Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 08/08/2011, covering the week from the 01st to the 07th August, 2011

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

General weather patterns

During the week of the 01st to the 07th August 2011, four weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 01st August and the 06th August bulletins are presented in the figures below:

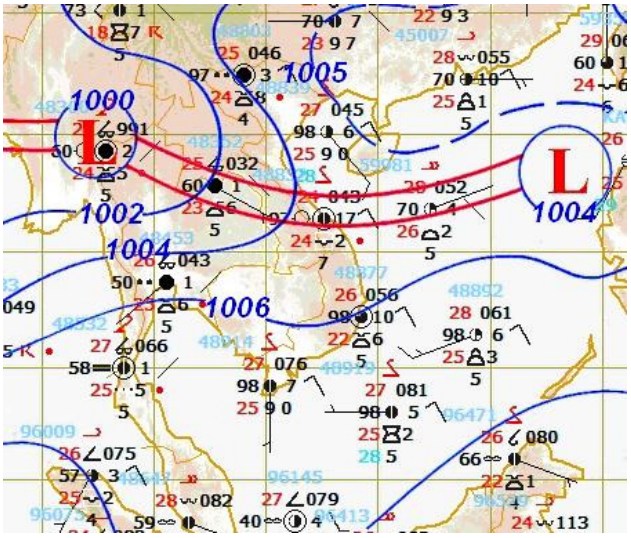


Figure 1: Weather map for 01st August 2011

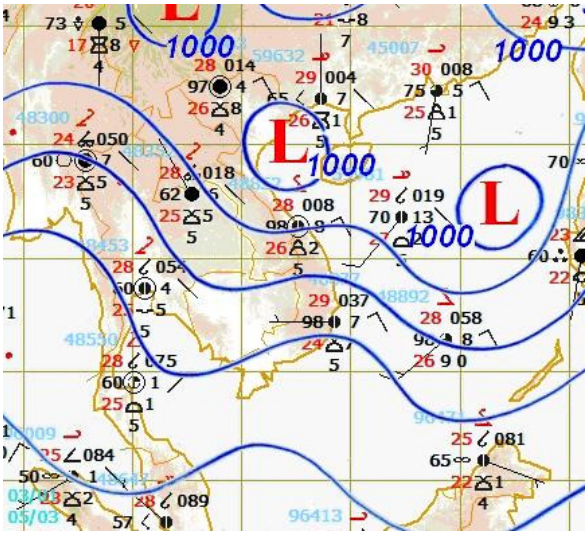


Figure 2: Weather map for 06th August 2011

Strong to week South-West (SW) Monsoon

Strong SW monsoon during the beginning and the mid of the week prevailed over Andaman Sea, Thailand, the Gulf of Thailand and Cambodia (Figure 1). At the end of the week, week SW monsoon prevailed over Andaman Sea at surface (Figure 2).

Inter Tropical Convergence Zone (ITCZ)

ITCZ laid across the upper part of Myanmar, Thailand and Indochina from the beginning to the mid of the week (Figure 1).

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

No Tropical Depression, Tropical Storm or Typhoon has significant affected to the LMB in last week.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Over weather situation

A normal weather situation lasted during last week. As the result of appearances of strong SW monsoon, ITCZ in the first half of the week and low pressure trough laid across Lao PDR and Viet Nam in the end of the week, isolated heavy rain occurred in the North and the Central of Thailand, Lao PDR, Viet Nam and Southwest of Myanmar. Figure 3 illustrates rainfall amount distribution over the LMB, covering last week. During last week, heavy rain mostly occurred in the middle part of LMB particularly in the left bank tributaries of Lao PDR. The amounts of rainfall were recorded at Thakhek (307mm); at Mahaxai (708.6mm).

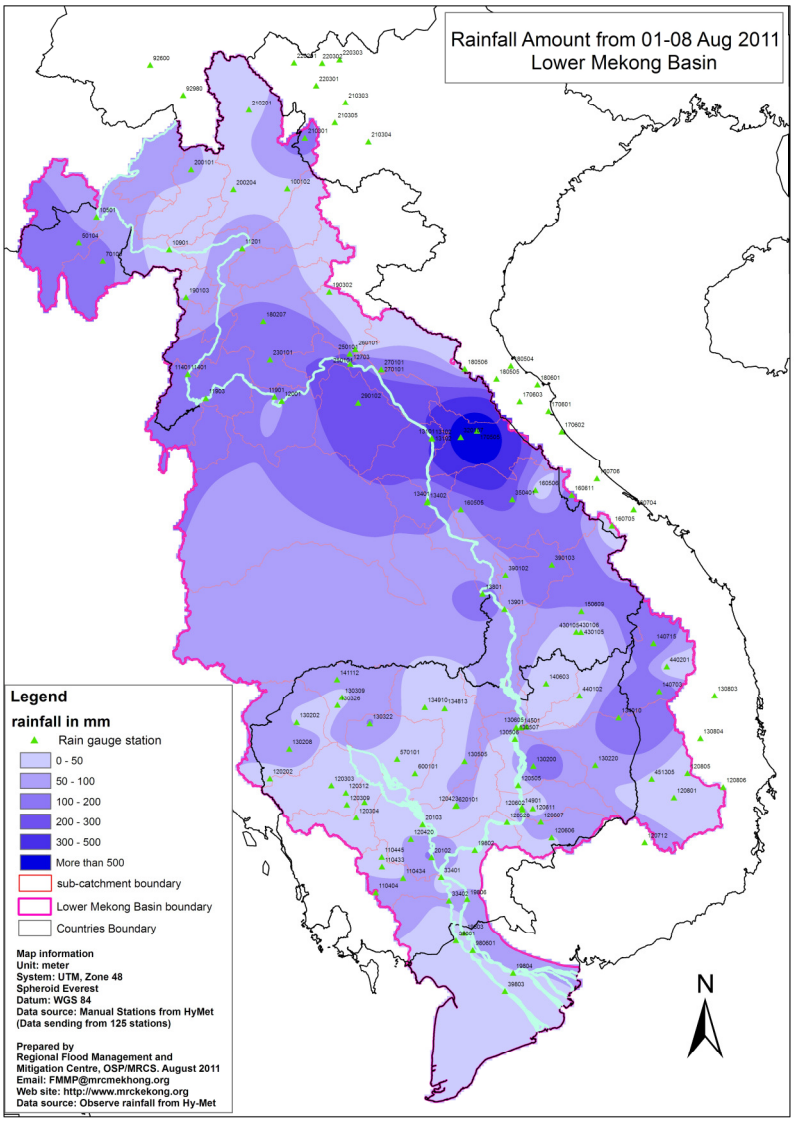


Figure 3: Rainfall distribution over the LMB, covering the week 01 – 07 August, 2011

General behaviour of the Mekong River

There is an inconsistency of water level along the Mekong River during the reporting period. In the middle reach of LMB, while water levels at stations from Paksane to Thakhek/Nakon Phanom show a rising and falling trend, water levels at station from Savannakhet/Mukdahan to Strung Treng were rising toward the end of the week. Water levels at stations in the lower reach from Kratie to Phnom Penh Port/Pnom Penh Bassac show a slightly rising trend by strong SW affect and water rising from upstream during last week.

Regarding to two stations in downstream at Tan Chau and Chau Doc, water levels at those two stations were fluctuated by tidal with slightly increasing trend in the monitoring period.

For stations from Chiang Saen to Vientiane/Nong Khai

Water level at Chiang Saen and Luang Prabang were more-or-less stable during last week and two stations were recording levels that are somewhat below the long-term average. Water levels at stations Chiang Khan, Vientiane/Nong Khai were rising at the beginning of the week and falling toward the end of the week. Water levers at these stations were somewhat around and above the long-term average for this time of the year.

For stations Paksane to Thakhek/Nakon Phanom

Water levels at Paksane, Nakon Phanon and Thakhet were rising in the first half of the week then slightly falling from 04th August to the end of the week. These stations were recording levels that are above the long-term average for this time of the year in which water level at Thakhek reached alarm situation during the 4th and 7th August.

For stations Savannakhet/Mukdahan to Pakse

Water levels at these stations showed a rising trend in the monitoring period and were above the long-term average for this time of the year. Water level in the middle reach of LMB has reached alarm stage at Mukdahan and flood stage at Pakse since 08 August.

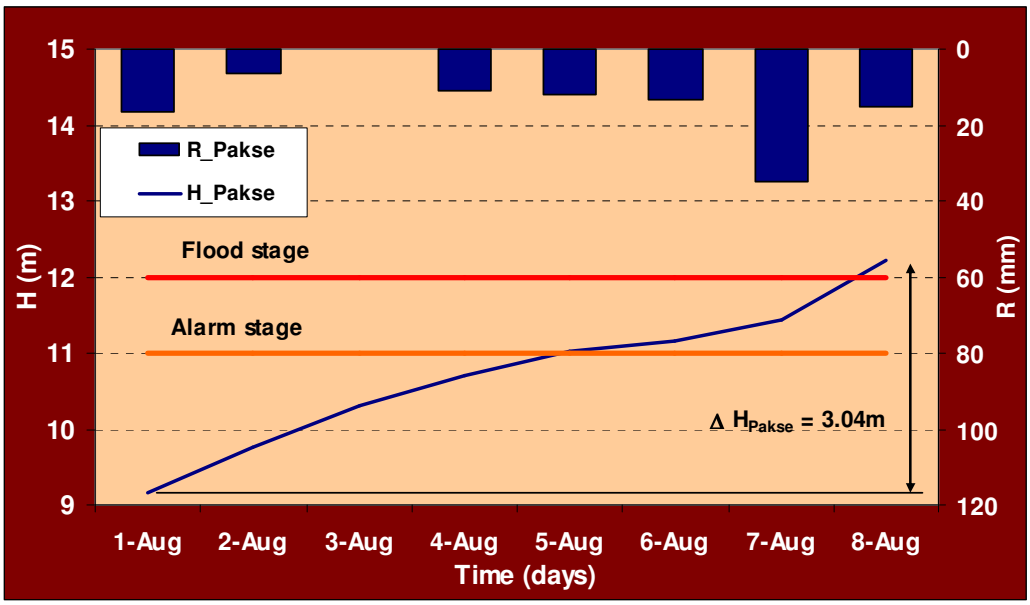


Figure 4: Water level at Pakse has reached flood stage since 08 August, 2011

Water levels at stations on the left bank tributaries of Lao PDR such as at Khong Sedon and Saravanne of Sedon river, at Veun Khen of Sekong river rose up quickly from 05 – 07 August (Figure 5).

