Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 04/07/2011, covering the week from the 27th to the 03rd July 2011

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

General weather patterns

During the week of the 27th June to the 03rd July 2011, four weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 28th June and the 03rd July bulletins are presented in the figures below:

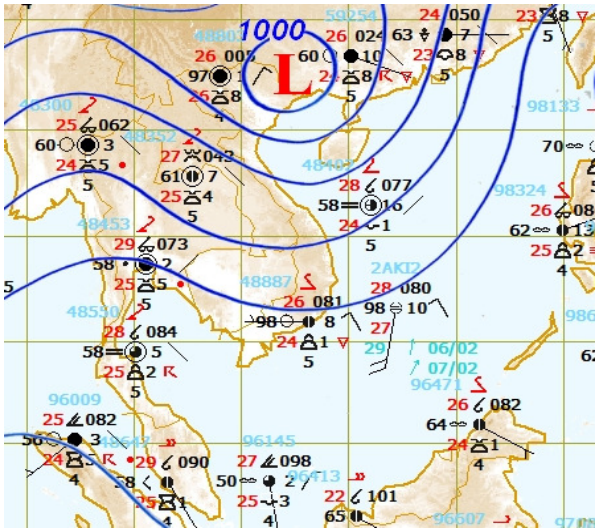


Figure 1: Weather map for 28th June 2011

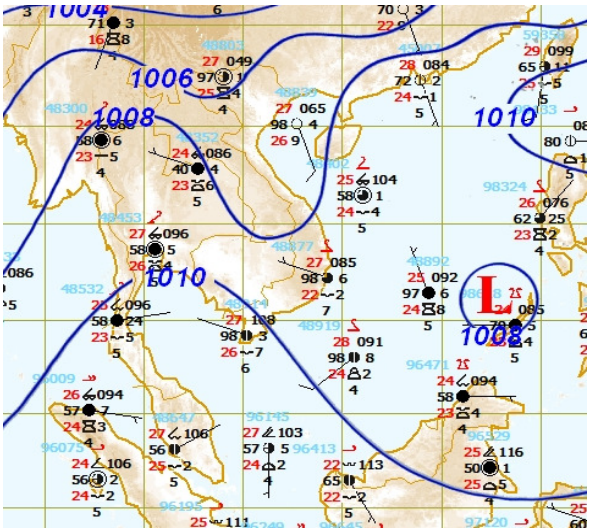


Figure 2: Weather map for 03rd July 2011

Strong South-West (SW) Monsoon

Strong SW monsoon prevailed over Andaman Sea and the Gulf of Thailand and was almost stationary during last week (Figure 1 and 2).

Inter Tropical Convergence Zone (ITCZ)

One ITCZ was observed on 28th - 29th June 2011 in this week and laid across the upper part of Myanmar, Lao PDR and Viet Nam.

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

No TD, TS and TY were observed in this week.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Over weather situation

After heavy rain had occurred in the whole areas of Northern of Thailand, Lao PDR and Vietnam during the week before and due to ITCZ and low pressure appearance; it then transformed into local high intensity rainfall covered in middle reach of LMB near Nakhon Phanom, Thakhek, Mukdahan and Savannakhet with the average rainfall depth of 300 mm and some parts of Ton le Sap (Figure 3).

