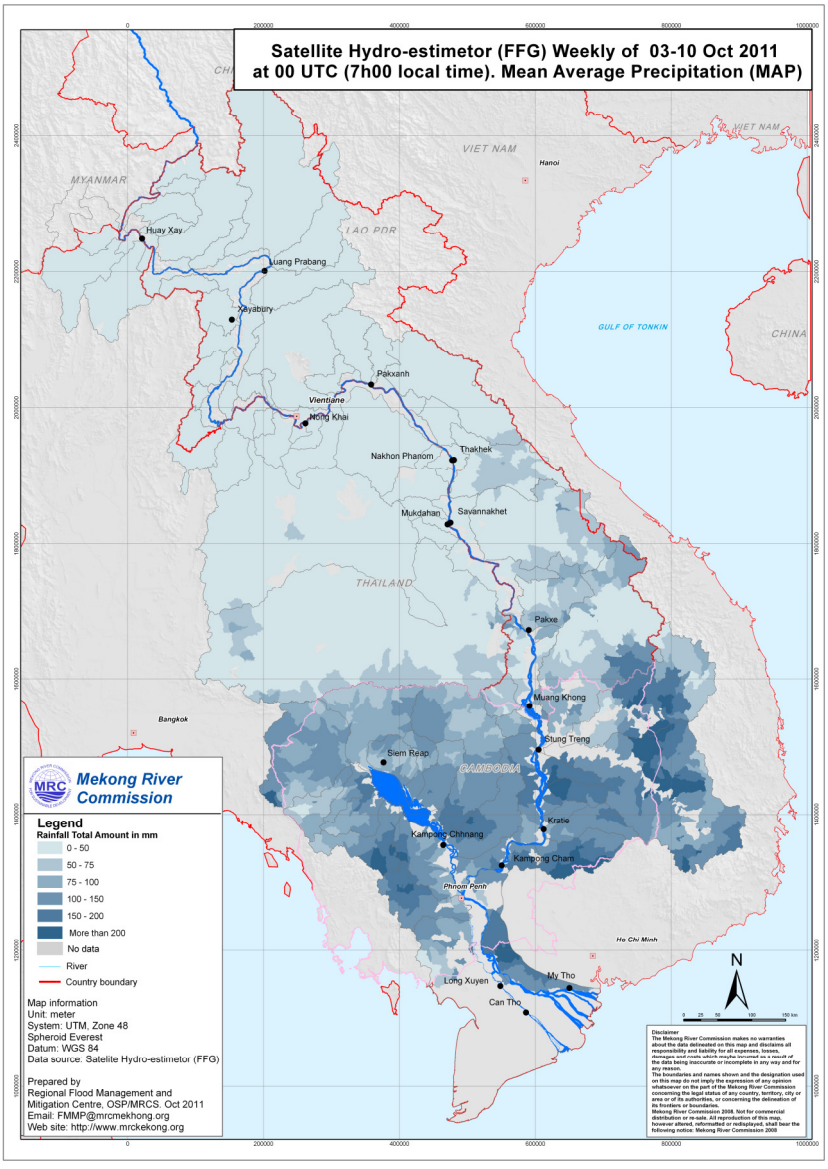


Figure 3: Rainfall distribution over the LMB, covering the week 03 October – 10 October, 2011

General behaviour of the Mekong River

During last week, water levels along mainstream of Mekong river from upper to middle part of LMB were recessed while those of lower part of LMB still increasing slightly. These indicate that flood volume has travelled down to the lower part of LMB.

All stations along Mekong river mainstream (except Chiang Saen to Nong Khai) were recording levels that are above the long-term average for this time of the year.

Regarding to two stations in downstream at Tan Chau and Chau Doc, water levels at those two stations were fluctuated by tidal with increasing trend in the first half of the week and then more-or-less stable till the end of the week.

For stations from Chiang Saen to Vientiane/ Nong Khai

Water level showed a decreasing trend during the monitoring period and water levels at these stations were recorded lower than the long-term average for this time of the year.

For stations Paksane to Pakse

Water levels at these stations recessed during last week and were above the long-term average for this time of the year.

For stations Strung Treng to Kompong Cham

Water levels were falling in last week. These stations were recording levels are above the long-term average for this time of the year.

For stations from Phnom Penh Port/ Phnom Penh Bassac to Prek Dam

Water levels at these stations were more-or-less stable during reporting period and above the long-term average for this time of the year.

Tan Chau and Chau Doc

Water levels at these two stations, significantly affected by tidal, were more-or-less stable during last week and above the long-term average for this time of the year.

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

Flood Situation

- Flood stage or alarm stage:
  - The Mekong has reached flood stage at Prek Dam, Tan Chau and Chau Doc monitoring stations.

For more details see the following annex:

- 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

2011	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
03/10	535.71	4.81	11.50	11.44	8.95	10.28	13.12	11.44	12.53	11.13	9.90	13.34	10.97	9.29	20.55	14.96	**10.75**	**9.88**	**7.87**	**7.95**	**10.02**	**4.74**	**4.18**
04/10	535.53	4.37	11.00	11.92	9.56	10.74	12.80	11.43	12.49	11.36	10.07	13.67	**11.25**	9.71	20.80	14.90	**10.78**	**9.88**	**7.87**	**7.92**	**10.06**	**4.71**	**4.17**
05/10	535.61	4.00	10.34	11.29	9.26	10.70	12.62	11.11	12.19	11.14	9.94	13.65	**11.25**	9.97	21.24	**15.02**	**10.79**	**9.91**	**7.87**	**7.94**	**10.10**	**4.71**	**4.17**
06/10	535.17	3.74	9.78	10.71	8.68	10.08	12.34	10.83	11.90	10.83	9.63	13.34	**11.02**	9.84	21.40	15.13	**10.79**	**9.91**	**7.86**	**7.90**	**10.08**	**4.72**	**4.21**
07/10	535.35	3.61	9.34	10.02	7.95	9.41	11.86	10.49	11.56	10.48	9.28	12.97	10.72	9.63	21.21	15.21	**10.82**	**9.94**	**7.86**	**7.92**	**10.10**	**4.75**	**4.23**
08/10	535.85	3.51	8.98	9.53	7.26	8.64	11.26	10.03	11.11	10.04	9.00	12.54	10.38	9.49	21.02	15.16	**10.83**	**9.94**	**7.87**	**7.94**	**10.11**	**4.76**	**4.24**
09/10	535.90	3.53	8.76	9.14	6.66	8.02	10.81	9.45	10.54	9.44	8.93	12.04	10.09	9.20	20.98	15.15	**10.85**	**9.96**	**7.88**	**7.96**	**10.13**	**4.77**	**4.23**
10/10	535.93	3.81	8.62	8.89	6.25	7.50	10.06	8.97	10.07	8.89	8.45	11.46	9.52	9.00	20.61	15.03	**10.86**	**9.98**	**7.88**	**7.96**	**10.14**	**4.78**	**4.23**
Flood level		11.80	18.00	17.40	12.50	12.20	14.50	12.70	14.00	12.60	13.00	16.20	12.00	12.00	23.00	16.20	12.00	11.00	7.90	8.00	10.00	4.20	3.50

Table A2: observed rainfall

Unit in mm

2011	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
03/10	0.0	nr	nr	55.8	62.7	100.8	3.0	0.3	nr	0.5	4.7	nr	nr	7.5	nr	nr	19.2	-	11.0	nr	nr	nr	-
04/10	0.0	nr	nr	4.6	nr	0.0	nr	0.0	nr	1.7	nr	5.3	nr	1.0	18.6	9.4	1.3	-	0.0	0.0	8.4	18.2	-
05/10	0.0	nr	nr	0.0	nr	0.0	nr	0.3	0.6	0.0	nr	nr	nr	0.0	19.0	2.7	20.2	-	21.5	24.6	15.3	18.2	3.0
06/10	0.0	nr	nr	0.0	16.0	14.0	3.2	1.9	1.6	0.5	nr	nr	nr	nr	nr	nr	nr	-	0.0	5.2	nr	0.0	-
07/10	0.0	nr	nr	4.0	2.0	3.9	2.4	0.0	0.3	0.0	nr	nr	nr	nr	62.0	18.0	10.8	-	0.5	nr	5.0	nr	-
08/10	0.0	0.0	nr	0.0	nr	0.0	nr	0.0	nr	0.0	nr	0.0	1.0	45.0	nr	6.0	nr	-	17.5	nr	nr	nr	-
09/10	0.0	0.0	nr	0.0	nr	0.0	nr	0.8	0.7	0.0	nr	8.8	1.5	11.5	33.5	10.7	12.5	-	0.0	nr	nr	0.0	-
10/10	0.0	0.0	nr	0.4	nr	0.0	nr	0.0	nr	0.0	nr	30.1	nr	18.0	11.6	9.7	nr	-	2.3	0.2	nr	0.0	-