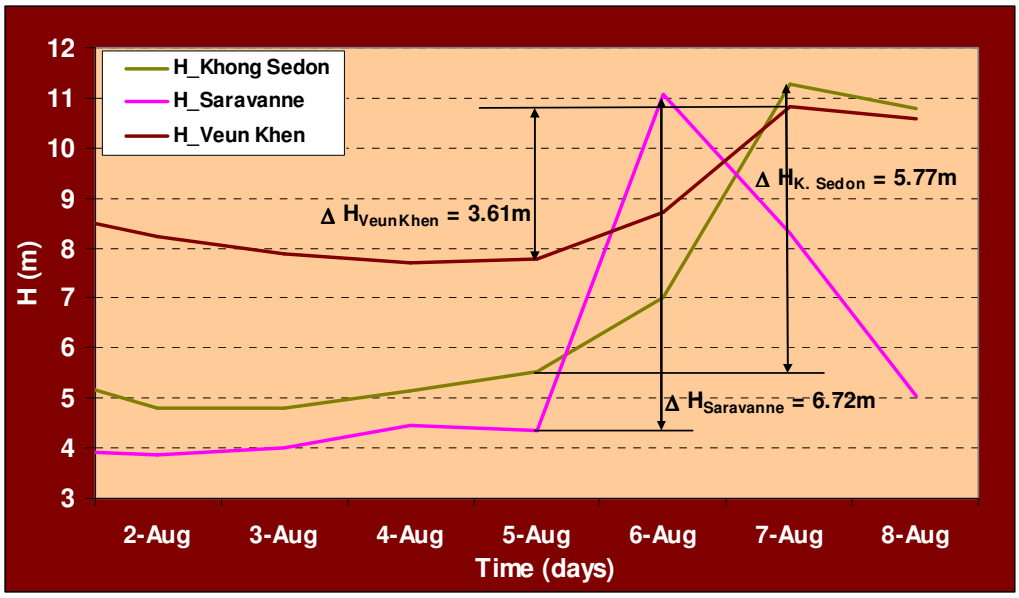


Figure 5: Rapidly increasing of water levels at stations on tributaries: Sedon at Khong Sedon and Saravanne, Sekong at Veukhen

For stations from Strung Treng to Phnom Penh Port/ Phnom Penh Bassac

Water levels were slightly rising during last week. These stations were recording levels that are above the long-term average for this time of the year.

Tan Chau and Chau Doc

Water levels were slightly rising till the end of the week. Both stations were recording levels that are around the long-term average for this time of the year and significantly affected by tidal.

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

Flood Situation

- Flood stage or alarm stage:
  - The Mekong reached alarm situation at Thakhek from the 04th to the 07th August and Pakse from the 05th to the 07th August, 2011.
  - The Mekong has reached alarm stage at Mukdahan, flood stage at Pakse since the 08th August and is expected to reach flood stage at Mukdahan, alarm stage at Strung Treng on the 10th August, 2011.
- Damage or victims:

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

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
01/08	536.85	4.72	10.04	10.86	8.00	9.22	12.32	11.00	12.10	10.60	9.36	11.01	9.17	8.35	18.79	12.73	7.70	7.08	6.56	5.32	6.46	2.41	1.76
02/08	536.71	4.69	9.82	11.16	8.77	10.07	12.44	11.44	12.50	11.29	10.08	11.97	9.77	8.78	19.04	12.91	7.80	6.86	6.60	5.42	6.54	2.43	1.74
03/08	536.60	4.86	10.00	10.96	8.85	10.32	13.00	11.89	12.95	11.80	10.64	12.56	10.33	8.78	19.15	13.04	7.92	6.98	6.68	5.51	6.61	2.50	1.79
04/08	536.56	4.88	10.28	10.89	8.77	10.21	13.24	12.24	**13.29**	12.22	11.05	13.02	10.70	8.90	19.20	13.11	8.00	7.06	6.73	5.59	6.69	2.56	1.86
05/08	536.58	4.97	10.50	10.64	8.44	10.00	13.08	12.25	**13.30**	12.37	11.21	13.35	**11.02**	9.00	19.32	13.21	8.09	7.14	6.77	5.64	6.77	2.61	1.90
06/08	536.57	4.98	10.32	10.46	8.09	9.60	12.62	12.11	**13.16**	12.32	11.16	13.51	**11.17**	9.12	19.47	13.33	8.16	7.17	6.84	5.70	6.87	2.66	1.94
07/08	536.29	4.88	10.38	10.30	7.82	9.30	12.38	11.94	**13.00**	12.24	11.10	13.75	**11.44**	9.36	19.66	13.48	8.26	7.28	6.88	5.78	6.97	2.71	1.98
08/08	536.83	4.84	11.12	10.24	7.60	9.04	12.08	11.89	12.94	**12.54**	11.39	14.67	**12.21**	10.00	20.12	13.67	8.38	7.42	6.94	5.84	7.07	2.78	2.04
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
01/08	6.0	9.00	nr	66.0	3.7	54.3	23.8	18.1	18.4	55.5	36.8	3.4	16.7	113.5	nr	0.2	9.6		2.7	nr	nr	14.9	21.0
02/08	nr	9.3	33.6	31.0	39.0	8.3	45.2	86.5	102.4	15.6	25.1	9.1	6.4	3.5	6.4	2.5	3.8		18.0	9.6	nr	12.6	5.0
03/08	nr	9.0	12.0	46.5	41.0	23.9	89.3	82.4	71.9	3.6	2.3	8.3	0.2	11.5	nr	2.3	6.3		12.5	33.6	nr	nr	
04/08	7.6	1.9	10.8	nr	19.6	9.9	38.2	12.2	13.3	2.4	nr	9.0	11.0	0.0	5.6	nr	17.0		nr	nr	12.5	13.4	21.2
05/08	7.0	0.4	nr	nr	nr	nr	nr	0.1	nr	1.0	nr	1.5	12.1	3.5	2.6	nr	nr		nr	nr	19.3	nr	nr
06/08	3.0	23.5	29.0	nr	nr	nr	0.2	71.5	68.0	11.2	14.2	27.3	13.5	nr	nr	10.0	0.8		0.0	nr	7.5	nr	nr
07/08	10.0	23.2	9.0	3.1	nr	nr	21.1	8.2	15.5	51.1	24.8	52.2	34.8	4.5	6.0	4.2	2.9		21.5	15.6	24.3	0.0	nr
08/08	nr	17.5	24.0	0.3	nr	4.4	33.3	15.3	17.5	54.7	73.7	9.5	15.3	5.5	1.2	1.3	2.2		0.0	nr	40.4	0.0	4.1