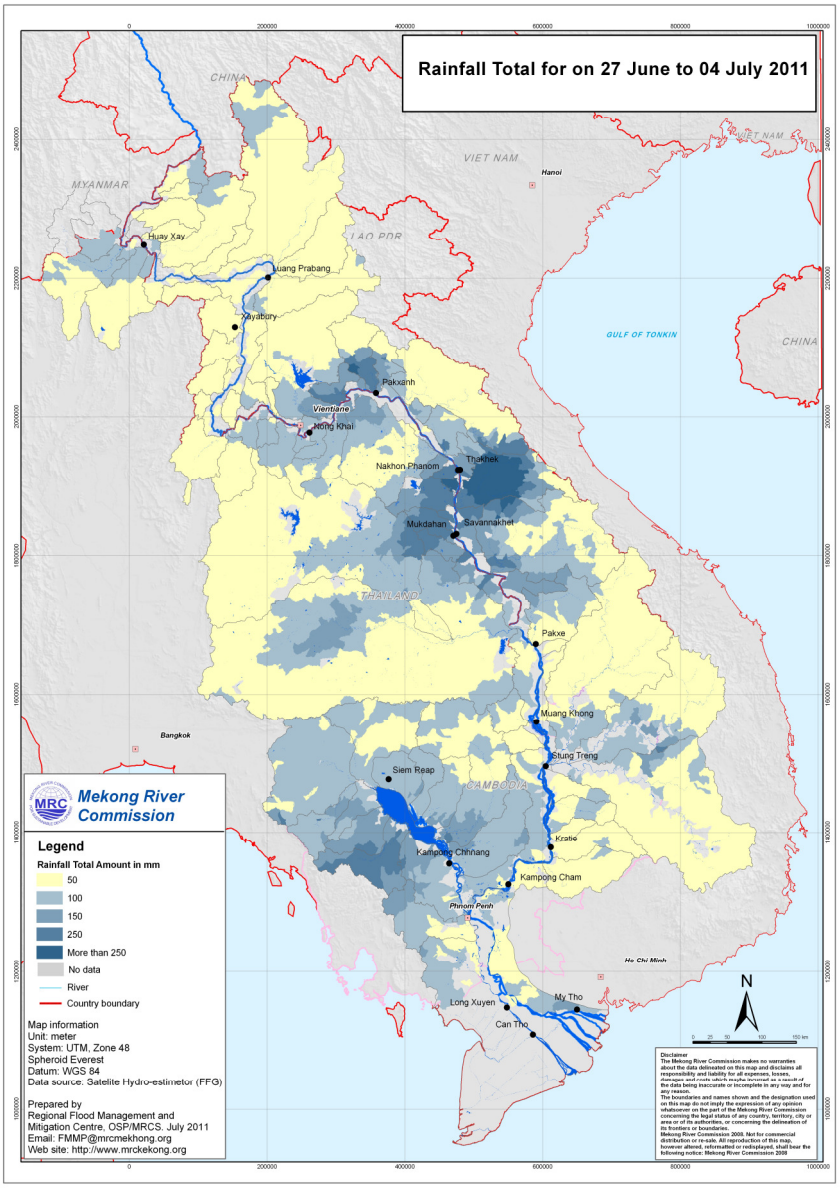


Figure 3: Rainfall distribution over the LMB, covering the week 27 June - 04 July 2011.

General behaviour of the Mekong River

Water levels along the Mekong River had rose up quickly during the week before, then slowly increased in start from Luang Prabang downward to Pakse during monitoring period. Water levels at the lower reach stations from Stung Treng to Phnom Penh Port/Pnom Penh Bassac showed rising trend during the week. Regarding to two stations in downstream at Tan Chau and Chau Doc, water levels at those two stations were less fluctuated by tidal with increasing influence from flood upstream toward the end of the week.

For stations from Chiang Saen to Paksane

Water levels at Chiang Saen rose due to normal condition but not the case at Luang Prabang, Chiang Khan, Vientiane/Nong Khai and Paksane which the week before were affected by **HAIMA** causing water levels rose up rapidly and then this week stabilized through time above the long-term average for this time of the

year. Water levels at stations Luang Prabang to Paksane were more-or-less stable till the end of the week (Figure 4).

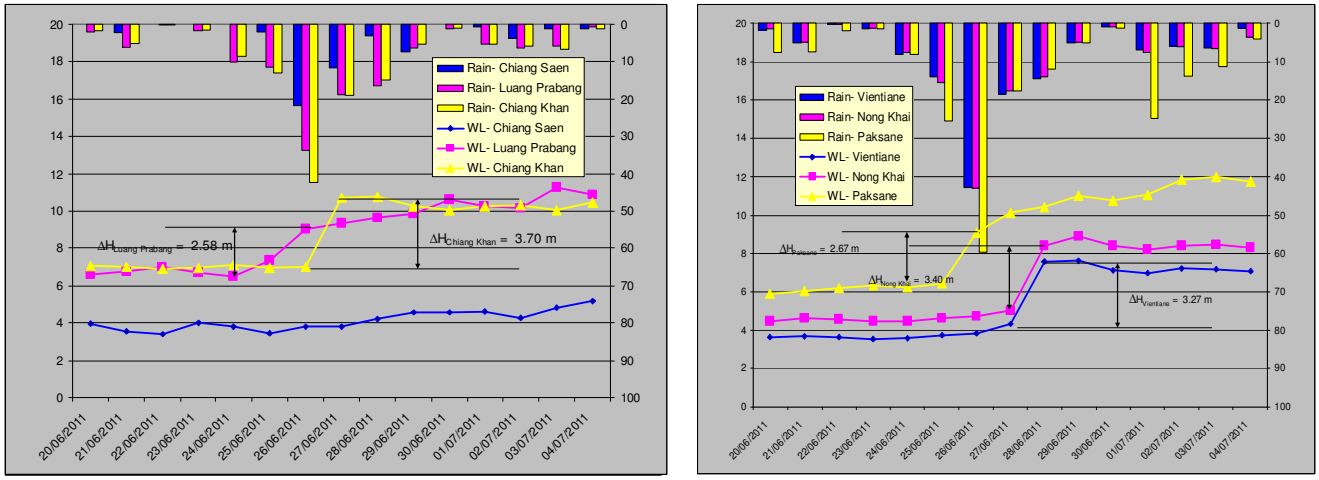


Figure 4: Stabilized water levels at stations: Luang Prabang, Chiang Khan, Vientiane/Nong Khai and Paksane

For stations Nakhon Phanom/Thakhek and Mukdahan/Savannakhet

In the first half of the week (Figure 5), water levels at the four stations were slowly increasing due to high intensity rainfall in the reach. All water levels in these four stations were above the long-term average for this time of the year.