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

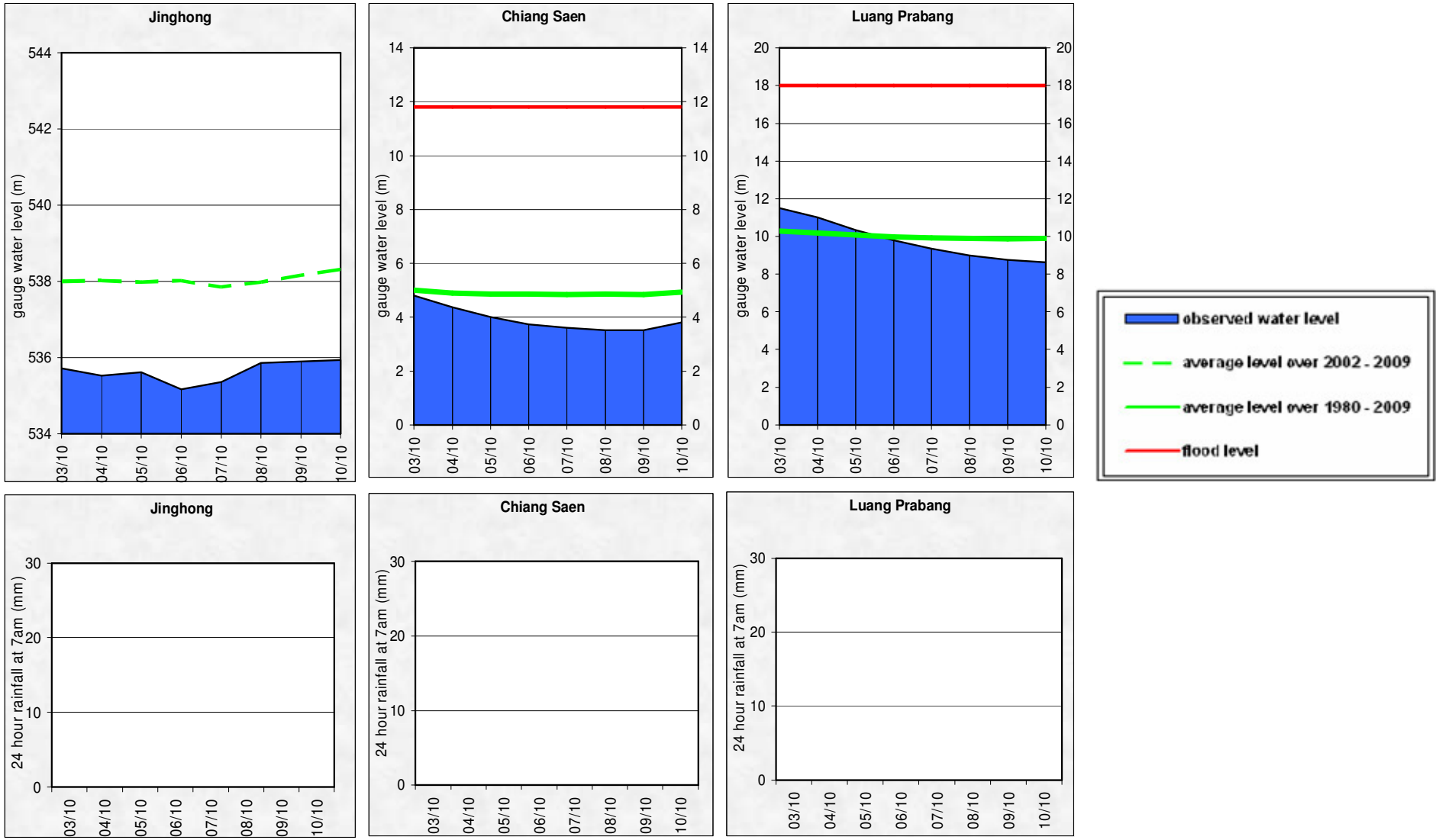


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

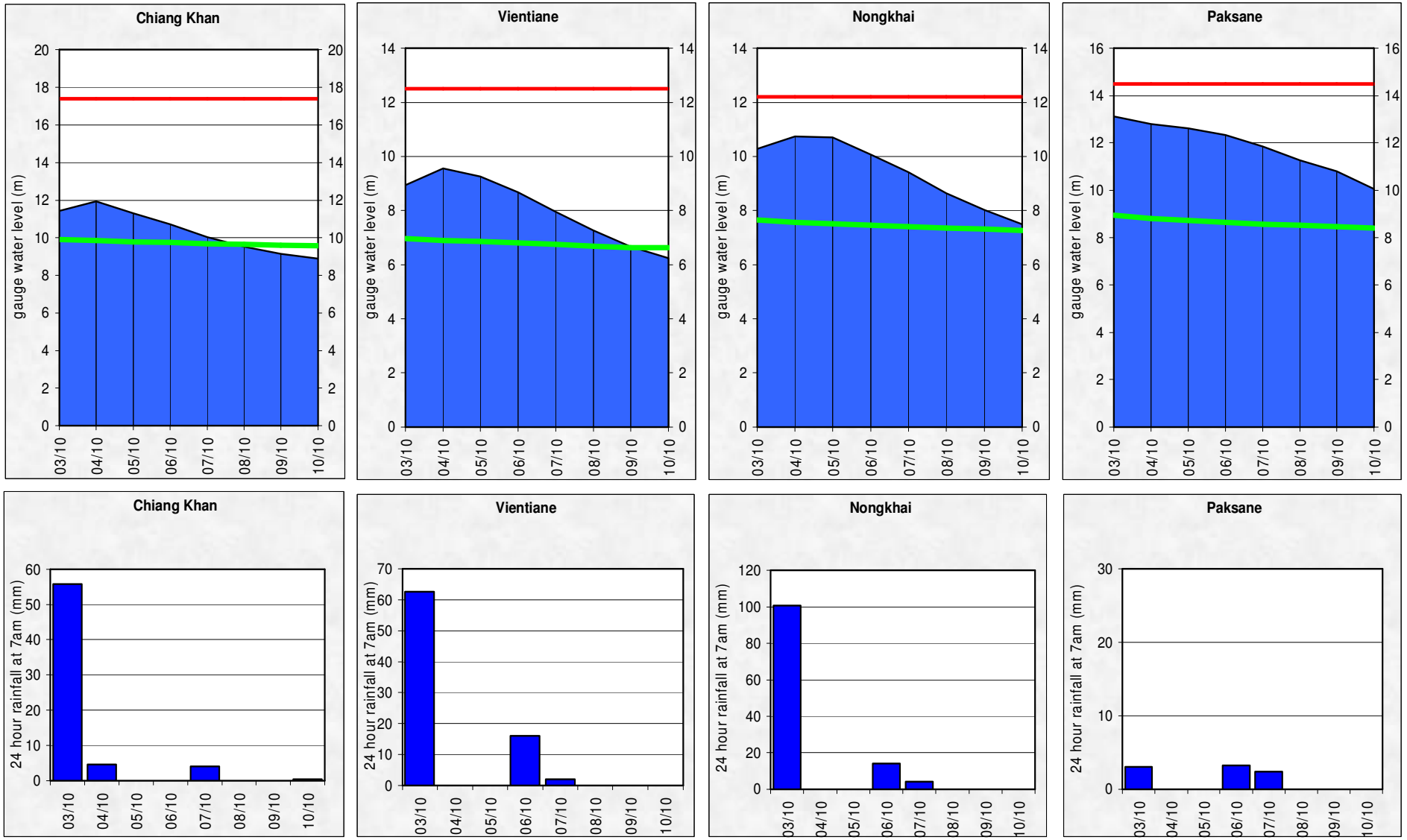


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