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

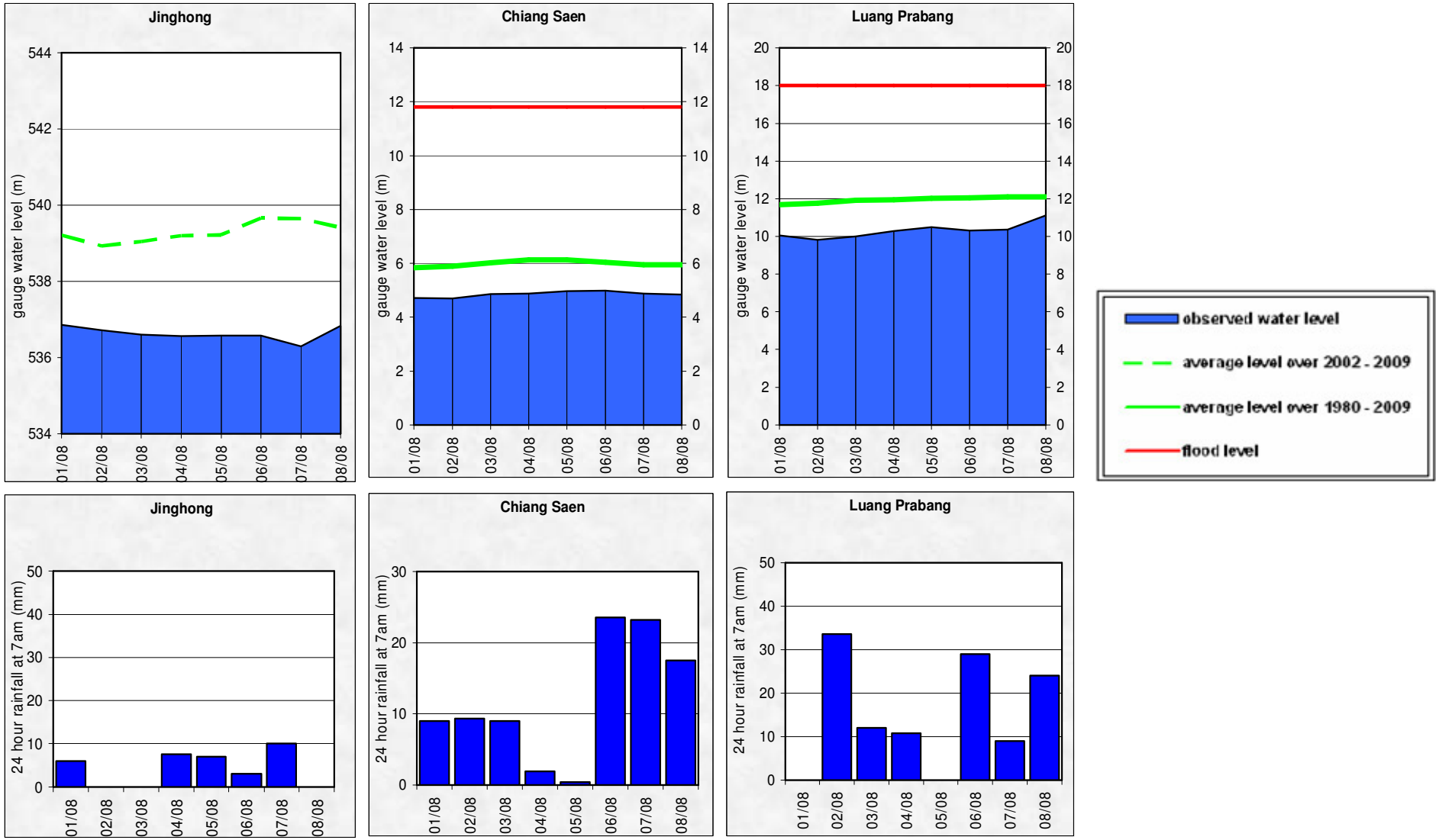


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

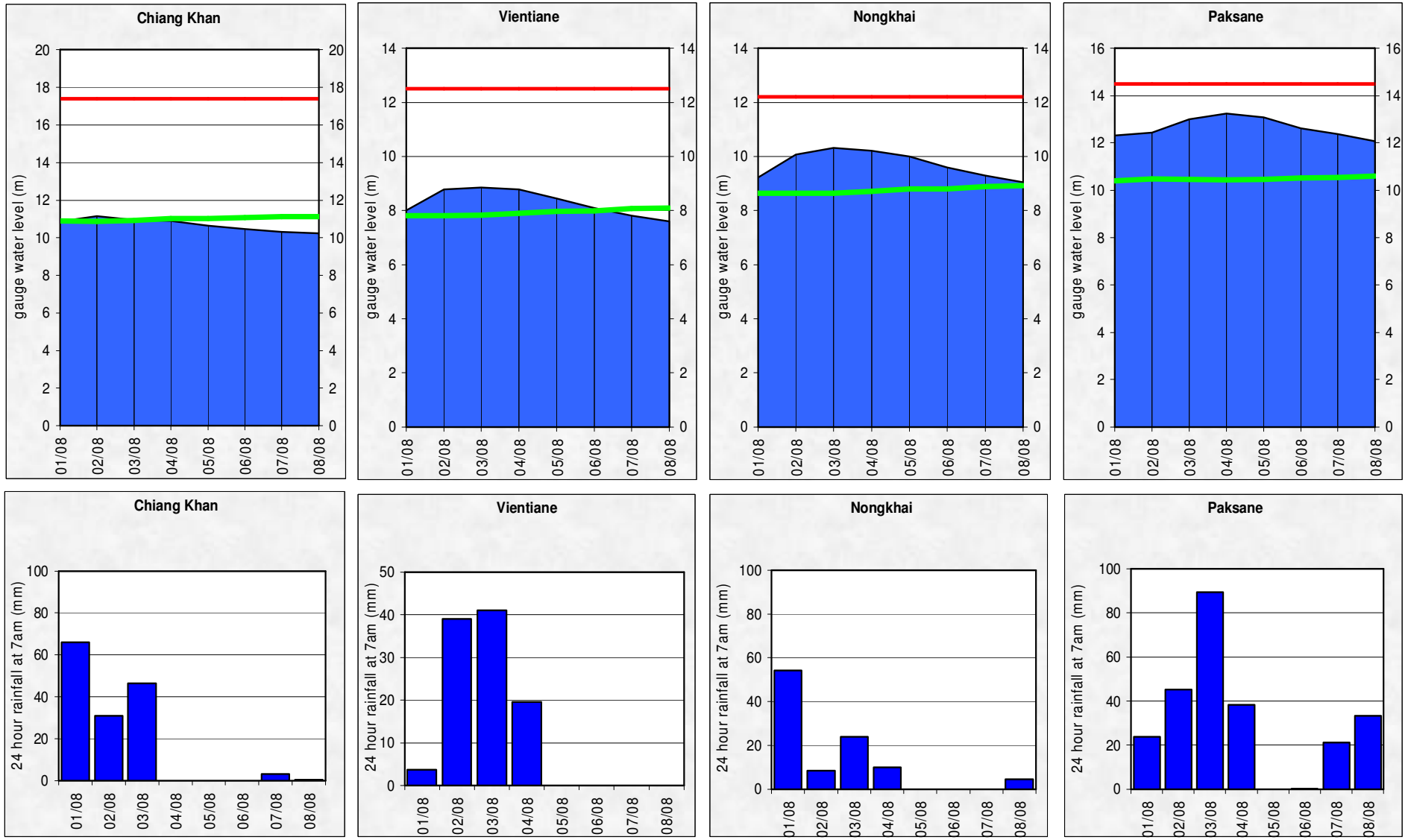


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

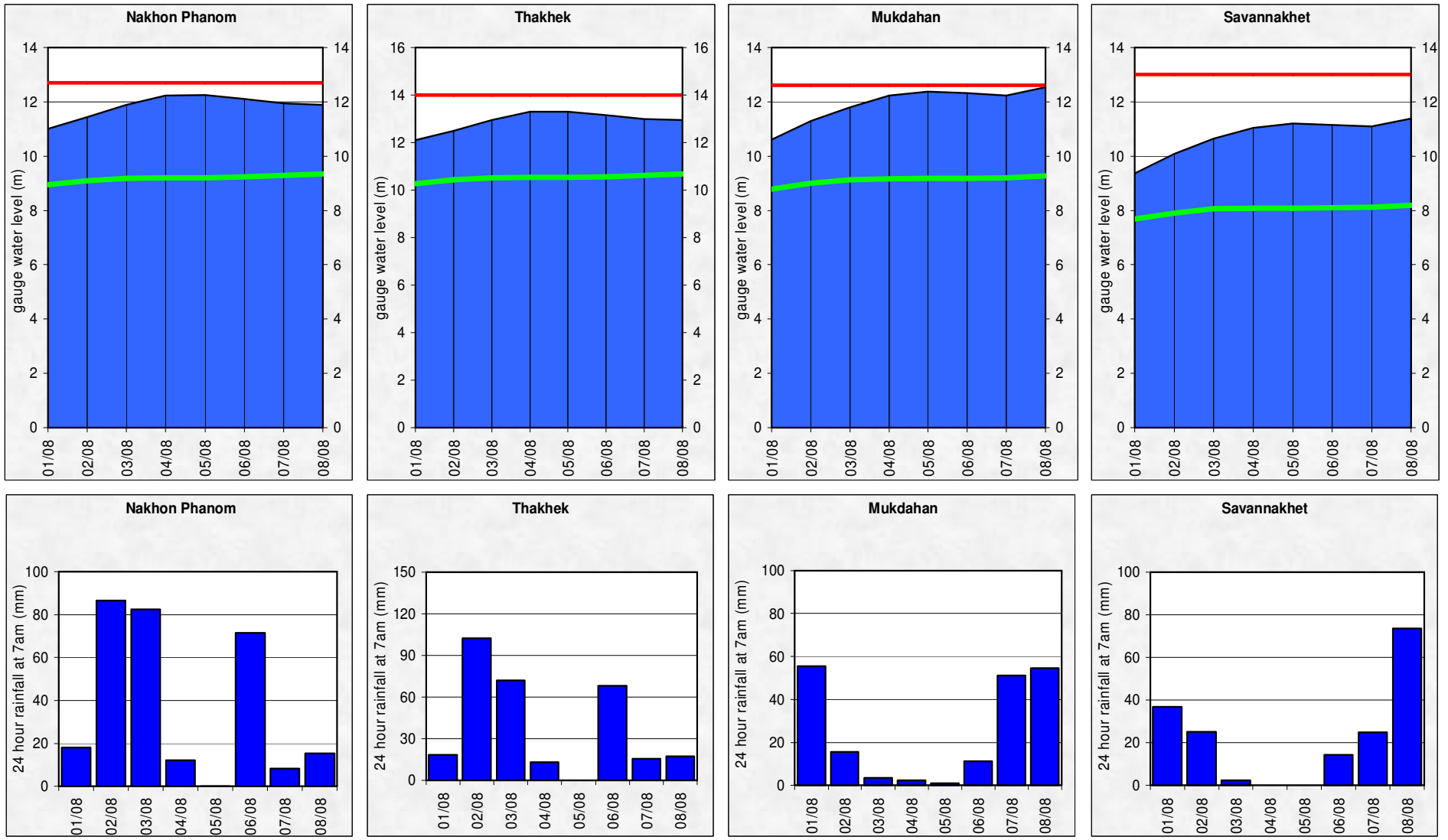


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

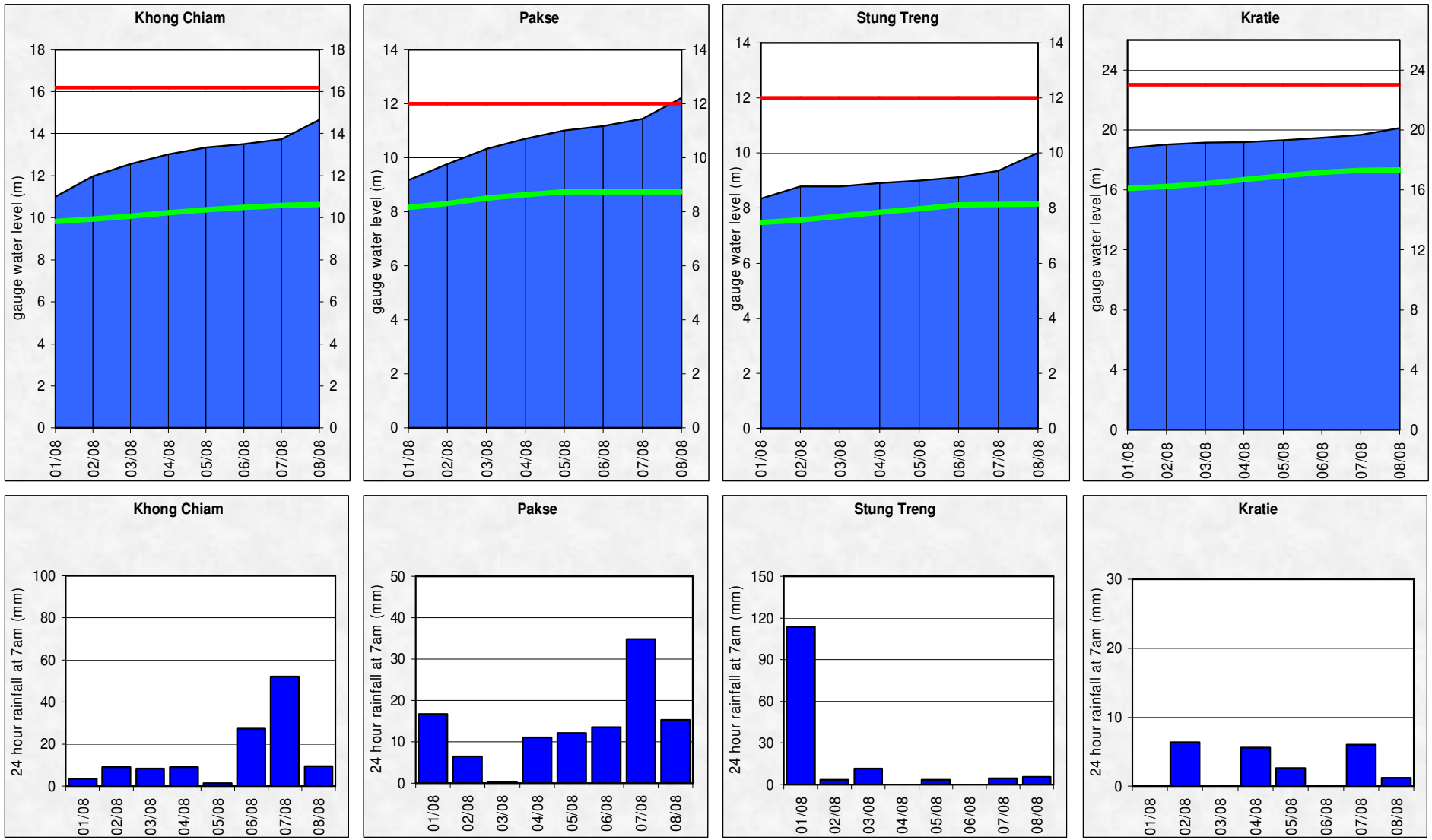


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

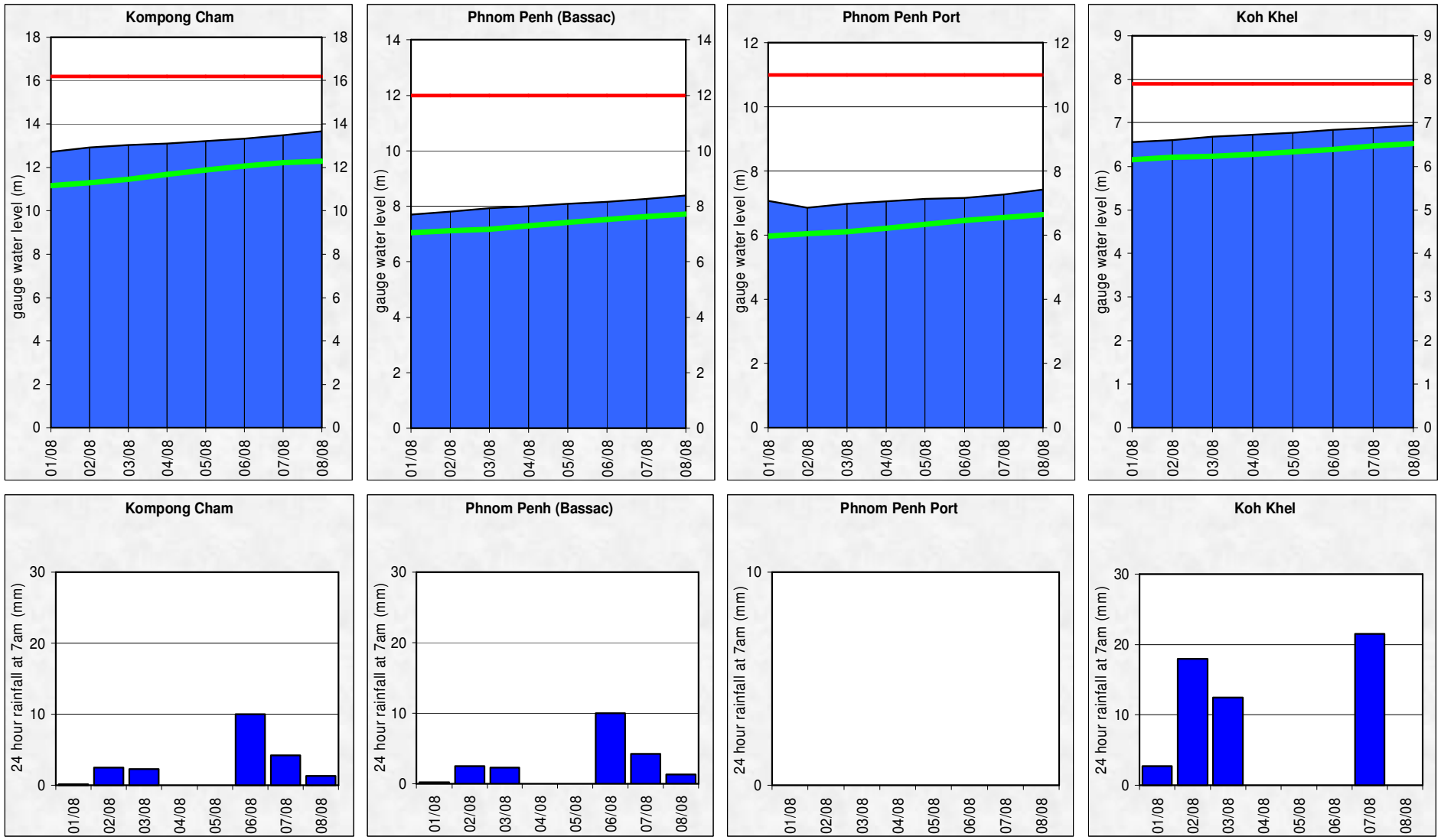
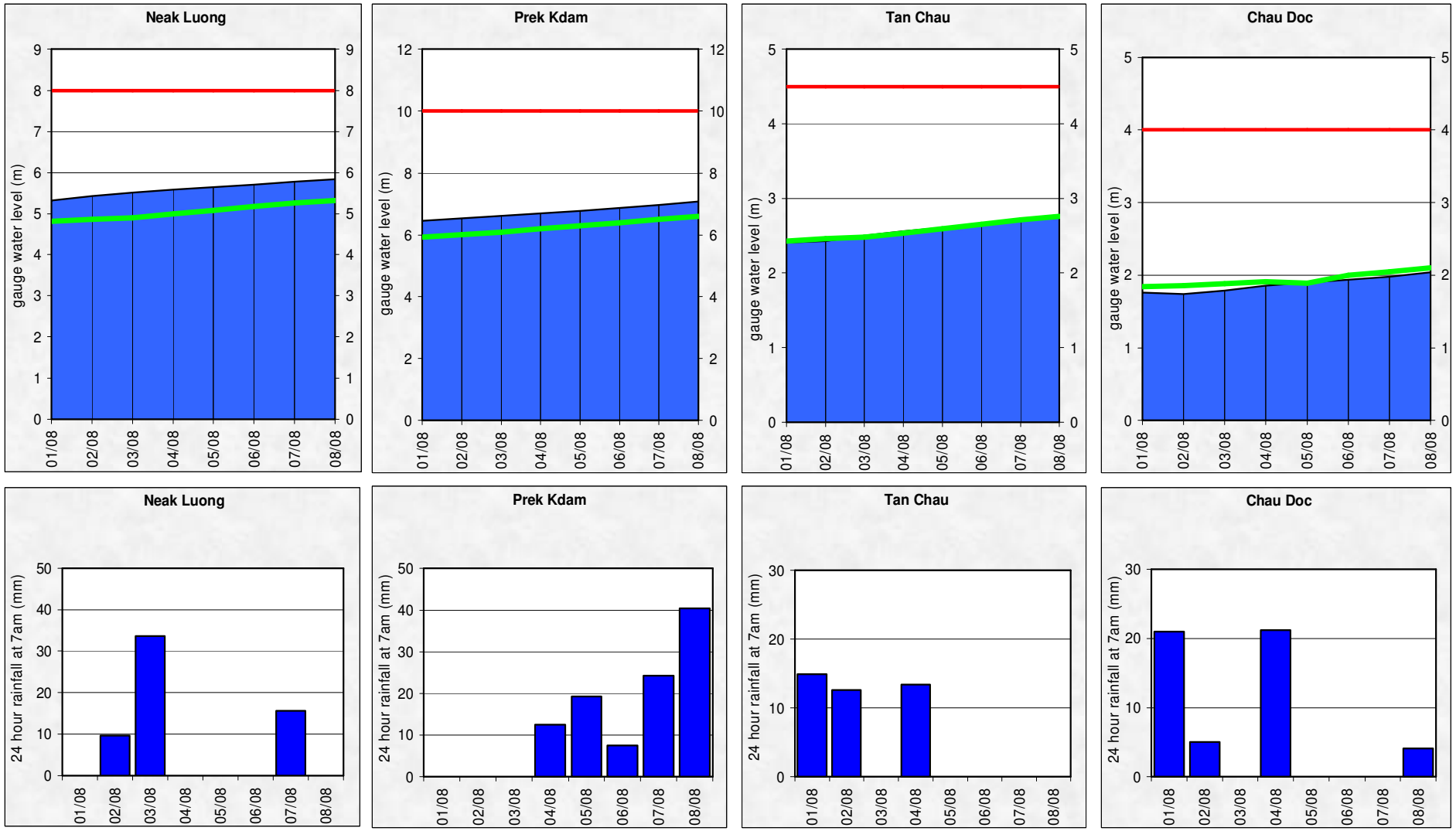


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

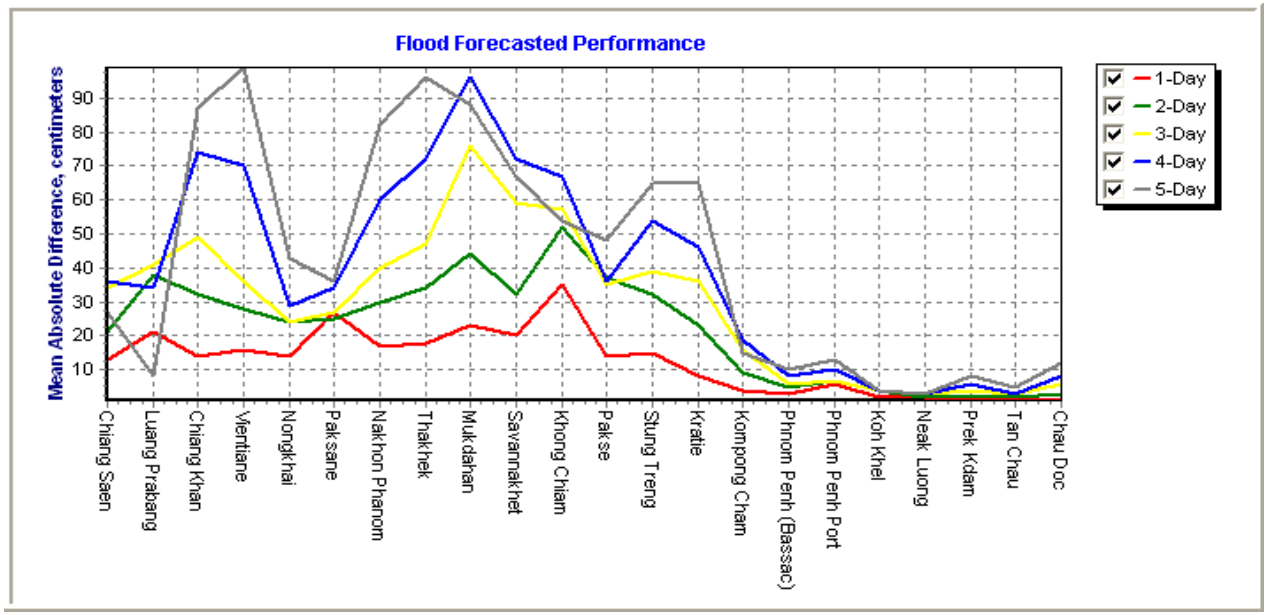
Accuracy

"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.

The graph of average difference between forecast and actual water levels for the past week shows the abnormal pattern, in which the accuracies at stations Chiang Saen and Luang Prabang in the upper reach of LMB were better than that in middle reach. In general, the overall accuracy is quite good for 1-day and 3-day forecast lead time at most stations; however the peaks at Thakhet for 5-day and Mukdahan for 4-day forecast were less than expected.

The above differences perhaps caused by internal model functionality in forecasting for middle reach of the LMB in taking into account flow contribution from left bank tributaries of Lao PDR, for which the parameter adjustment in the model is not possible.