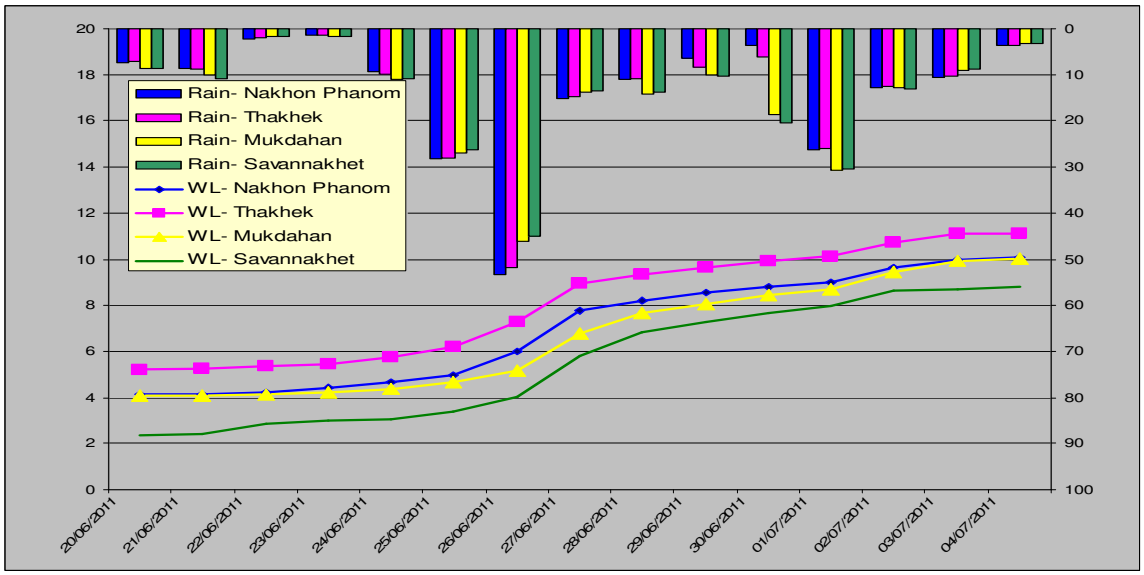


Figure 5: Slightly rising of water levels at stations: Nakhon Phanom/ Thakhek and Mukdahan/Savannakhet.

For stations from Savannakhet, Khong Chiam and Pakse

As shown in Figure 6, Water levels at Khong Chiam and Pakse were slightly increasing follow those of Savannakhet but lag by two more days. All water levels in these four stations were above the long-term average for this time of the year.

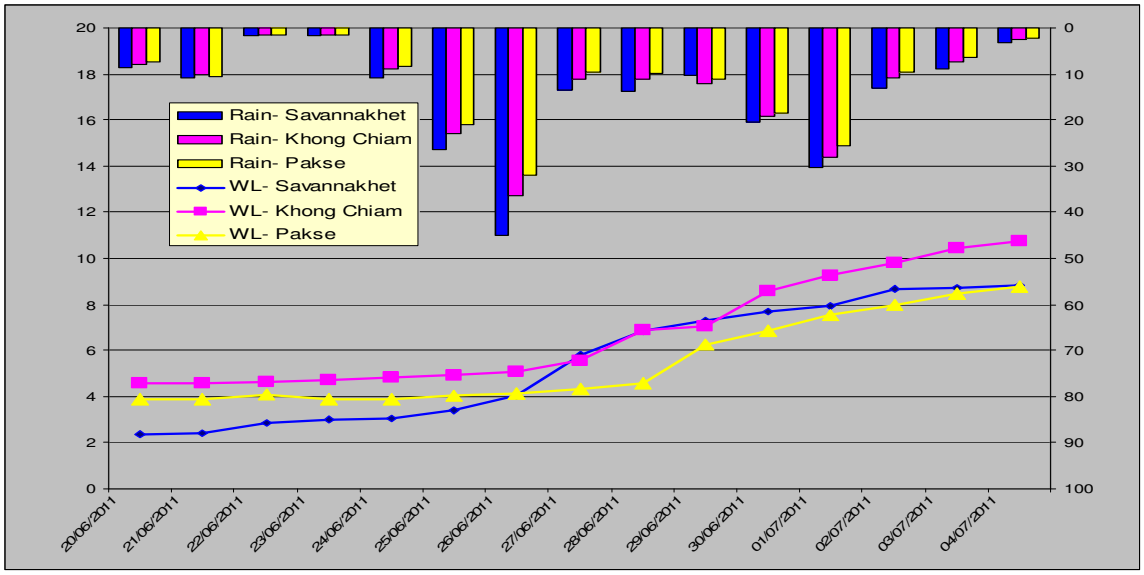


Figure 6: Slightly rising of water levels at stations: Savannakhet, Khong Chiam and Pakse.