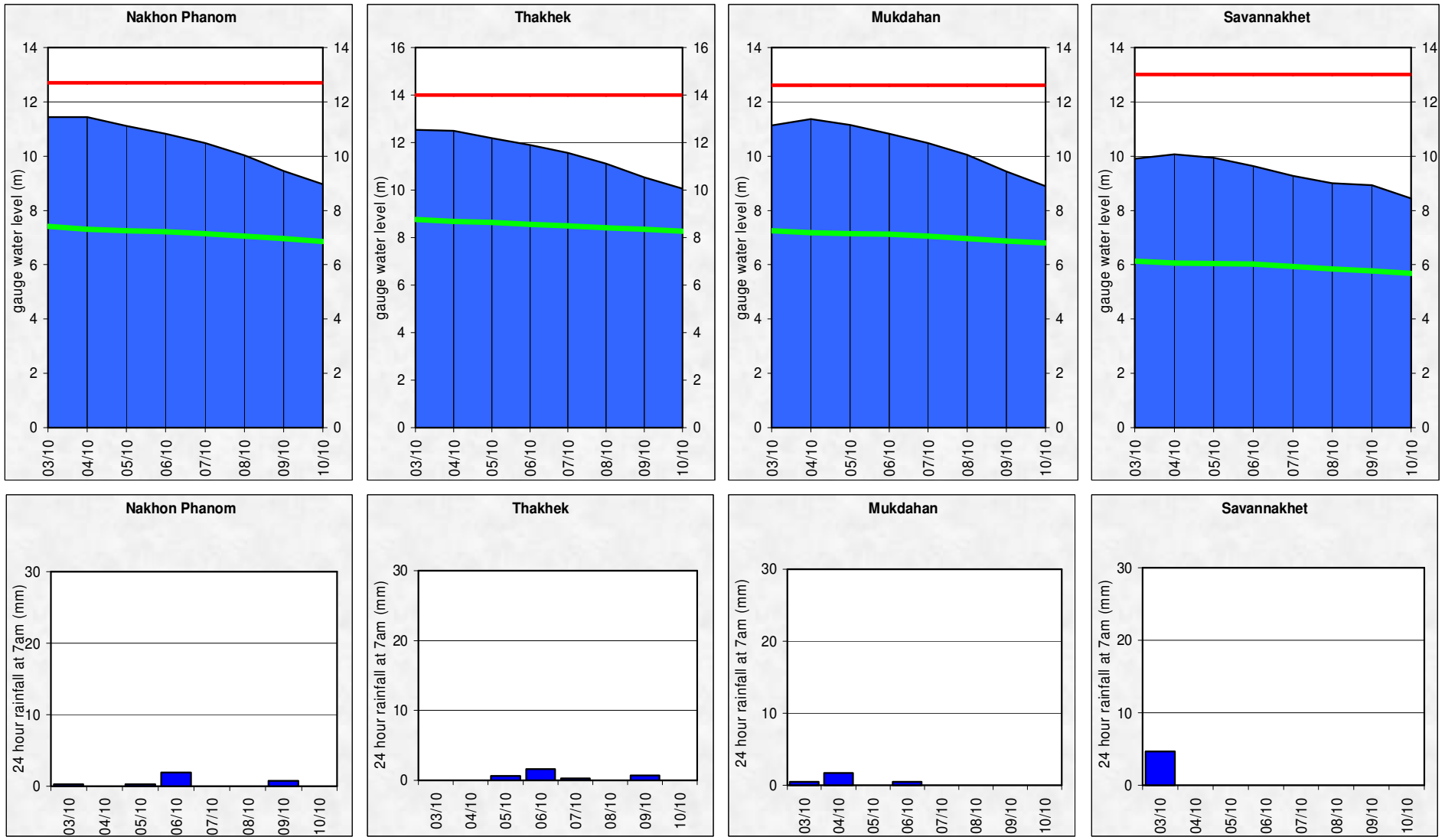


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

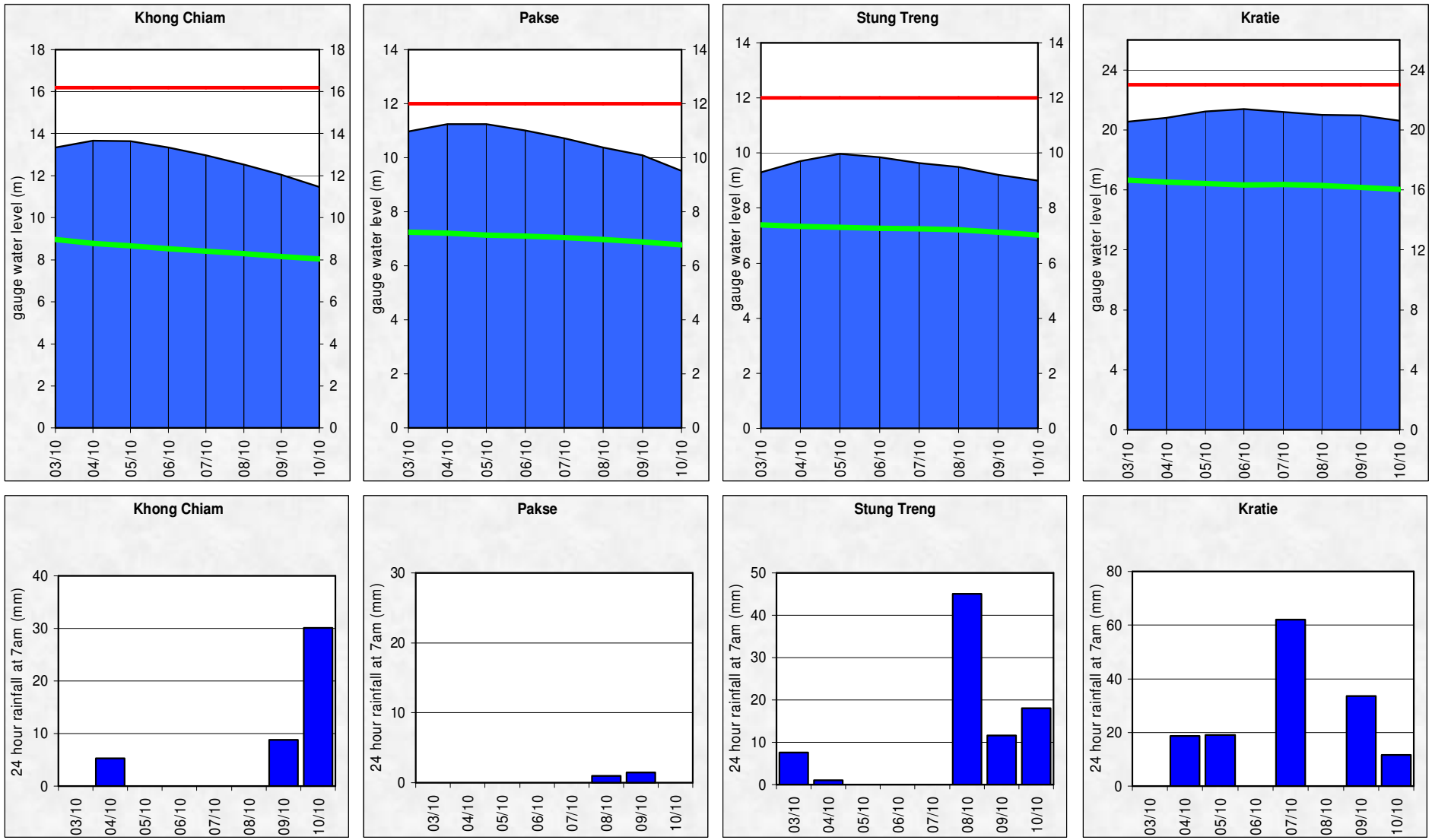


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

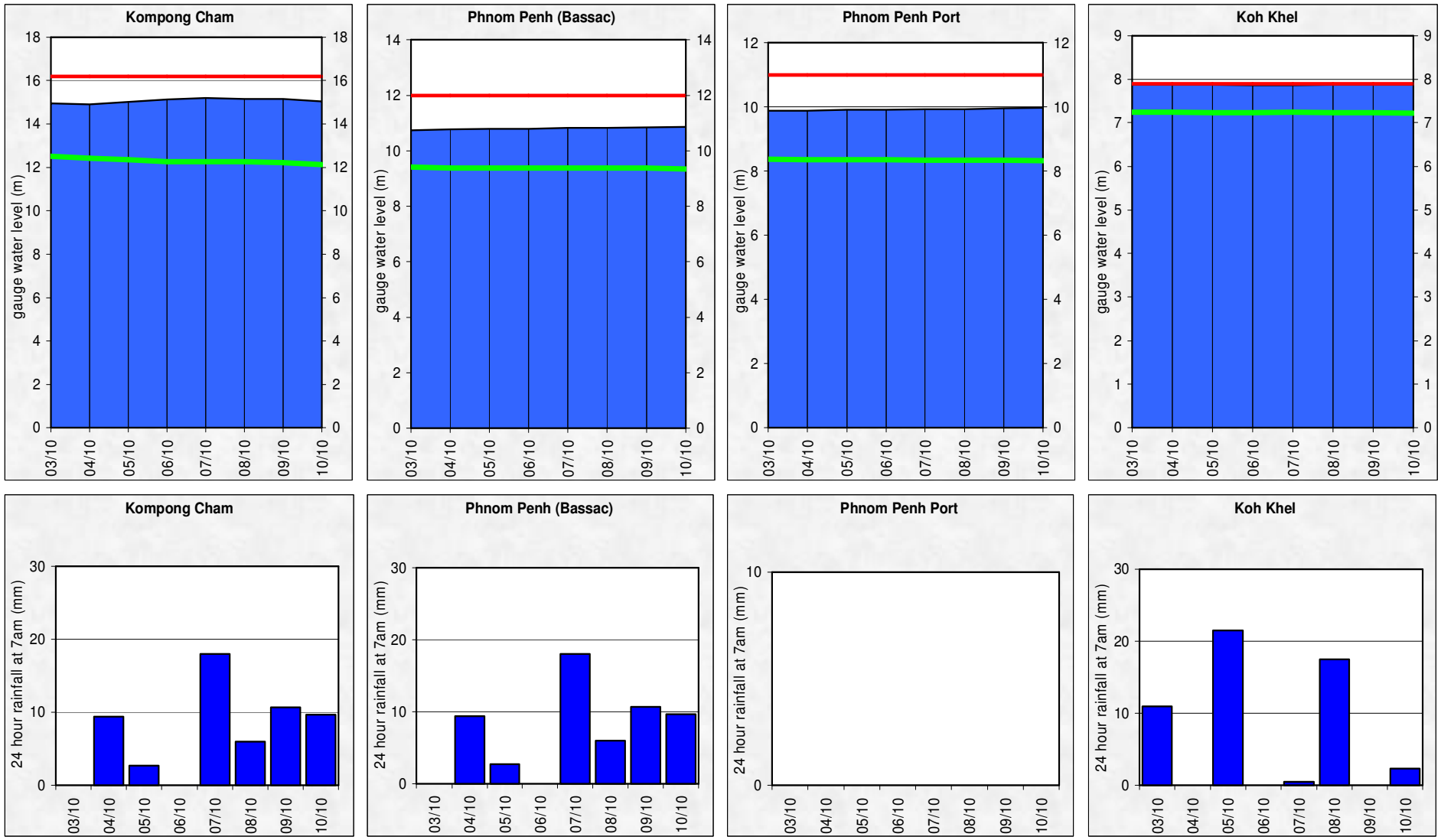
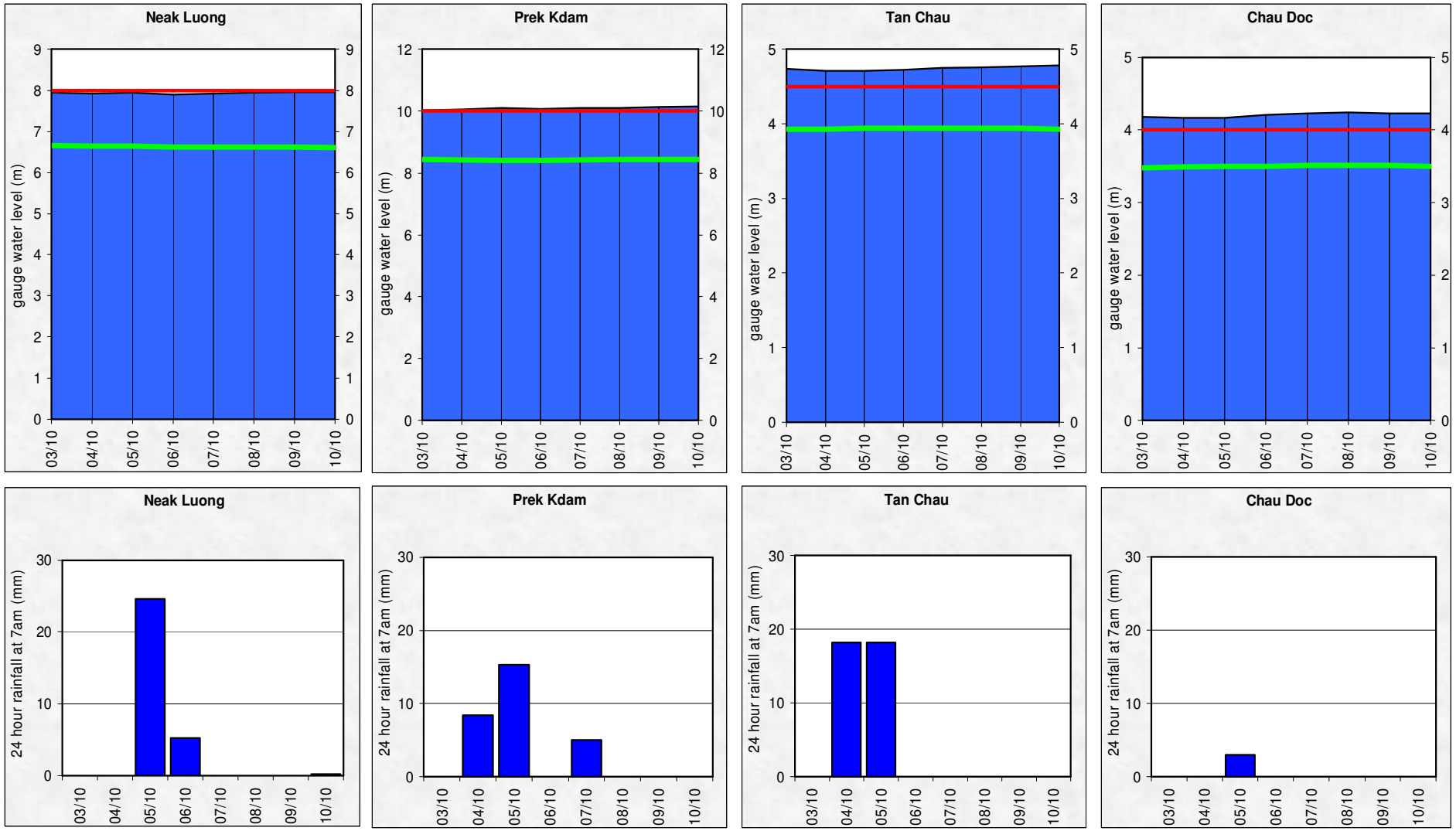