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	42.9	71.4	42.9	42.9	28.6	57.1	57.1	42.9	42.9	28.6	57.1	42.9	57.1	100.0	100.0	85.7	100.0	100.0	100.0	100.0	100.0	***67.5***
2-day	83.3	83.3	83.3	50.0	50.0	66.7	66.7	66.7	50.0	50.0	33.3	50.0	50.0	50.0	100.0	100.0	66.7	100.0	100.0	100.0	100.0	100.0	***72.7***
3-day	80.0	60.0	40.0	40.0	80.0	40.0	60.0	60.0	0.0	20.0	40.0	60.0	40.0	40.0	80.0	80.0	80.0	100.0	100.0	100.0	100.0	80.0	***62.7***
4-day	100.0	100.0	25.0	25.0	75.0	75.0	75.0	75.0	25.0	25.0	50.0	75.0	50.0	75.0	100.0	75.0	100.0	100.0	100.0	100.0	100.0	50.0	***71.6***
5-day	100.0	100.0	0.0	0.0	66.7	66.7	33.3	33.3	33.3	33.3	0.0	66.7	33.3	33.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	***63.6***

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	*10:51*	*0*	*-*	*4*	*08:12*	*08:12*	*07:56*	*05:54*	*09:08*	*07:36*	*07:13*	*0*	*0*	*2*	*67*	*131*	*2*	*34*
month	*10:40*	*0*	*-*	*12*	*08:12*	*08:00*	*07:40*	*06:04*	*09:03*	*07:40*	*07:13*	*0*	*12*	*3*	*181*	*495*	*7*	*149*
season	*10:27*	*1*	*-*	*44*	*08:12*	*08:25*	*07:34*	*06:07*	*09:04*	*07:48*	*07:13*	*1*	*16*	*37*	*743*	*1267*	*19*	*385*

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.