For stations from Stung Treng, Kratie and Kompong Cham

Water levels at these three stations were almost stable at first half of the week then rose up till the end of the week due to local high intensity rainfall in the area (Figure 7). Water levels of these stations were above the long-term average for this time of the year.

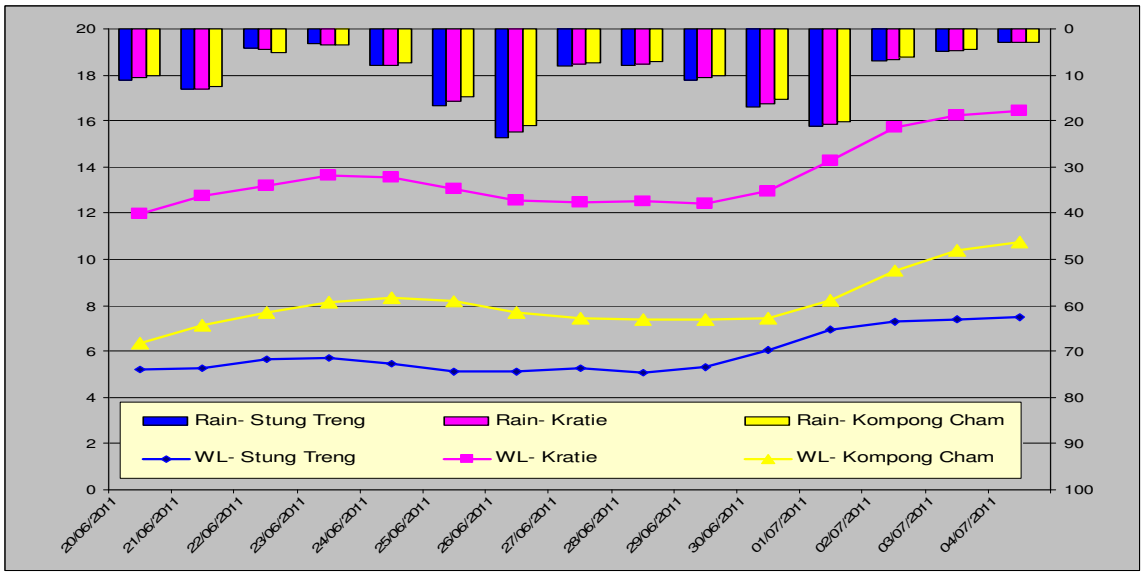


Figure 7: Slightly rising of water levels at stations: Stung Treng, Kratie and Kompong Cham

For stations from Bassac/Phnom Penh to Koh Khel/Neak Luong

Water levels at these four stations were almost stable at first half of the week then rose up till the end of the week due to combination effects from upstream flood, local high intensity rainfall in the area and tidal effects downstream (Figure 8). Water levels of these stations started from mid of the week were above the long-term average for this time of the year.

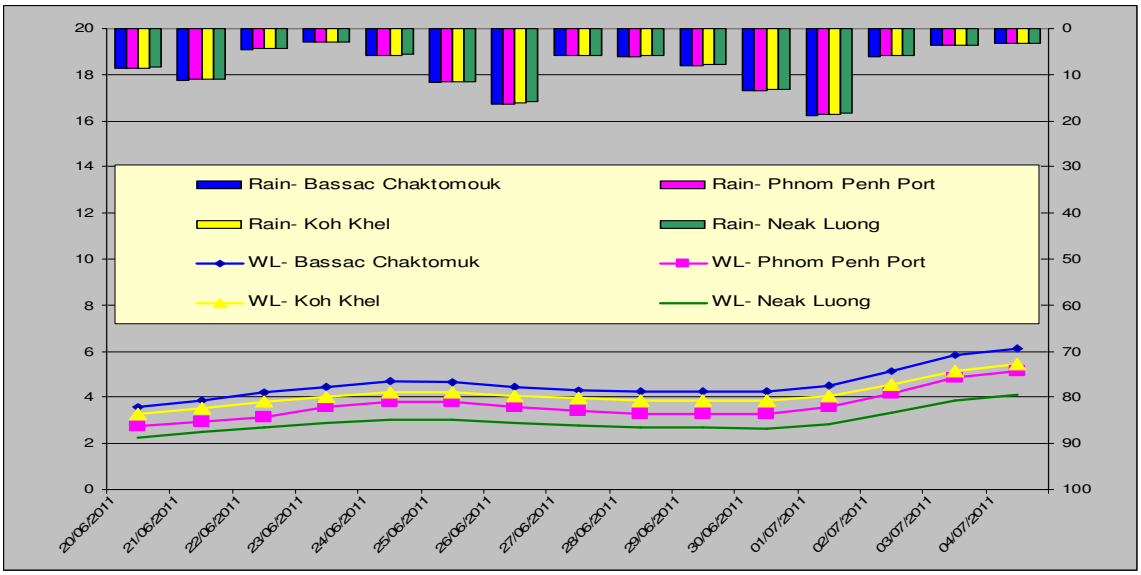


Figure 8: Slightly rising of water levels at stations: Bassac/Phnom Penh to Koh Khel/Neak Luong

Tan Chau and Chau Doc

Water levels show a rising trend during the reporting period. Both stations were recording levels that are somewhat below the long-term average for this time of the year and significantly affected by tidal. Start from mid of the week, water level shown increasing trend due to upstream flood.