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

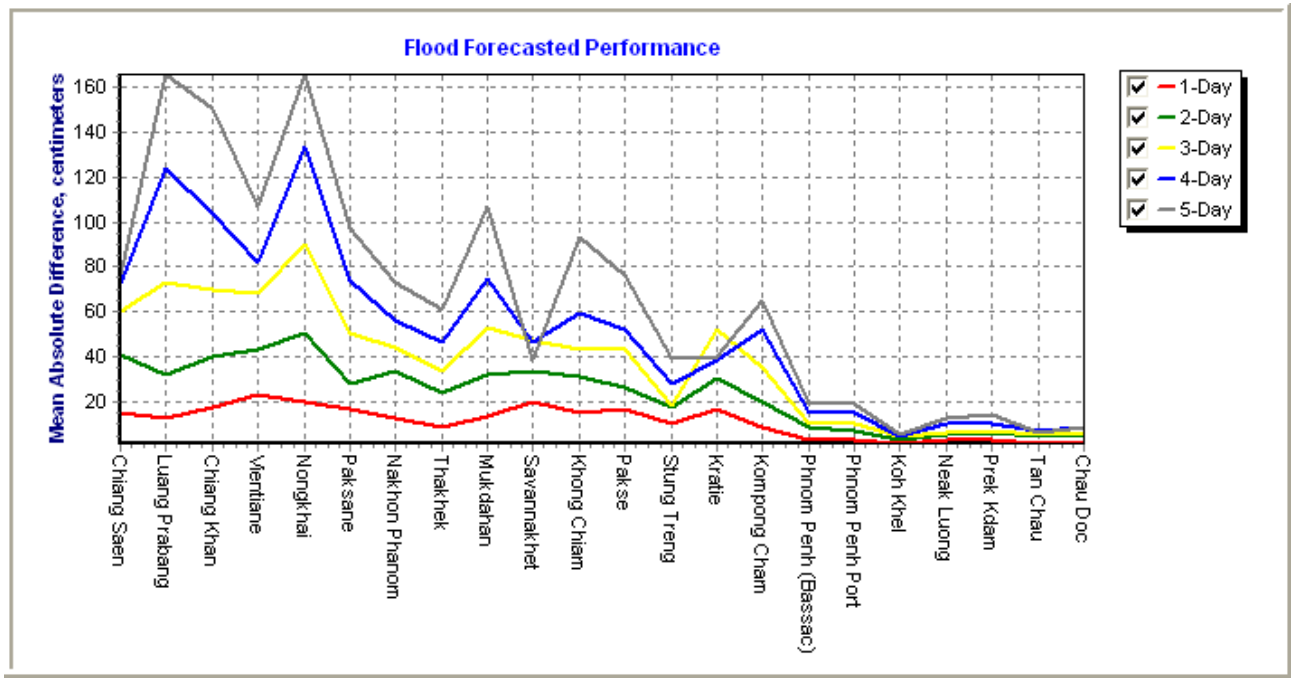
Accuracy

"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 good for 1-day and 2-day forecast lead time at most stations; however accuracies at stations Luang Prabang and Nongkhai for 4-day to 5-day forecast were less than expected.

The above differences due to 2 main factors: (1) internal model functionality in forecasting for middle reach of the LMB in taking into account flow contribution from tributaries, for which the parameter adjustment in the model is not possible; (2) the adjustment by flood forecaster-in-charge at those stations.

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: Achievement of daily forecast against benchmarks unit in %

	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	85.7	100.0	71.4	42.9	14.3	42.9	28.6	85.7	57.1	28.6	28.6	28.6	42.9	42.9	71.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	***66.9***
2-day	66.7	83.3	50.0	33.3	16.7	33.3	33.3	50.0	33.3	33.3	50.0	66.7	83.3	50.0	83.3	66.7	66.7	100.0	100.0	83.3	100.0	100.0	***62.9***
3-day	20.0	20.0	20.0	20.0	0.0	20.0	20.0	40.0	20.0	20.0	40.0	40.0	60.0	0.0	20.0	40.0	40.0	100.0	60.0	80.0	100.0	100.0	***40.0***
4-day	50.0	0.0	0.0	25.0	0.0	50.0	50.0	75.0	0.0	50.0	50.0	75.0	75.0	75.0	50.0	50.0	100.0	100.0	100.0	100.0	75.0	100.0	***56.8***
5-day	33.3	0.0	0.0	33.3	0.0	0.0	0.0	66.7	0.0	66.7	0.0	0.0	66.7	66.7	33.3	66.7	66.7	100.0	100.0	100.0	100.0	100.0	***45.5***

Table B2: Benchmarks of success (Indicator of accuracy in mean absolute error) Unit in cm

	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 5 days including the current report date

	Flood Forecast: time sent				Arrival time of input data (average)							Missing data (number)						
2011	FF completed and sent (time)	stations without forecast	FF2 completed and sent (time)	Weather information available (number)	NOAA data	China	Cambodia - DHRW	Cambodia - DOM	Lao PDR - DMH	Thailand - DWR	Viet Nam - NCHMF	NOAA data	China	Cambodia - DHRW	Cambodia - DOM	Lao PDR - DMH	Thailand - DWR	Viet Nam - NCHMF
week	*10:18*	*0*	*-*	*7*	*08:09*	*08:08*	*07:33*	*-*	*08:59*	*07:36*	*07:08*	*0*	*0*	*12*	*272*	*102*	*1*	*72*
month	*10:30*	*0*	*-*	*22*	*08:08*	*08:13*	*07:28*	*06:34*	*09:11*	*07:32*	*07:01*	*0*	*0*	*43*	*616*	*497*	*12*	*128*
season	*10:29*	*1*	*-*	*81*	*08:10*	*08:18*	*07:31*	*06:08*	*09:05*	*07:44*	*07:08*	*1*	*16*	*82*	*1486*	*2272*	*34*	*730*

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.

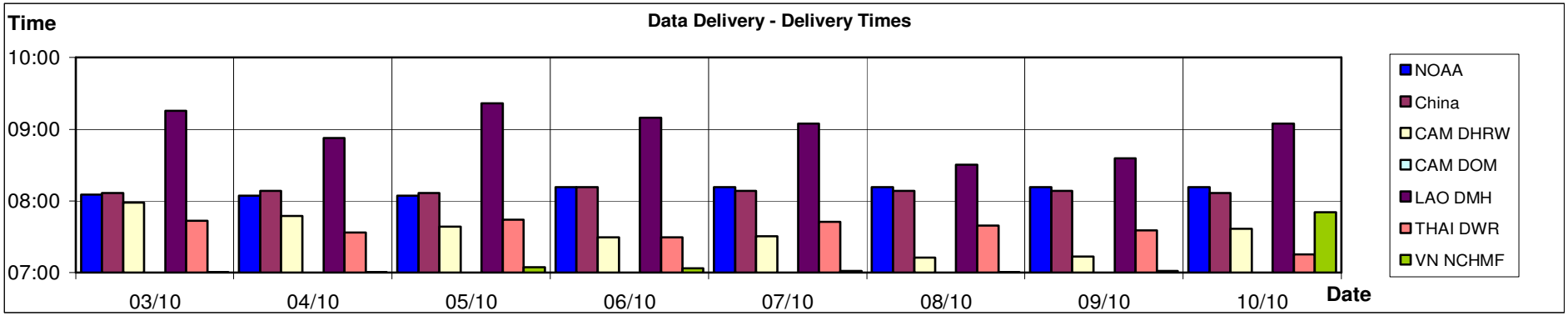


Figure B2: Data delivery times for the past 8 days including the current report date