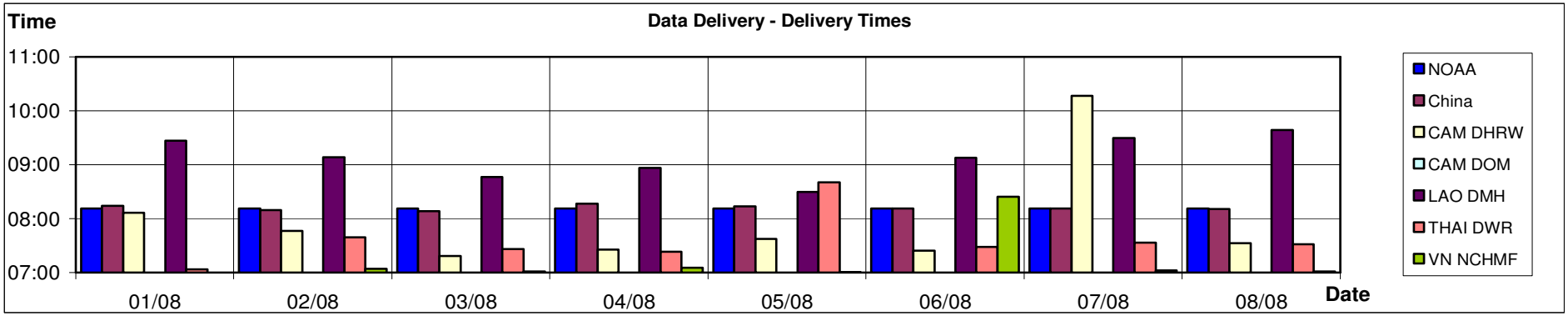


Figure B2: Data delivery times for the past 8 days including the current report date

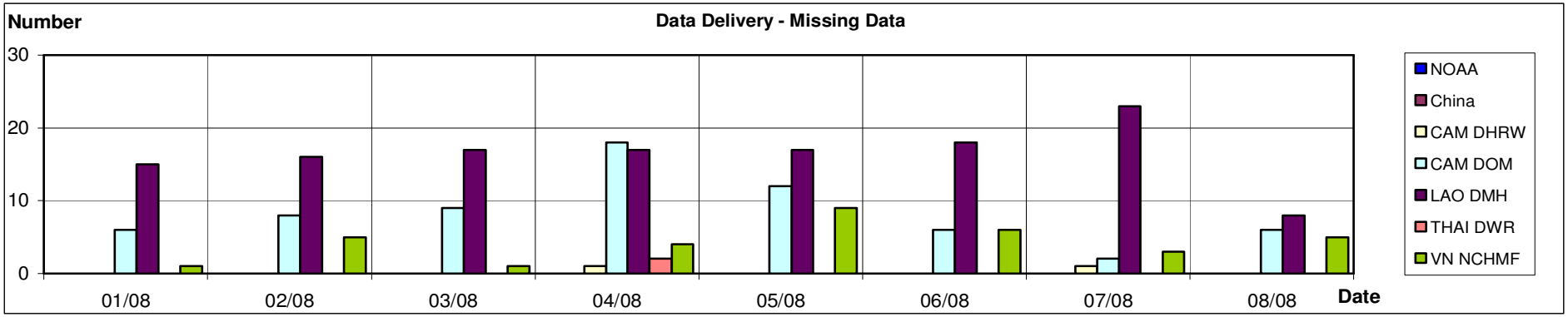


Figure B3: Missing data for the past 8 days including the current report date

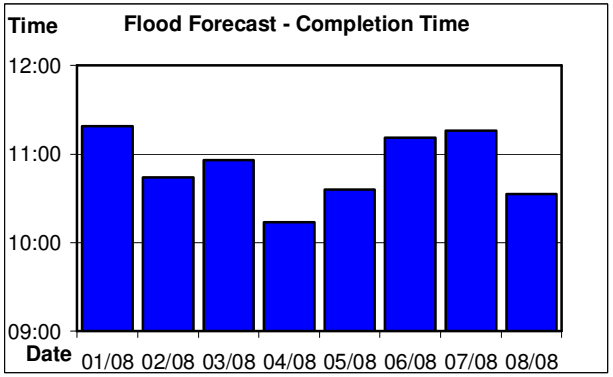


Figure B4: Flood forecast completion time

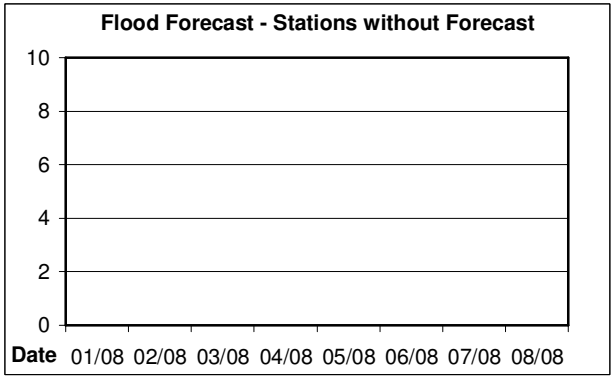


Figure B5: Flood forecast stations without forecast

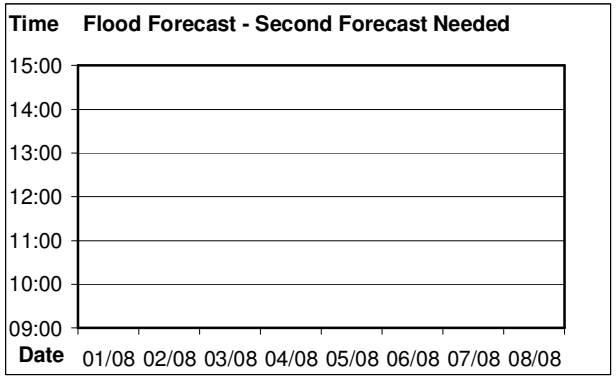


Figure B6: Second forecast needed

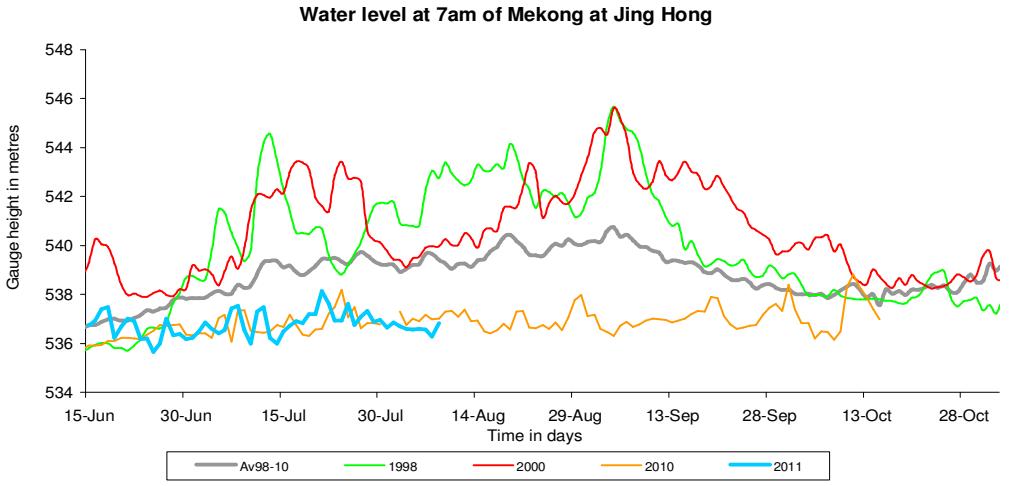
During last week, performance indicators of bulletin delivery (Table B3 and Figure B4) shows that the flood bulletins were disseminated timely to the registered national Line Agencies, MRC website, and other interested users a bit later than 10h30 AM which is a prescribed time in the Operational Manual. This was due to three main factors: (1) The late transfer and incomplete of data from LA's usually occurred in weekend time and in the case of critical flood occurrences (Figure B2 shows data delivery time that is sometime over 9h AM); (2) Water levels at stations in the middle reach of LMB were in critical situation which resulted in difficulties for forecaster-in-charge in analysing, adjusting forecast results and which consequently lead to the late bulletin dissemination.

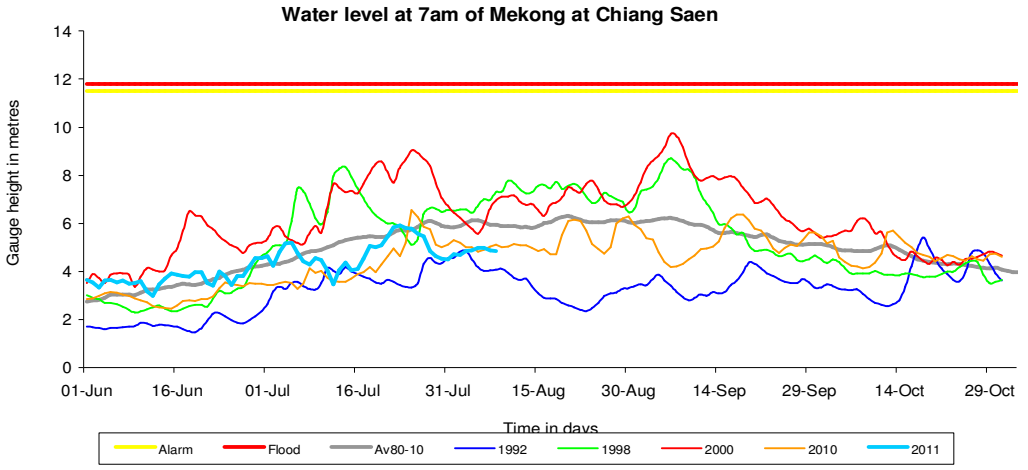
Annex C: Season Water Level Graphs

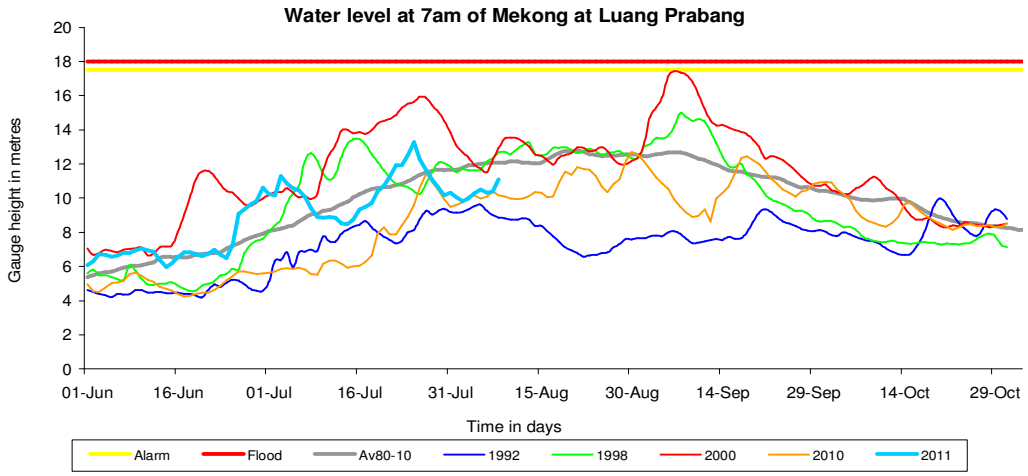
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