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

Flood Situation

- Flood stage or alarm stage:

No alarm stage (where the forecast is expected to reach flood level within three days) was reported anywhere on the mainstream of the Mekong River during the past week. Water levels are still significantly below flood levels (as defined by the national agency) at all forecast stations.

- 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
27/06	537.01	3.81	9.32	10.69	4.32	5.00	10.13	7.74	8.95	6.80	5.82	5.59	4.35	5.25	12.46	7.42	4.30	3.41	3.98	2.77	3.37	1.11	0.94
28/06	536.34	4.20	9.64	10.76	7.59	8.40	10.42	8.23	9.35	7.69	6.85	6.89	4.58	5.07	12.49	7.41	4.27	3.30	3.87	2.70	3.32	1.21	1.13
29/06	536.38	4.56	9.84	10.26	7.60	8.88	11.02	8.55	9.65	8.05	7.28	7.05	6.28	5.30	12.40	7.38	4.27	3.30	3.86	2.68	3.31	1.20	1.16
30/06	536.17	4.55	10.62	10.03	7.14	8.42	10.76	8.81	9.92	8.46	7.69	8.59	6.86	6.07	12.95	7.46	4.27	3.30	3.88	2.66	3.33	1.16	1.12
01/07	536.22	4.63	10.24	10.26	7.00	8.21	11.06	8.98	10.10	8.71	7.94	9.26	7.53	6.95	14.30	8.22	4.52	3.57	4.07	2.84	3.54	1.08	1.00
02/07	536.49	4.25	10.16	10.30	7.24	8.38	11.85	9.62	10.73	9.44	8.65	9.82	8.00	7.30	15.72	9.50	5.16	4.17	4.57	3.32	4.07	1.19	0.90
03/07	536.84	4.83	11.28	10.06	7.18	8.45	12.00	10.00	11.10	9.92	8.72	10.43	8.45	7.40	16.26	10.40	5.83	4.85	5.15	3.85	4.65	1.39	0.91
04/07	536.59	5.16	10.86	10.46	7.08	8.30	11.74	10.06	11.13	10.03	8.80	10.72	8.75	7.49	16.47	10.73	6.15	5.17	5.45	4.14	4.96	1.53	0.99
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
27/06	25.00	46.50	15.4	4.3	4.2	2.1	2.5	4.0	4.0	6.1	5.7	1.8	nr	30.5	nr	nr	nr		1.8	11.40	nr	6.90	1.00
28/06	3.0	11.7	13.4	2.8	3.4	2.1	0.0	0.5	2.7	nr	nr	2.2	nr	3.0	2.4	nr	nr		nr	nr	nr	nr	0.6
29/06	4.0	29.0	8.0	nr	nr	nr	4.7	64.0	72.6	16.7	18.3	20.0	8.8	nr	nr	nr	3.2		50.2	4.1	nr	nr	13.0
30/06	-	nr	4.2	nr	nr	nr	nr	70.5	82.8	101.2	78.4	0.3	34.7	21.0	nr	0.3	2.5		41.5	15.4	nr	27.9	11.0
01/07	8.0	3.4	5.0	0.4	36.4	22.7	166.0	20.2	21.7	18.8	17.0	30.2	22.7	nr	16.8	29.9	8.4		nr	8.6	5.4	7.0	19.1
02/07	67.0	15.5	20.0	nr	8.2	8.7	21.3	7.0	9.1	30.6	22.0	10.5	nr	nr	nr	0.5	3.6		0.2	5.2	nr	7.9	12.9
03/07	19.0	5.0	13.4	1.1	0.6	11.0		12.2	3.1	nr	0.3	nr	1.8	nr	nr	2.7	nr		nr	nr	6.5	0.0	0.0
04/07	0.0	5.50	0.8	nr	0.2	52.5	5.2	4.0	0.3	nr	nr	nr	nr	7.8	9.6	13.3	nr		nr	nr	4.50	nr	0.80