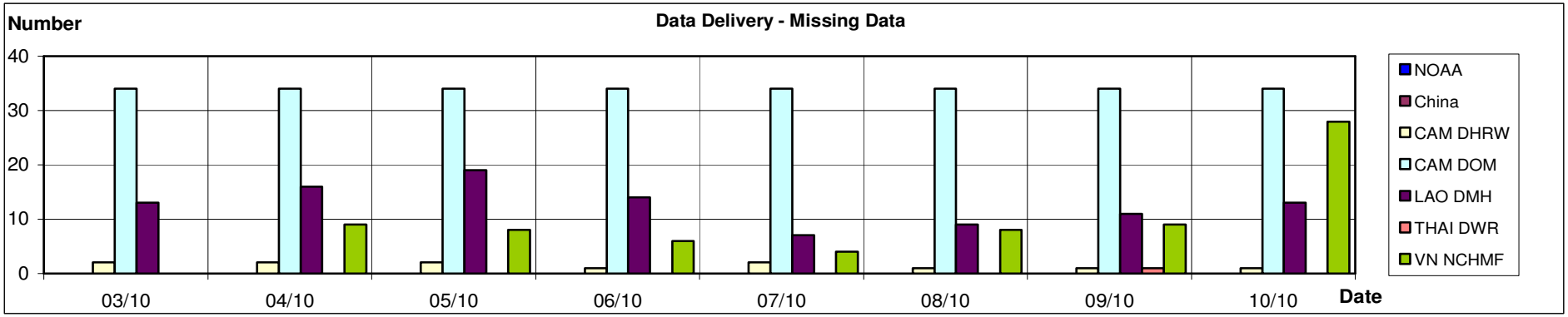


Figure B3: Missing data for the past 8 days including the current report date

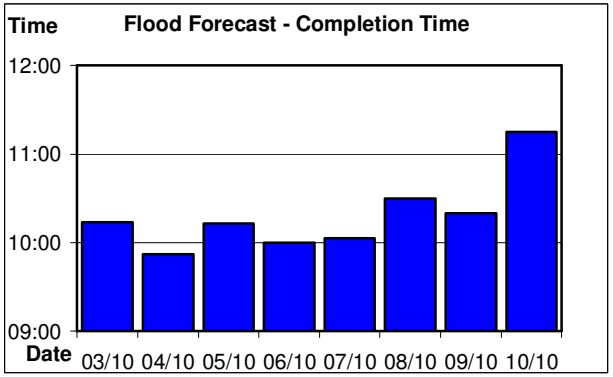


Figure B4: Flood forecast completion time

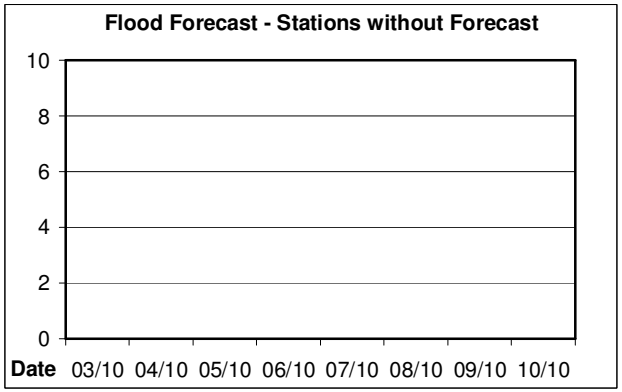


Figure B5: Flood forecast stations without forecast

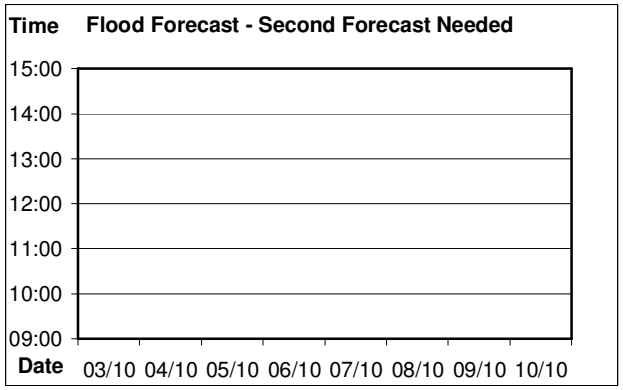


Figure B6: Second forecast needed

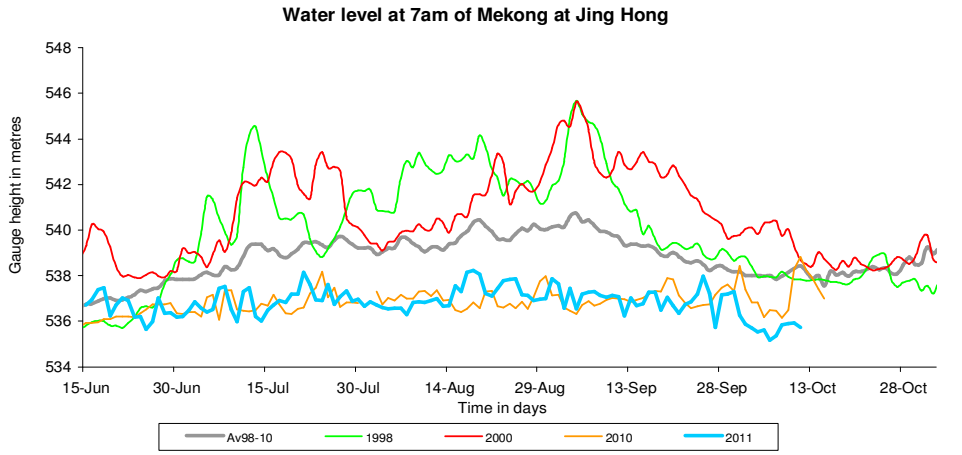
During last week, performance indicators of bulletin delivery (Table B3 and Figure B4) shows that the flood bulletins were disseminated timely to the registered national Line Agencies, MRC website, and other interested users about 10h30 AM which is a prescribed time in the Operational Manual. Some days was later than prescribed time due to the late transfer and complete of data from LA's (Figure B2 shows data delivery time that is over 9h AM) as a result less time was available for adjusting the forecast results..

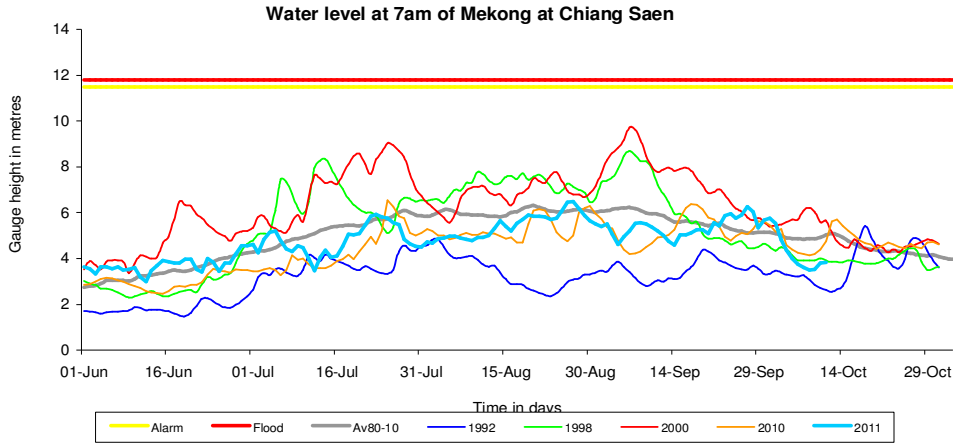
Annex C: Season Water Level Graphs

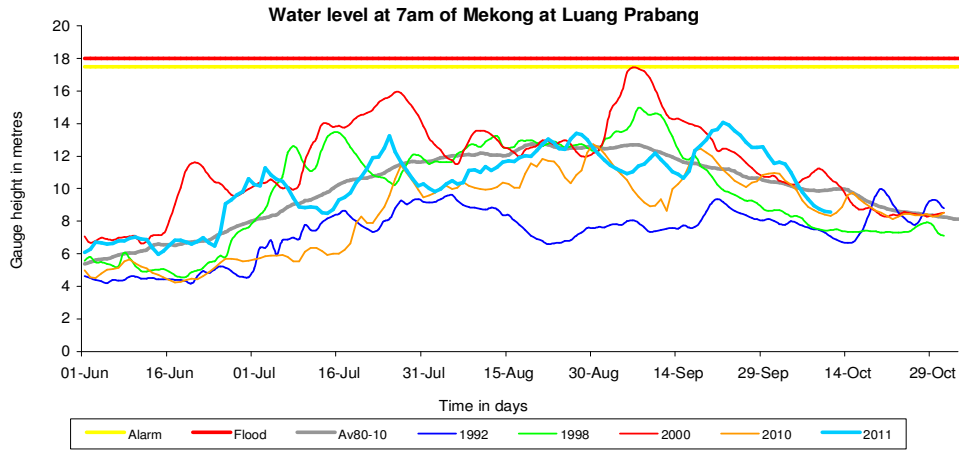
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

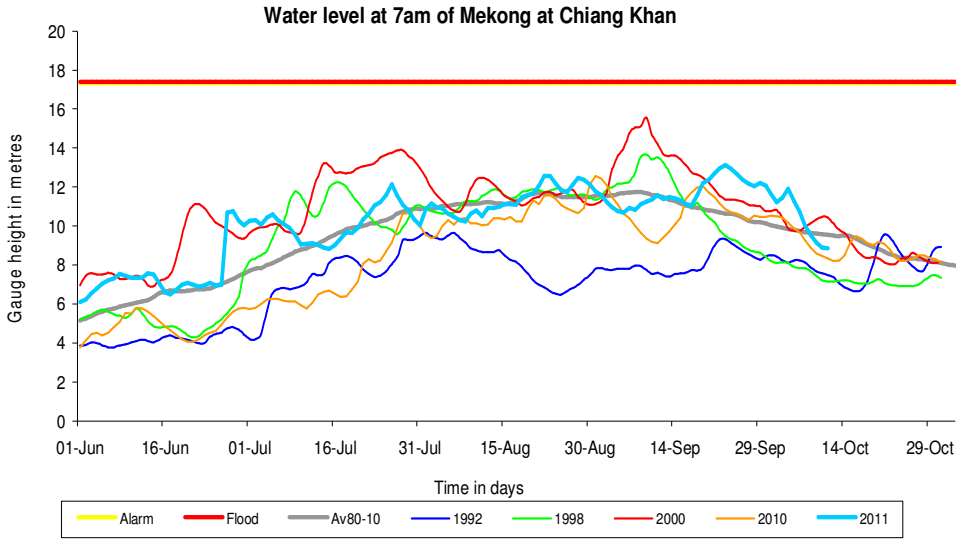
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