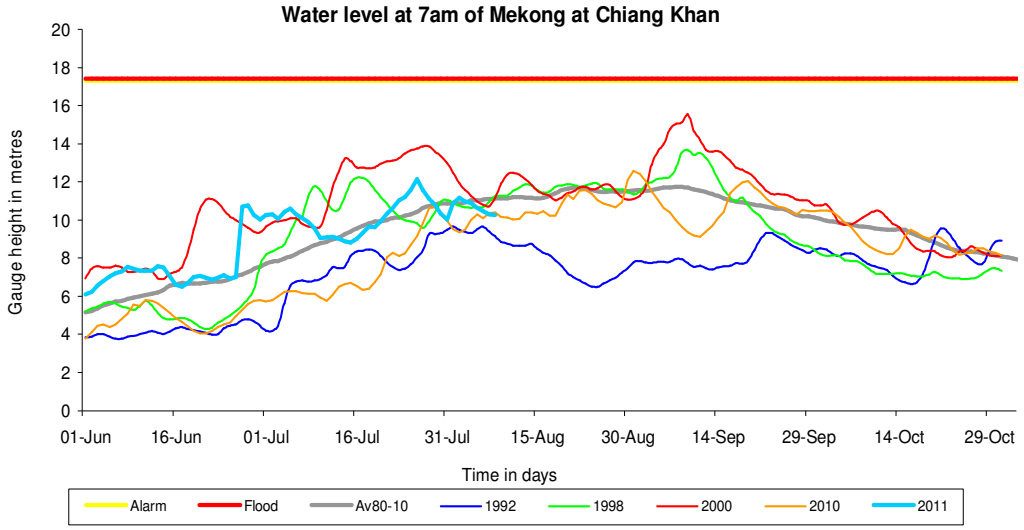
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

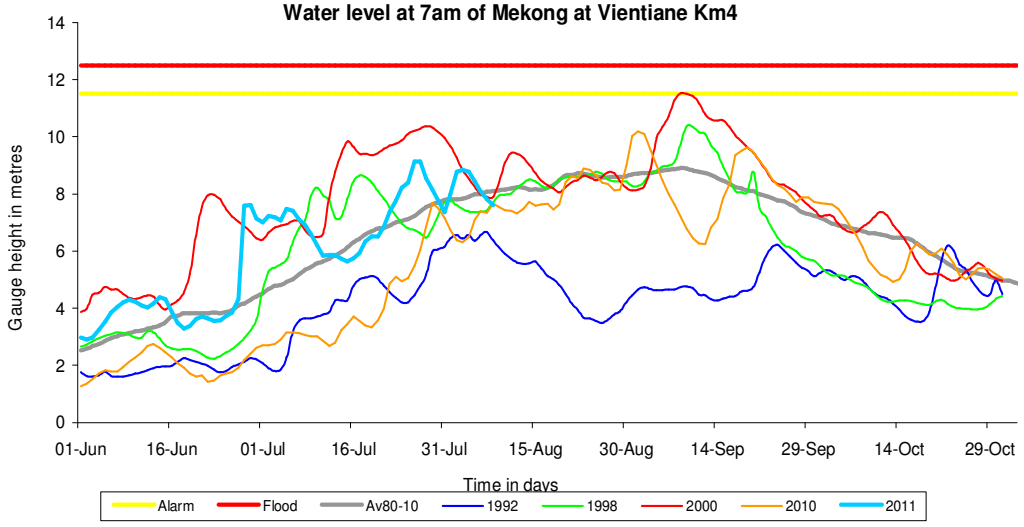
IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

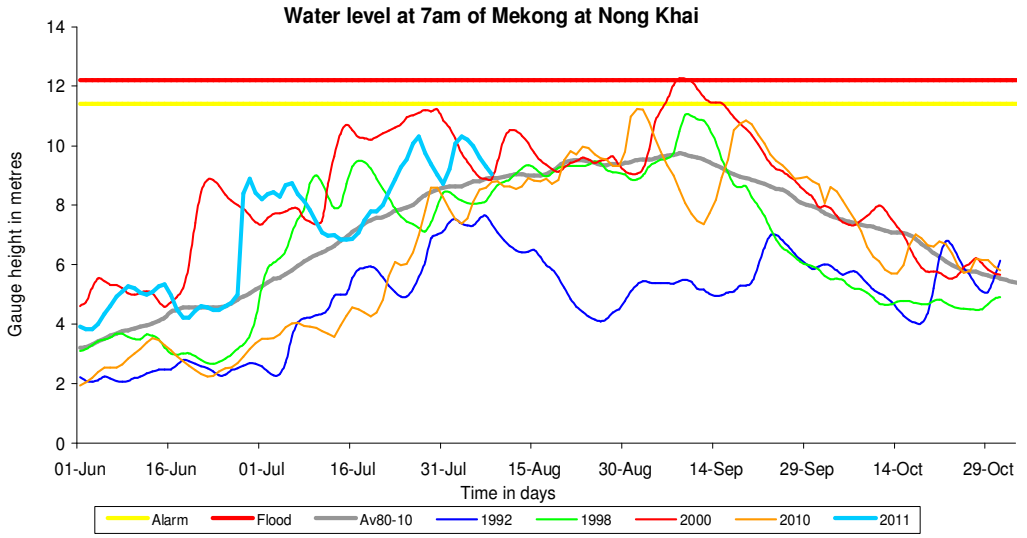


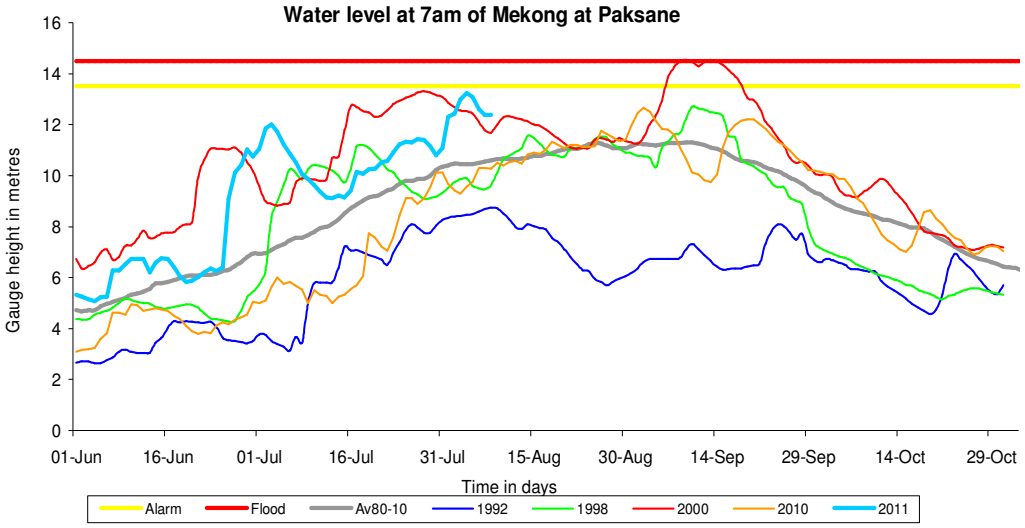


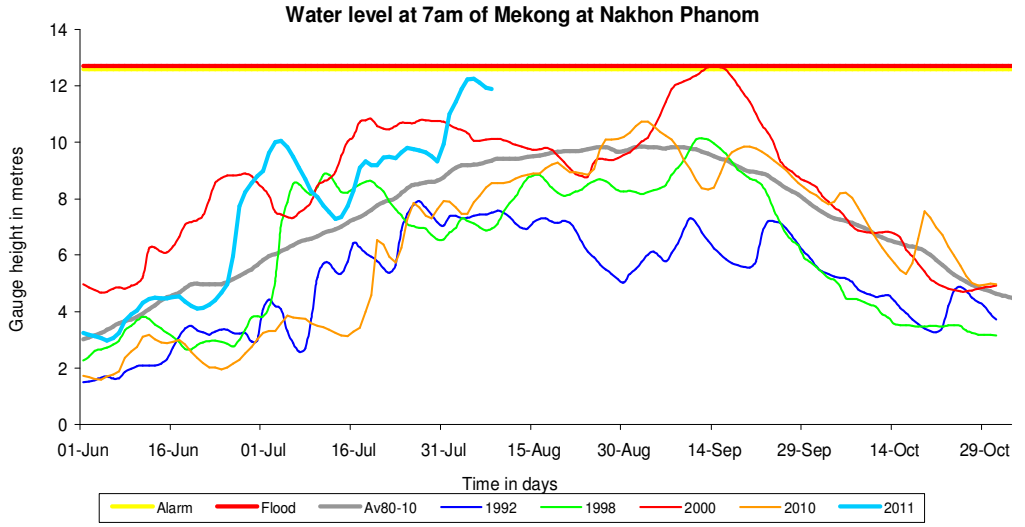


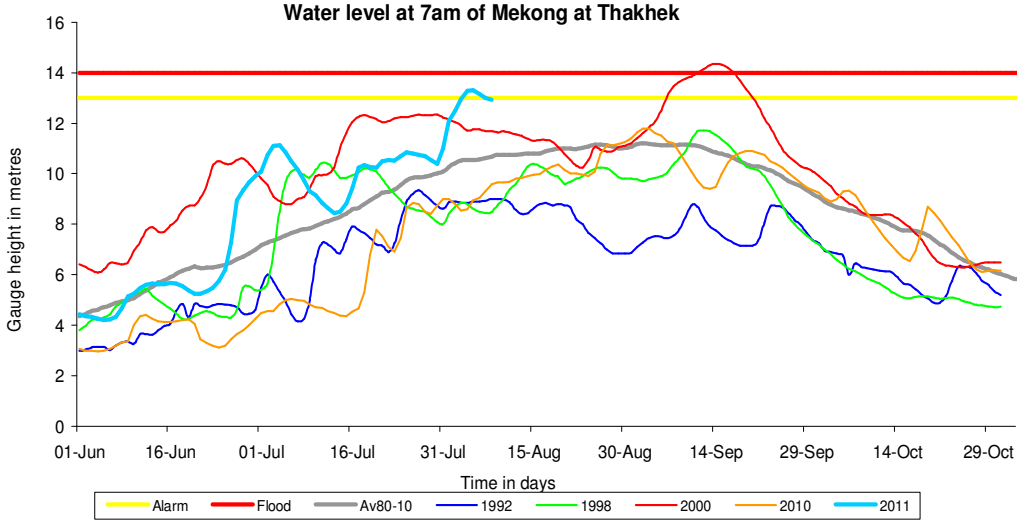

Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
20
18
16
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