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

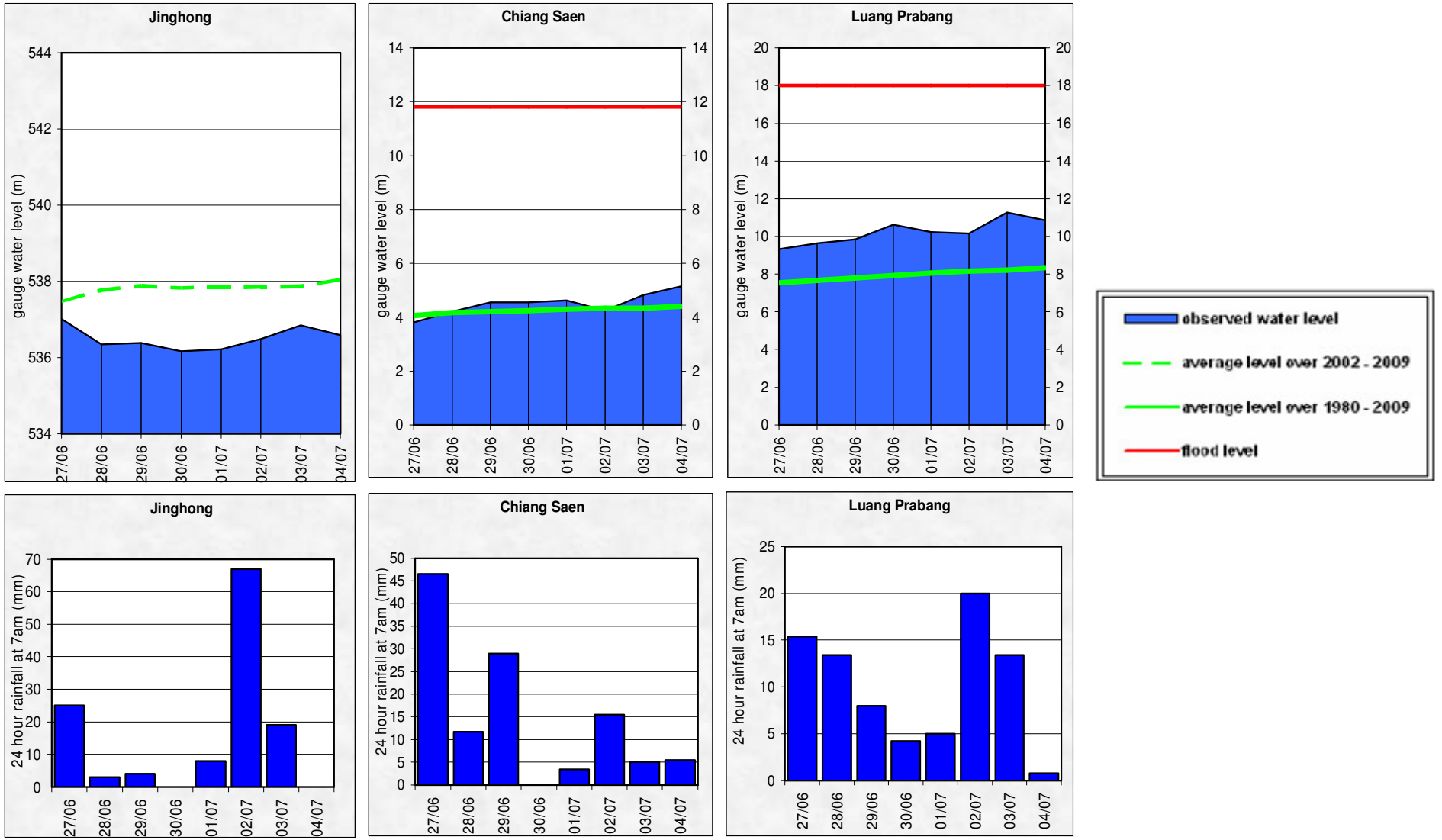


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