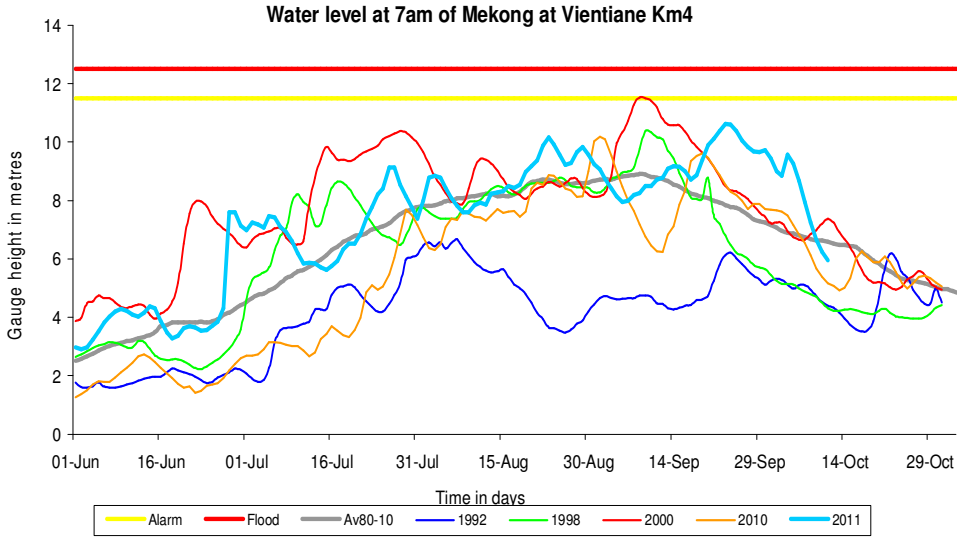
IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

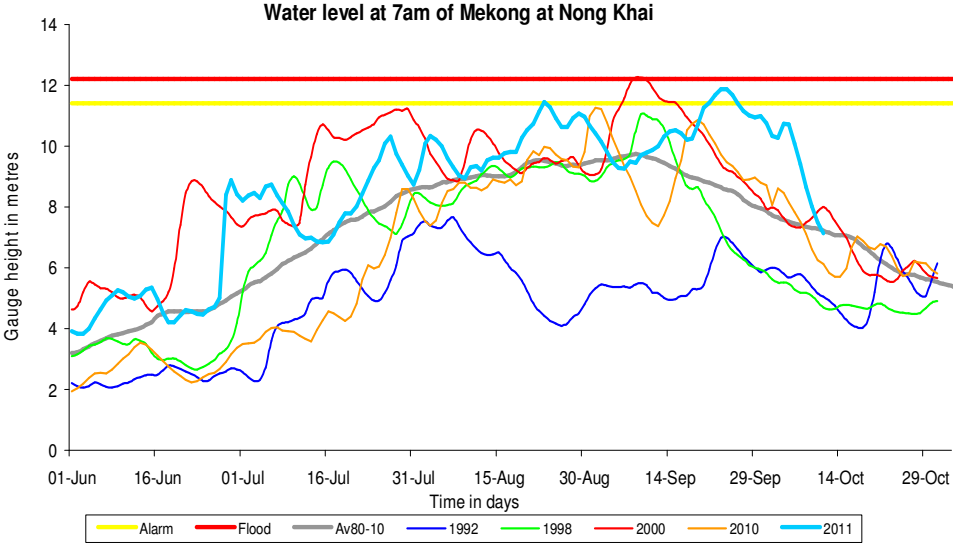


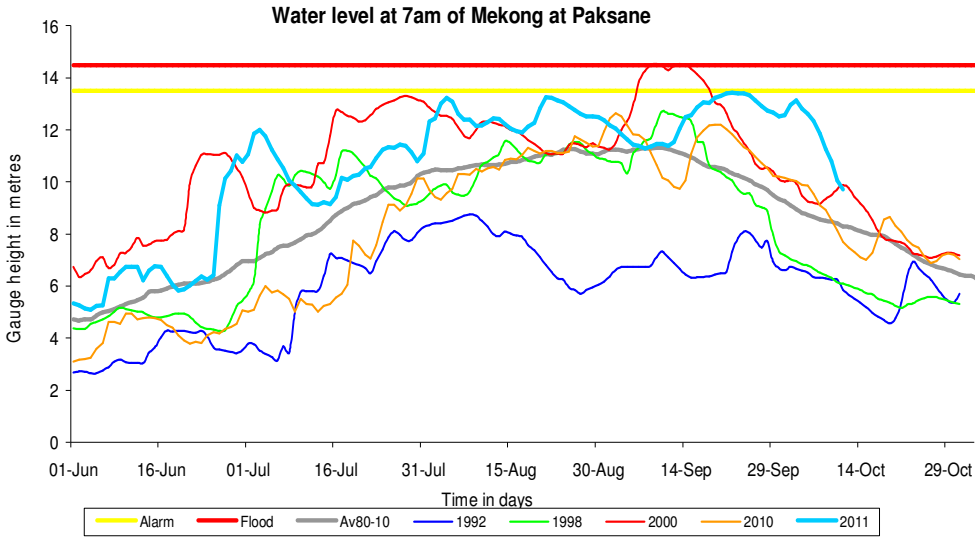


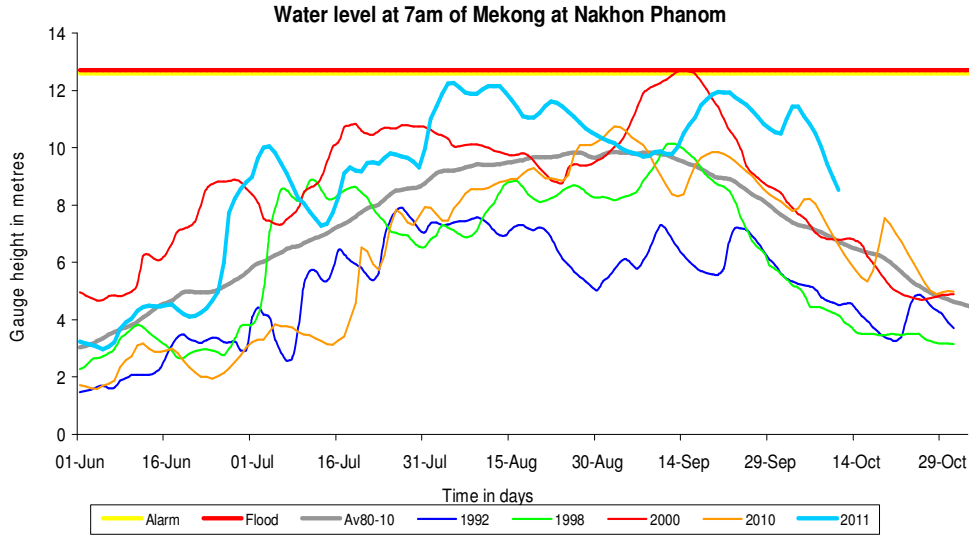


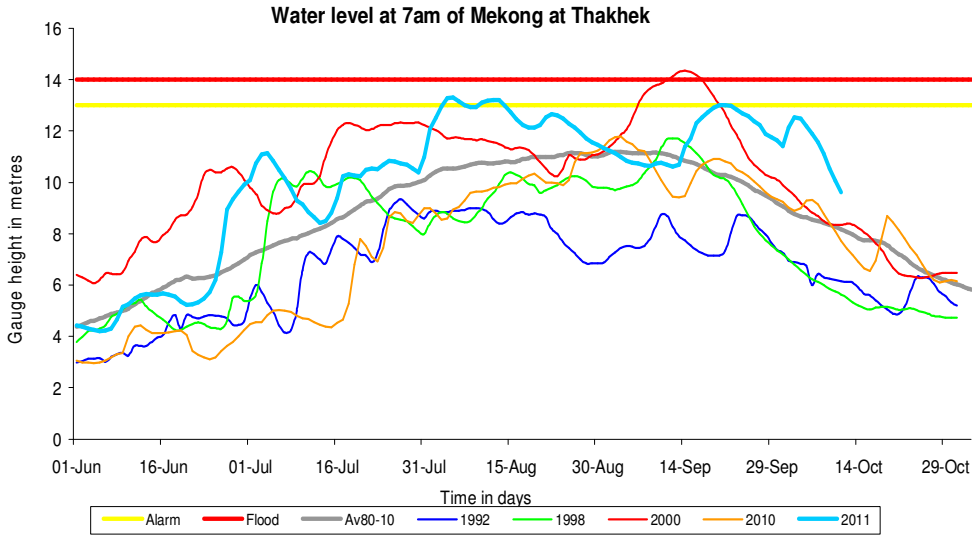

Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
20
18
16
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

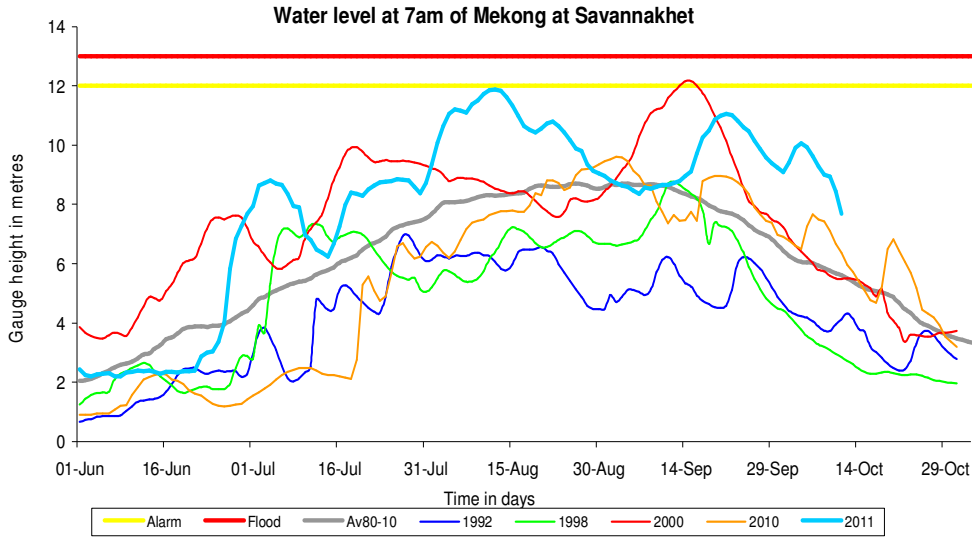

Water level at 7am of Mekong at Vientiane Km4
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