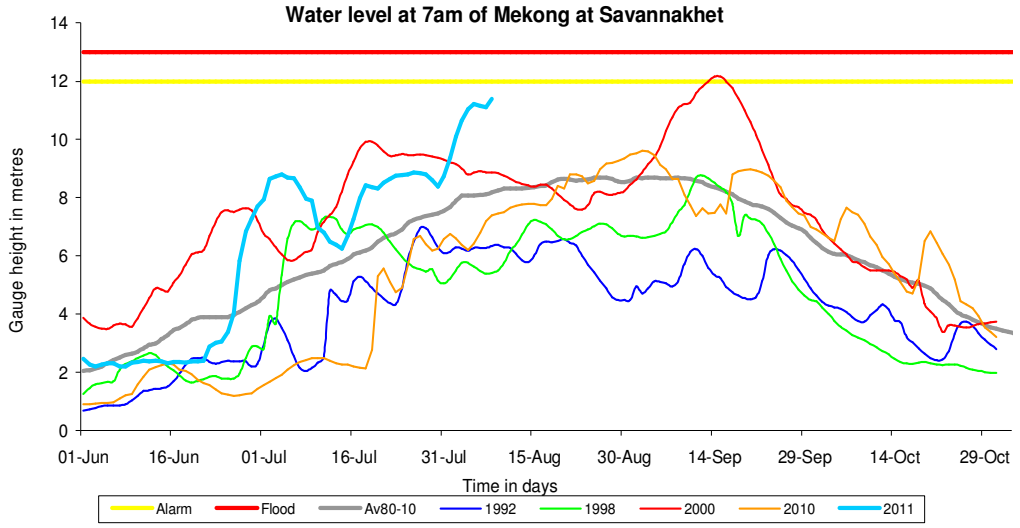

Water level at 7am of Mekong at Vientiane Km4
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

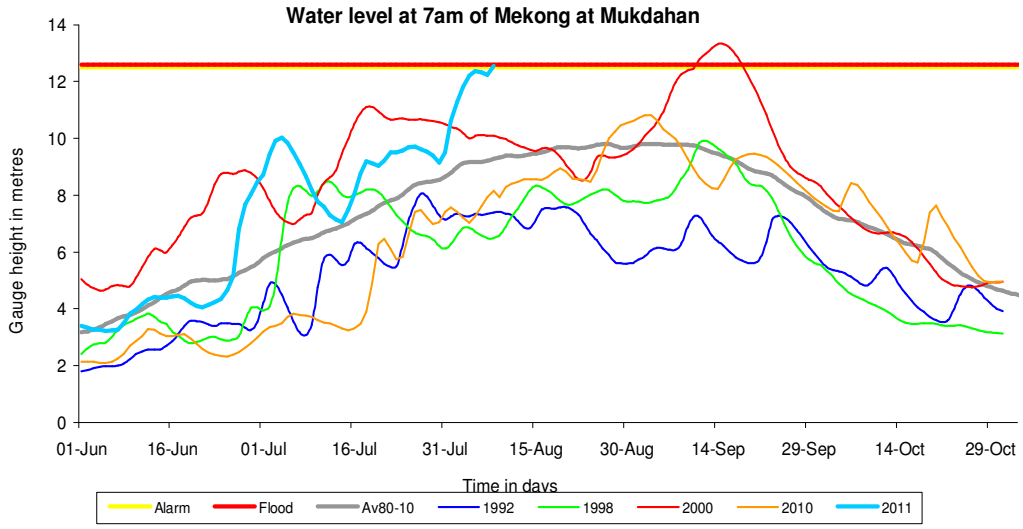

Water level at 7am of Mekong at Nong Khai
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

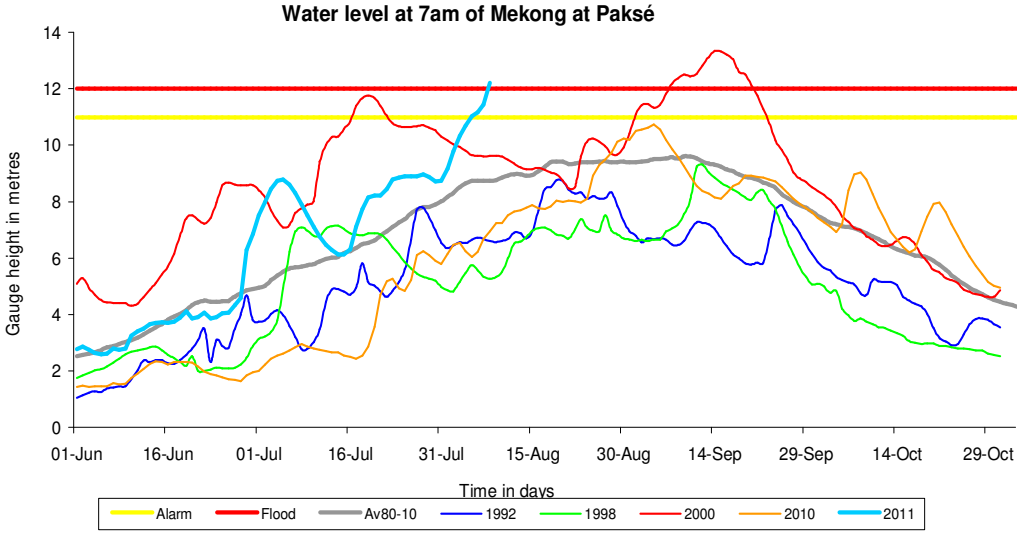

Water level at 7am of Mekong at Paksane
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

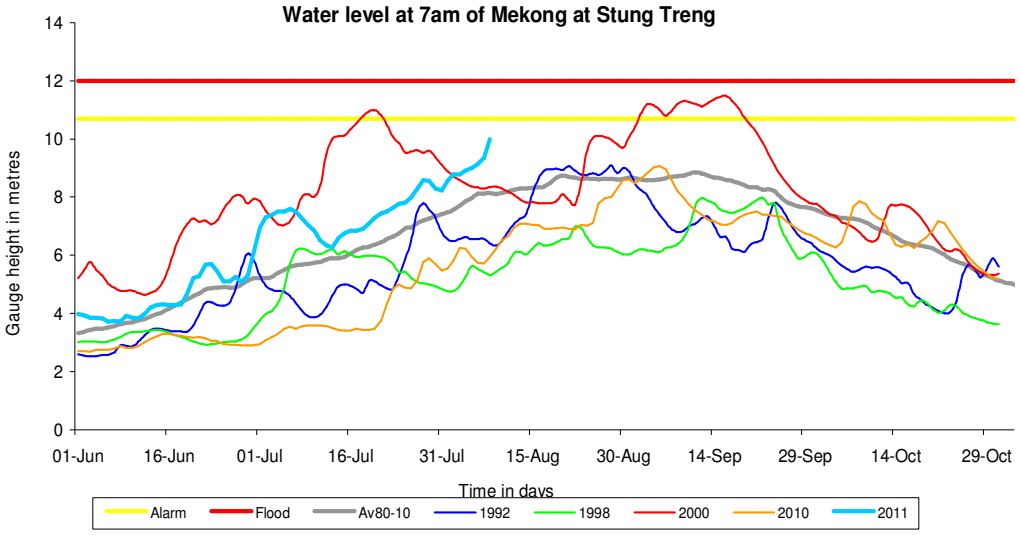

Water level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

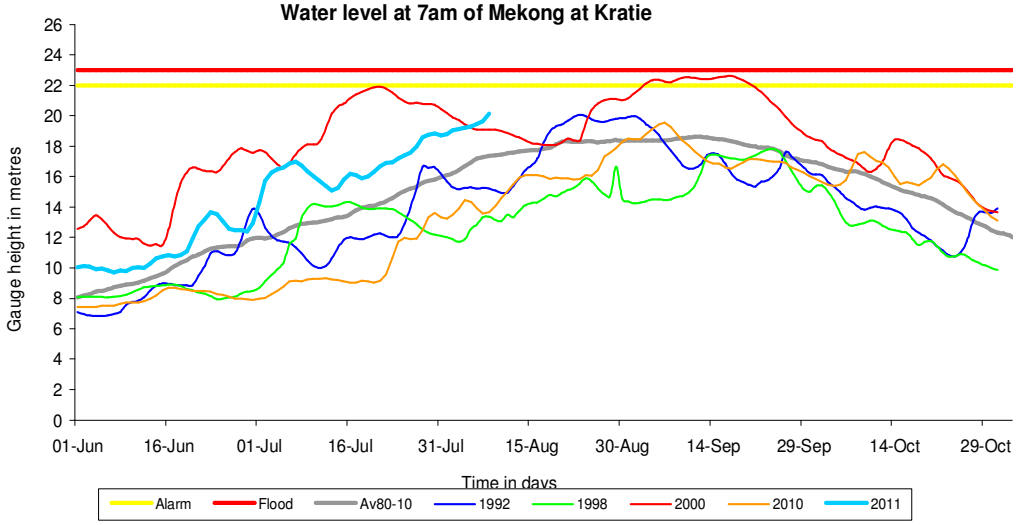

Water level at 7am of Mekong at Thakhek
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