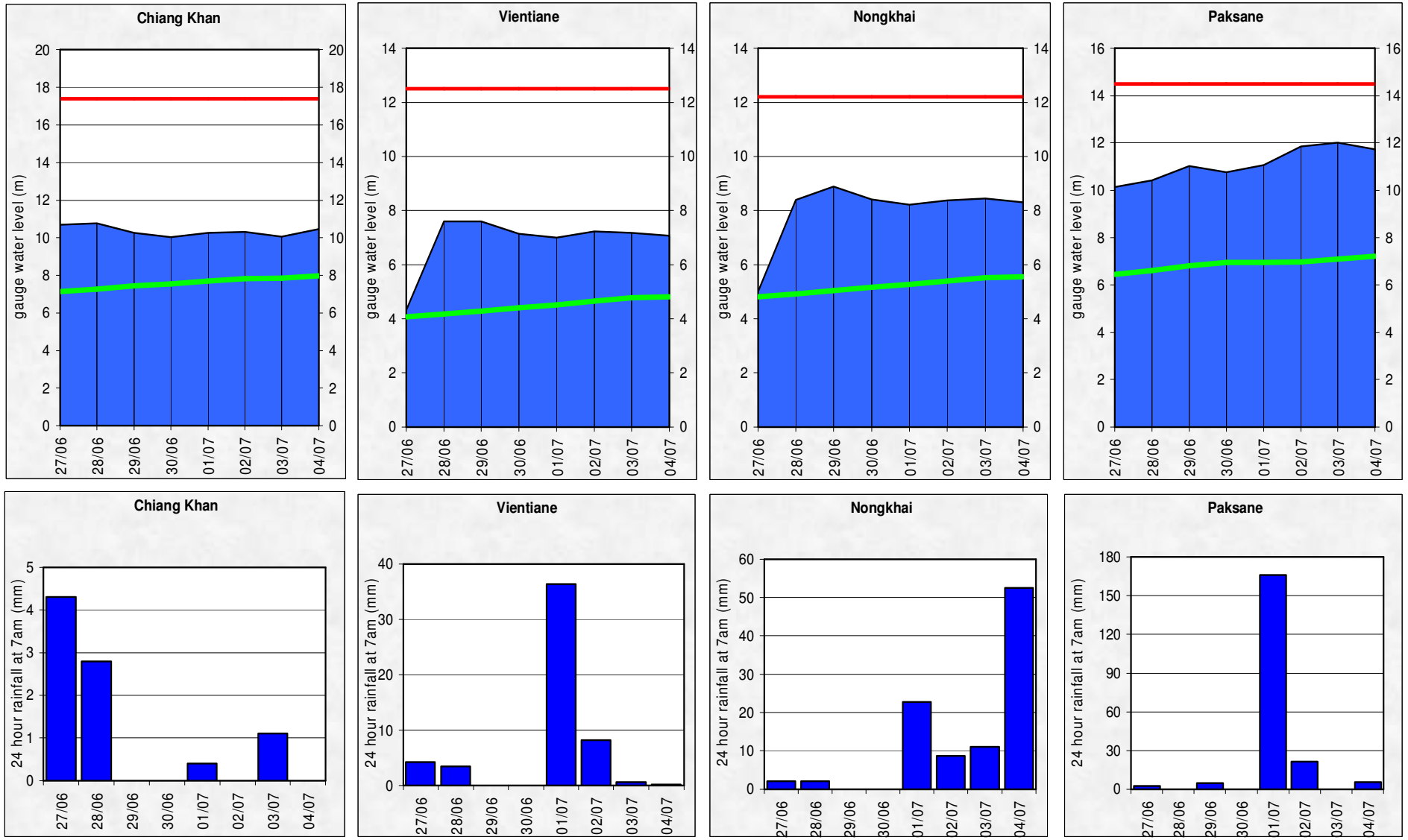


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

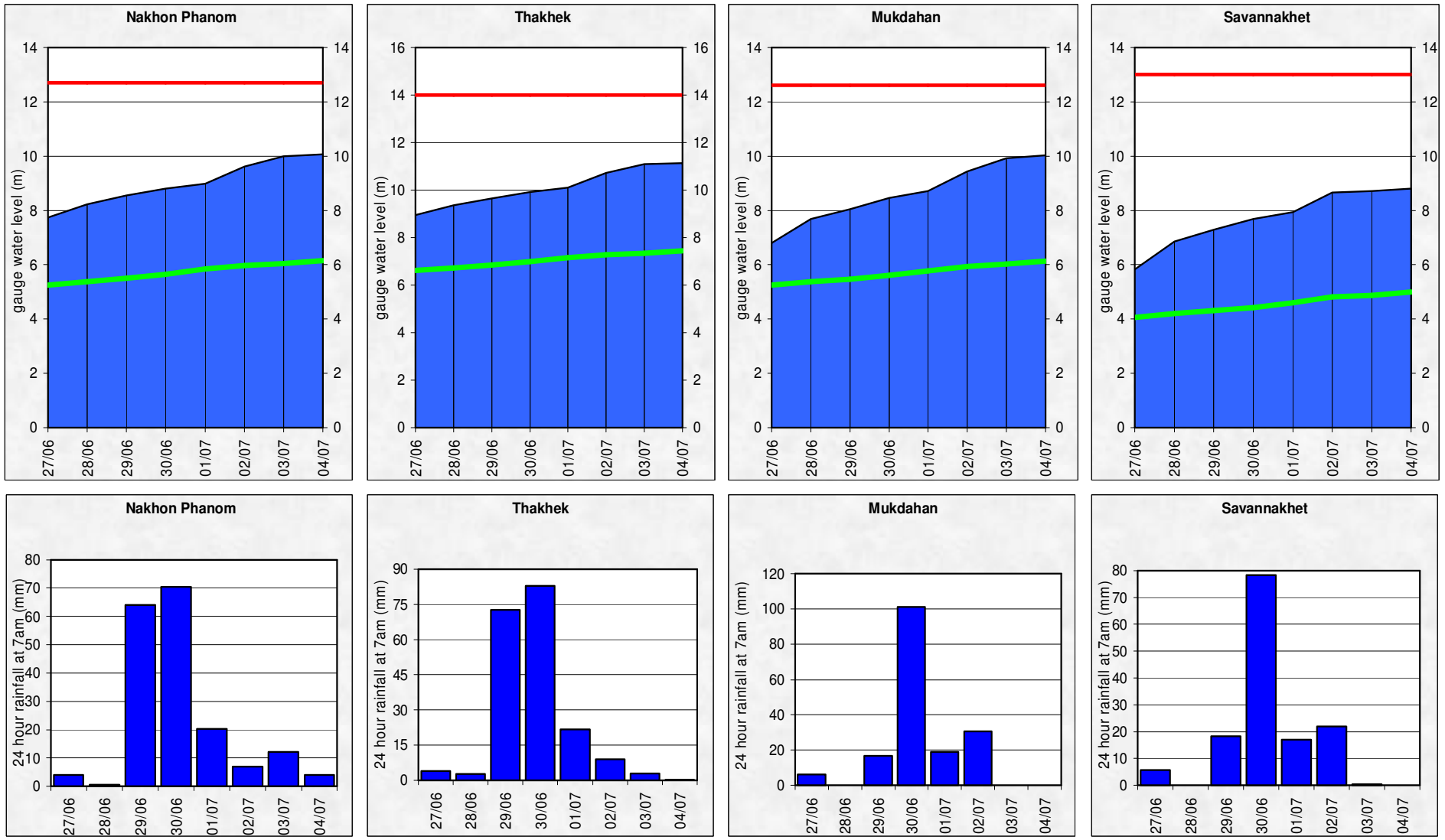