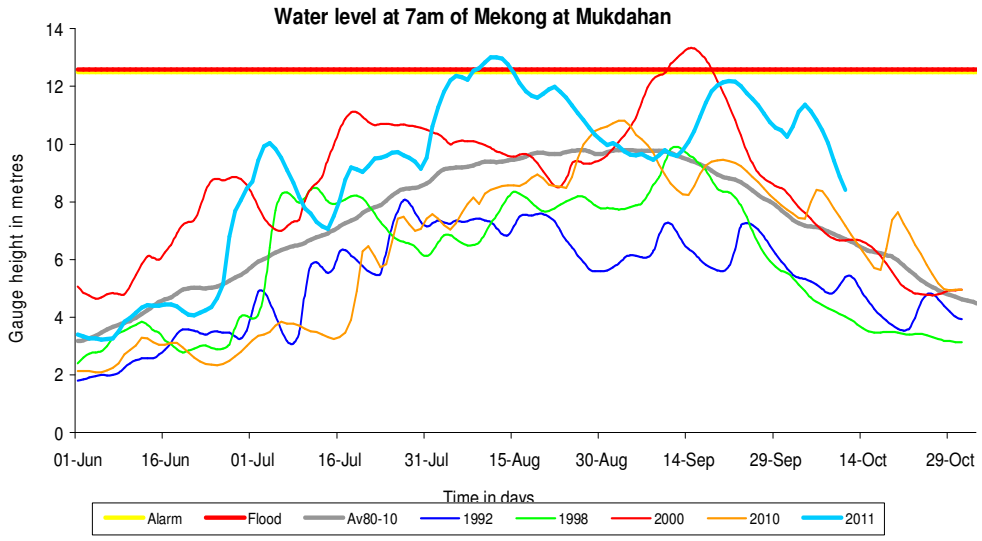

Water level at 7am of Mekong at Nong Khai
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

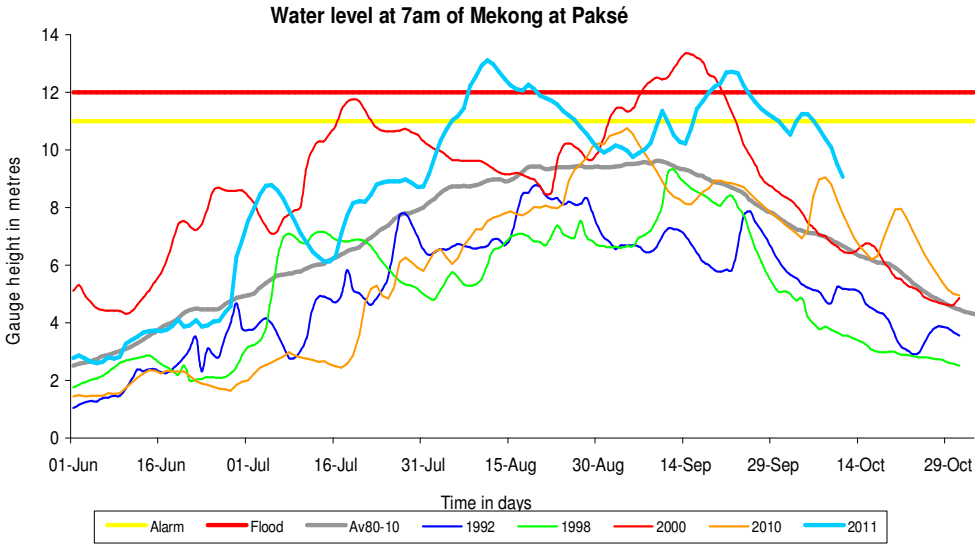

Water level at 7am of Mekong at Paksane
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

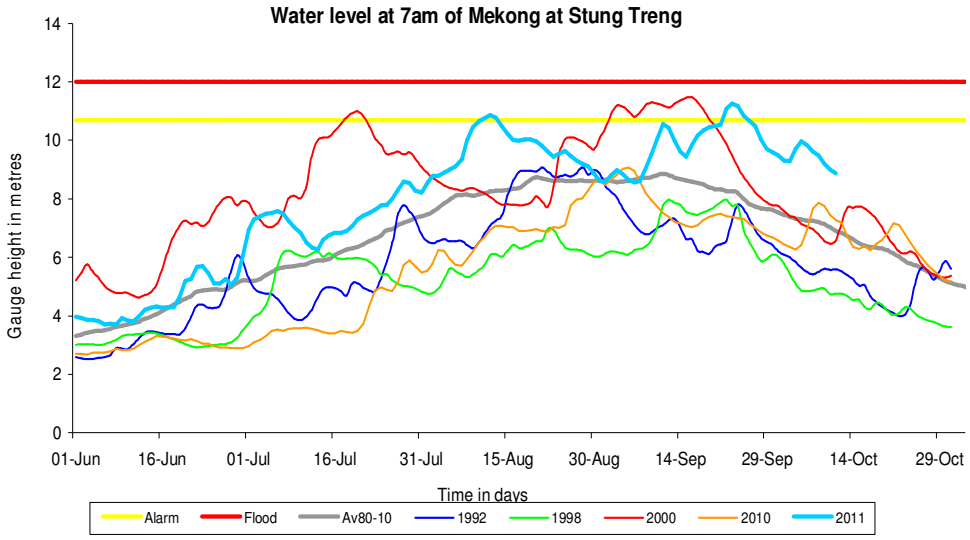

Water level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

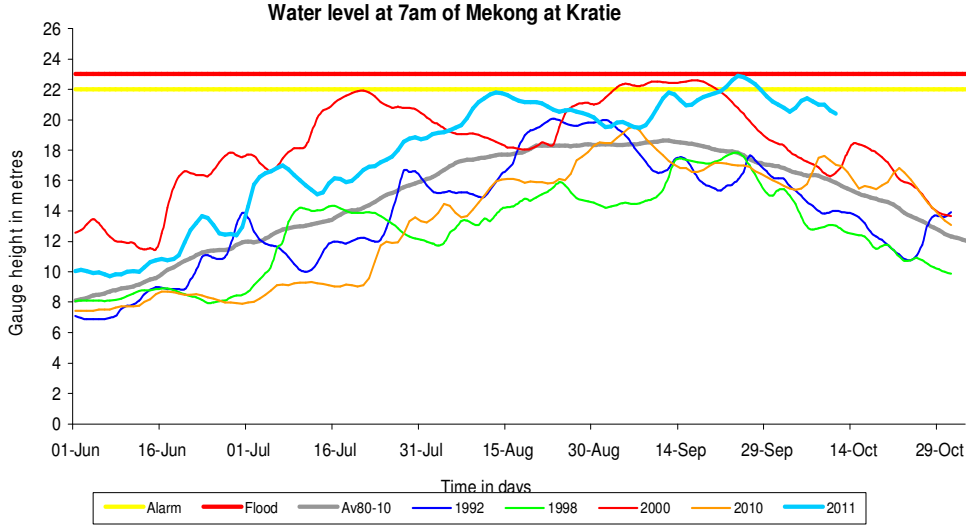

Water level at 7am of Mekong at Thakhek
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