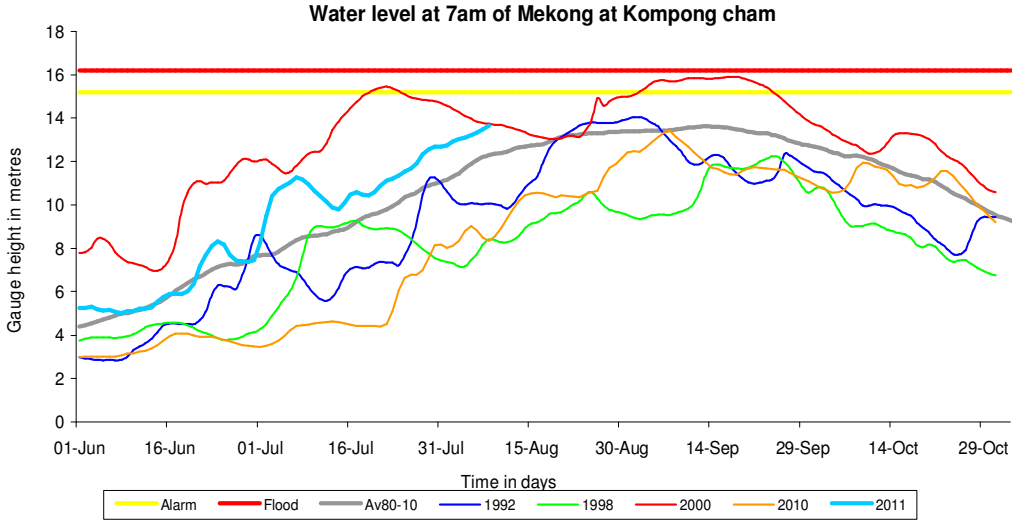

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

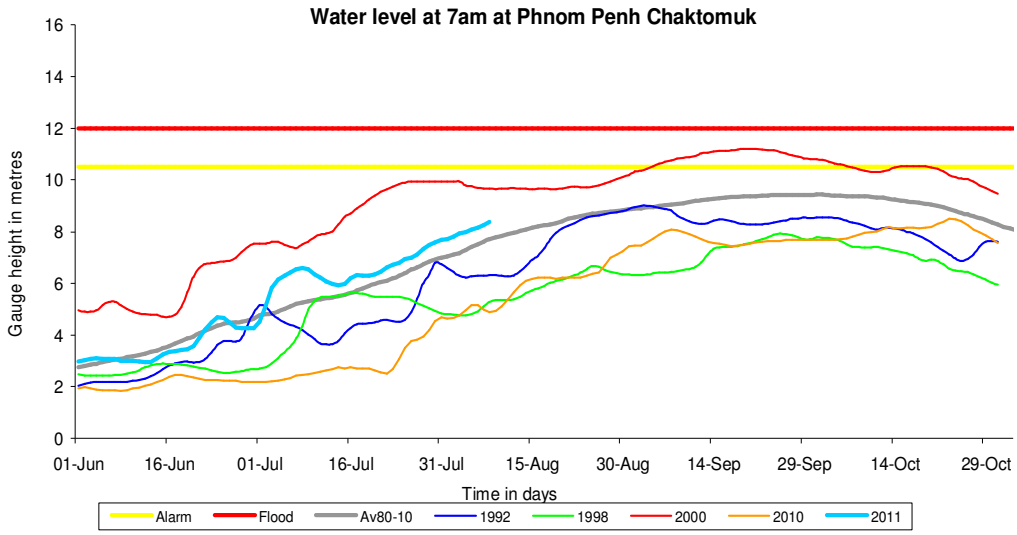

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

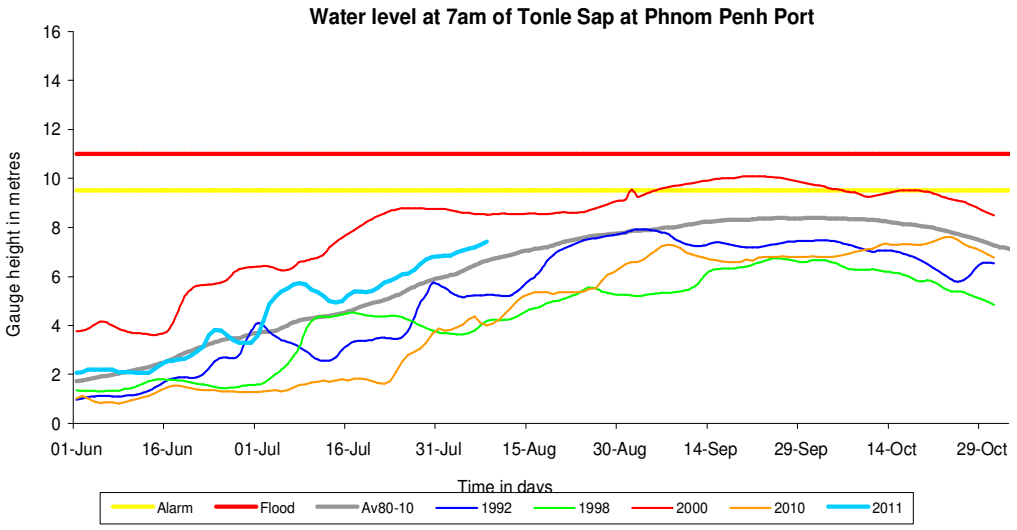

Water level at 7am of Mekong at Paksé
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

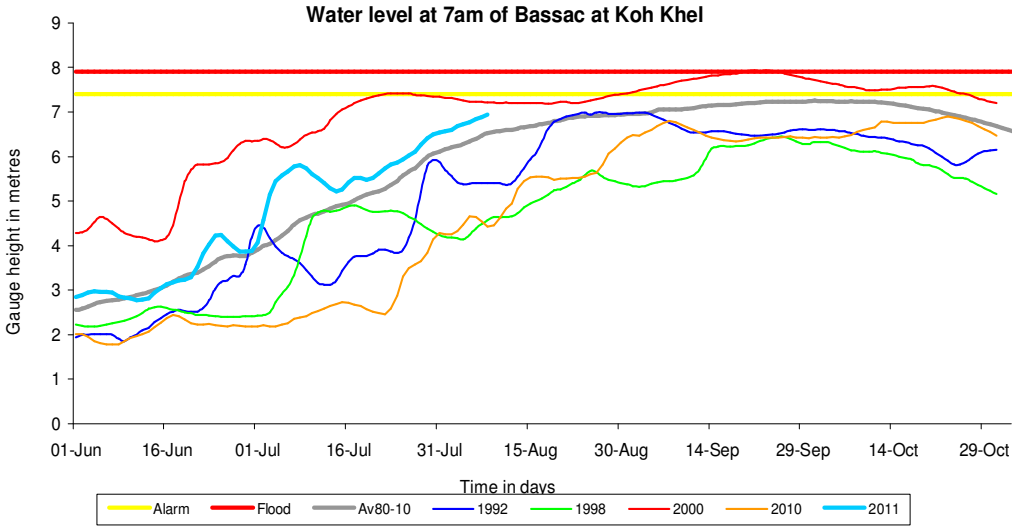

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

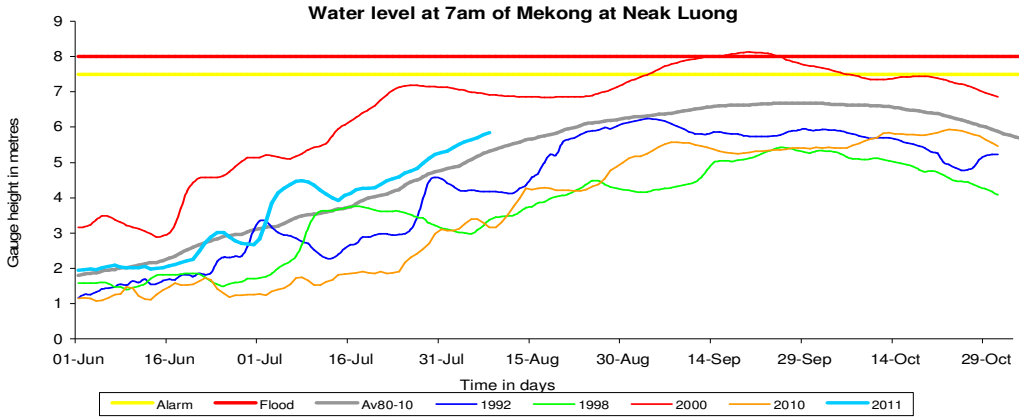

Water level at 7am of Mekong at Kratie
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
20
22
24
26
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

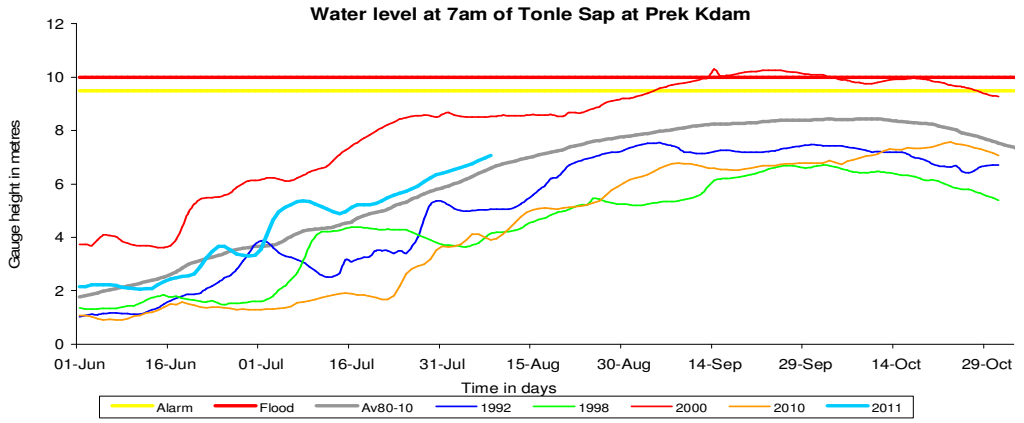

Water level at 7am of Mekong at Kompong cham
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

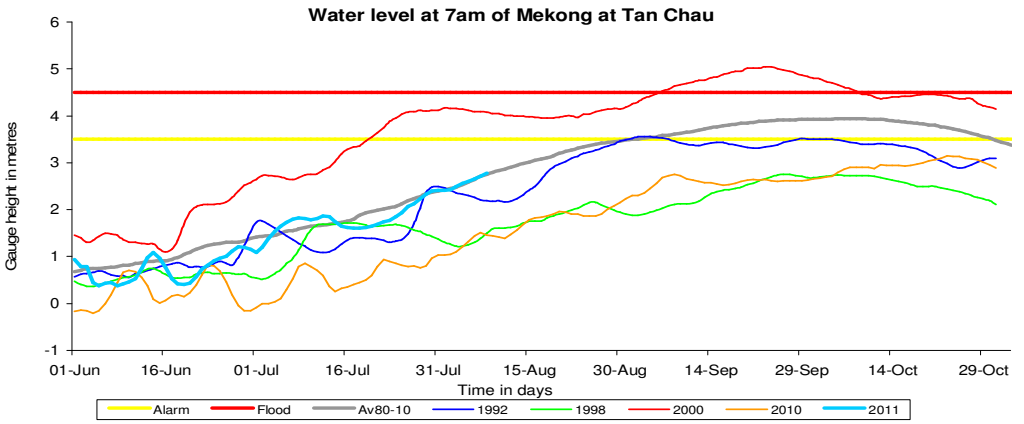

Water level at 7am at Phnom Penh Chaktomuk
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

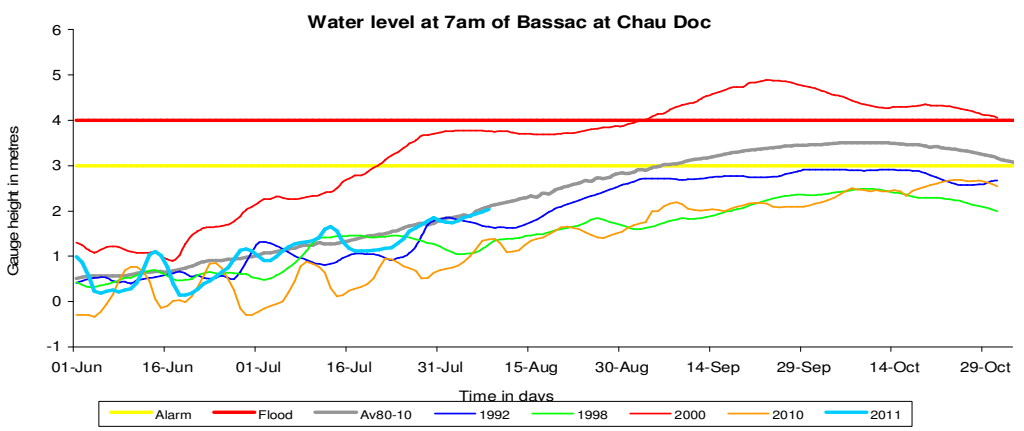

Water level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011


Water level at 7am of Bassac at Koh Khel
Gauge height in metres
0
1
2
3
4
5
6
7
8
9
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 Neak Luong
Gauge height in metres
0
1
2
3
4
5
6
7
8
9
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 Tonle Sap at Prek Kdam
Gauge height in metres
0
2
4
6
8
10
12
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 Tan Chau
Gauge height in metres
-1
0
1
2
3
4
5
6
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 Bassac at Chau Doc
Gauge height in metres
-1
0
1
2
3
4
5
6
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