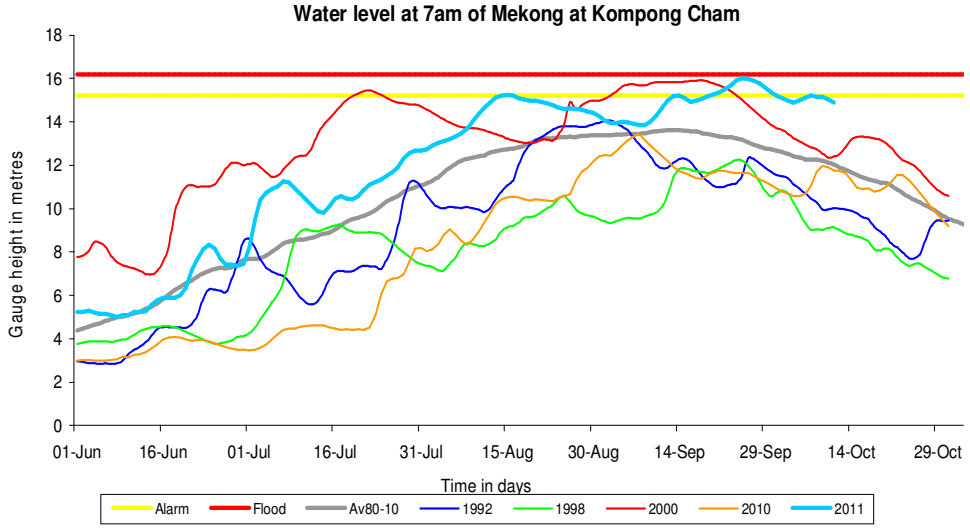

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

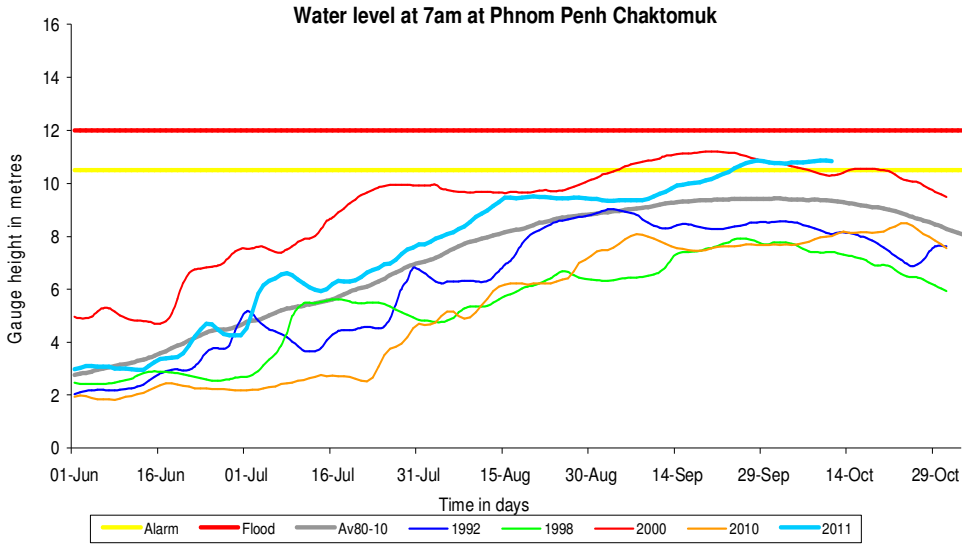

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

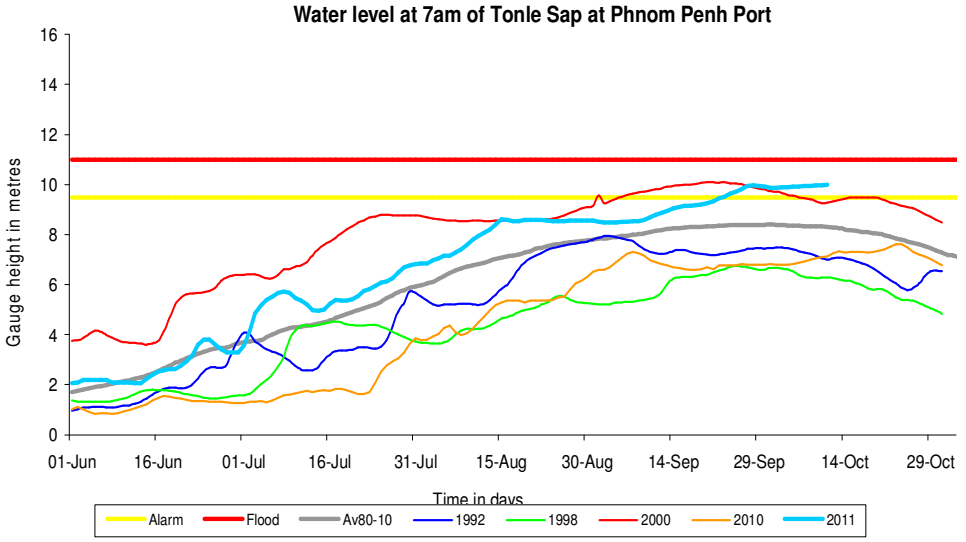

Water level at 7am of Mekong at Paksé
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

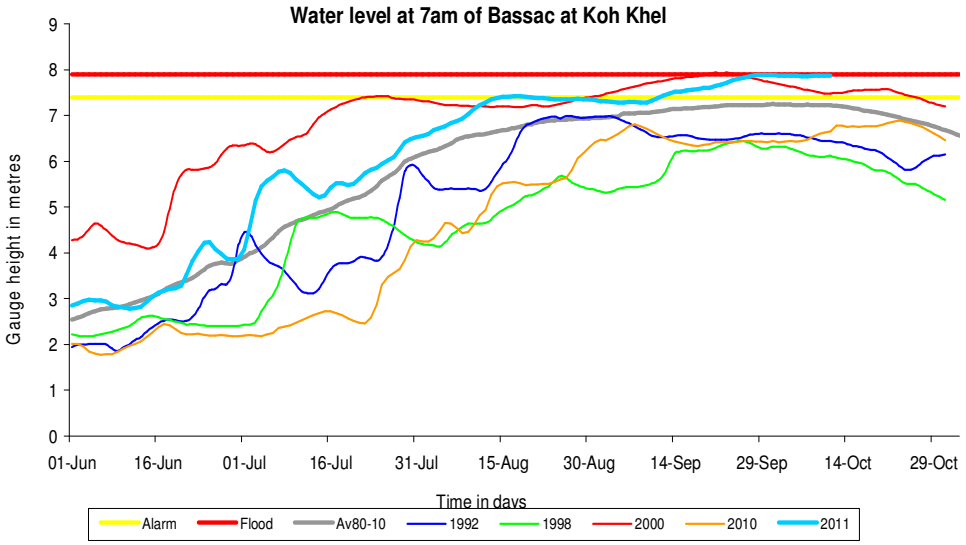

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

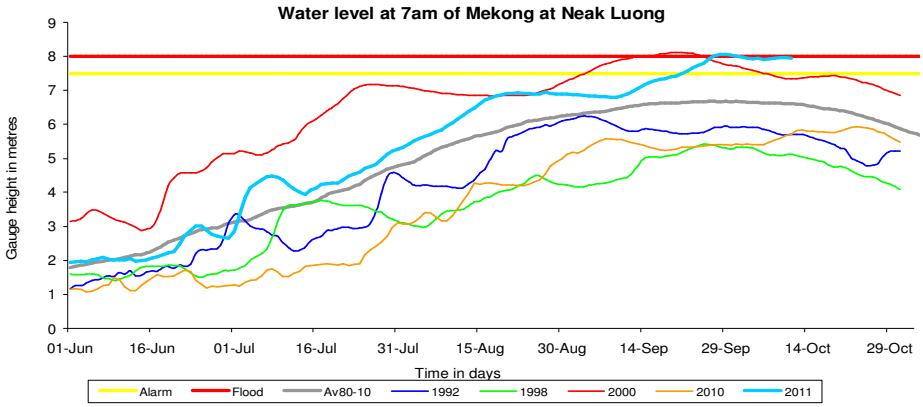

Water level at 7am of Mekong at Kratie
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
20
22
24
26
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

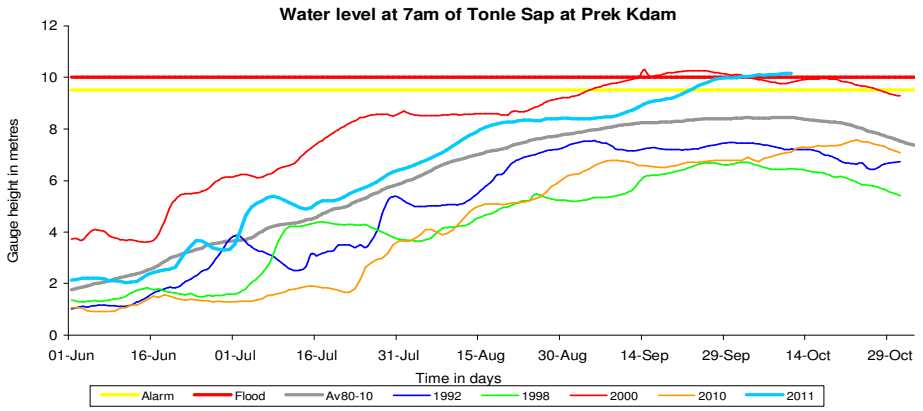

Water level at 7am of Mekong at Kompong Cham
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

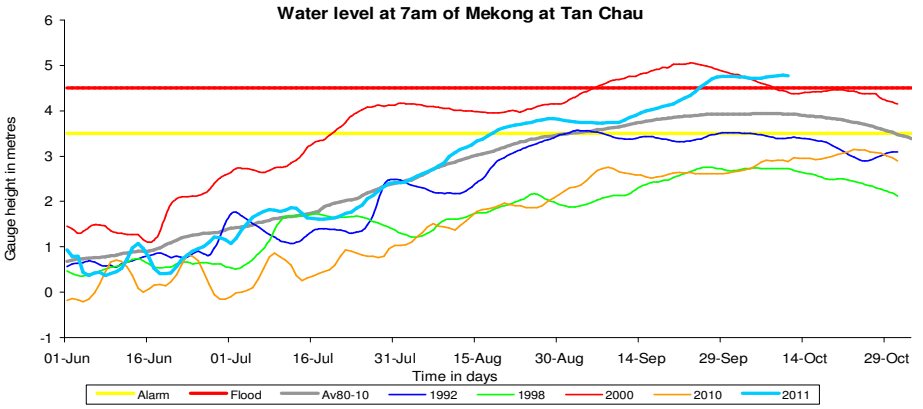

Water level at 7am at Phnom Penh Chaktomuk
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

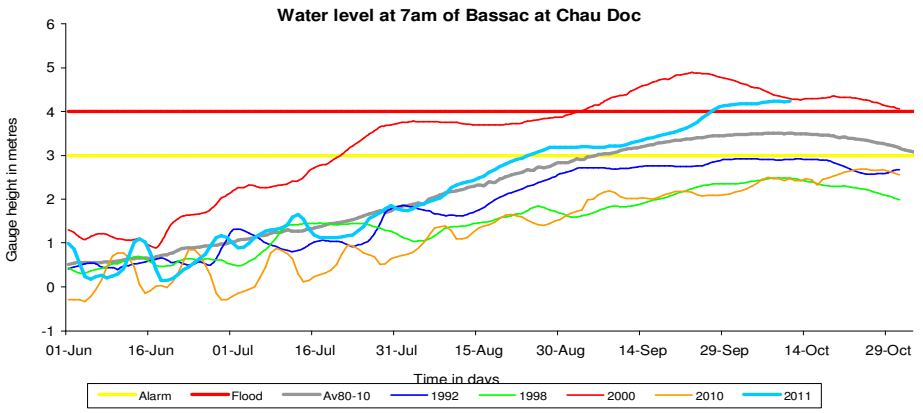

Water level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011


Water level at 7am of Bassac at Koh Khel
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011


Water level at 7am of Mekong at Neak Luong
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011


Water level at 7am of Tonle Sap at Prek Kdam
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011


Water level at 7am of Mekong at Tan Chau
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011


Water level at 7am of Bassac at Chau Doc
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011