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

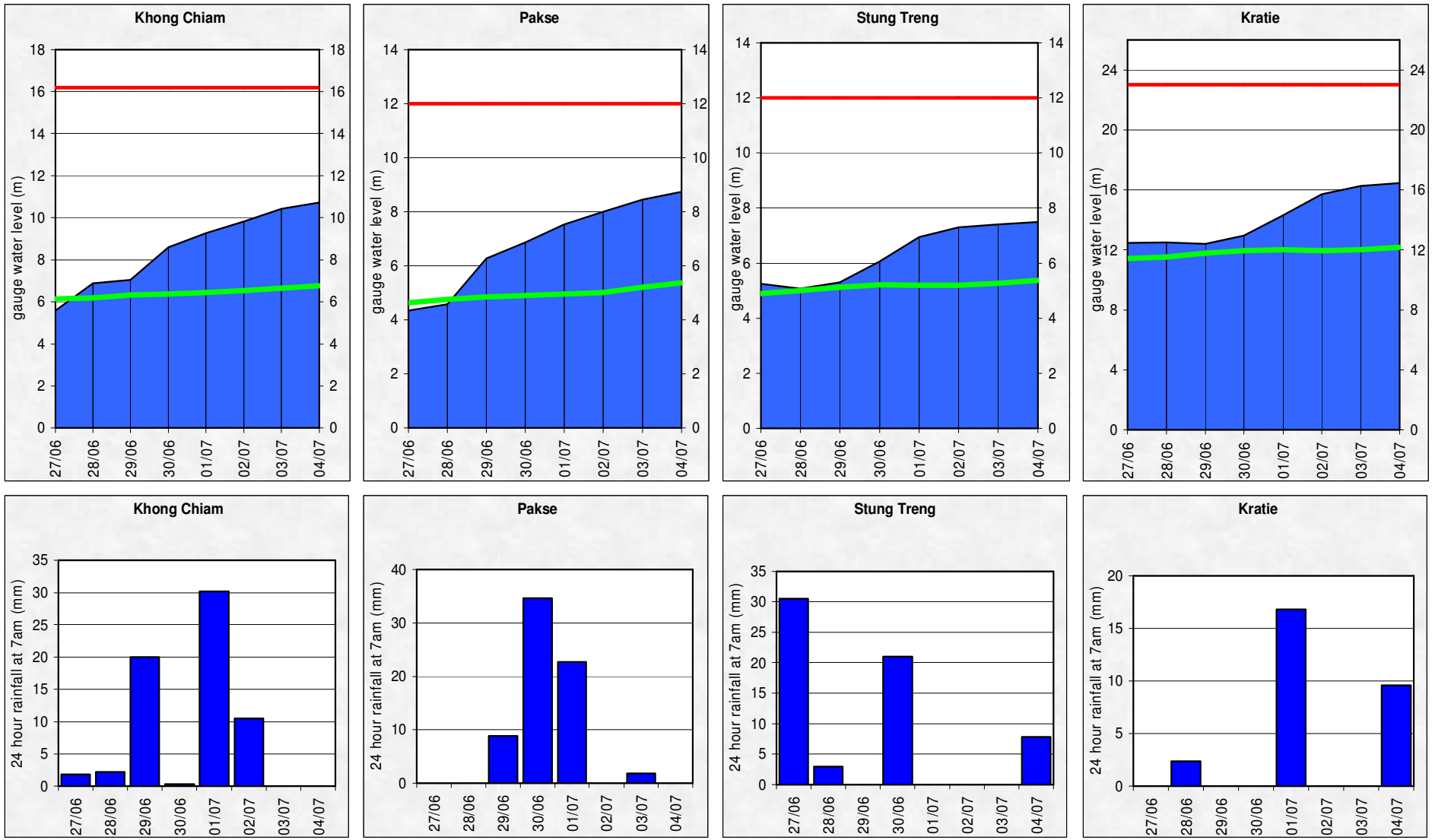


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

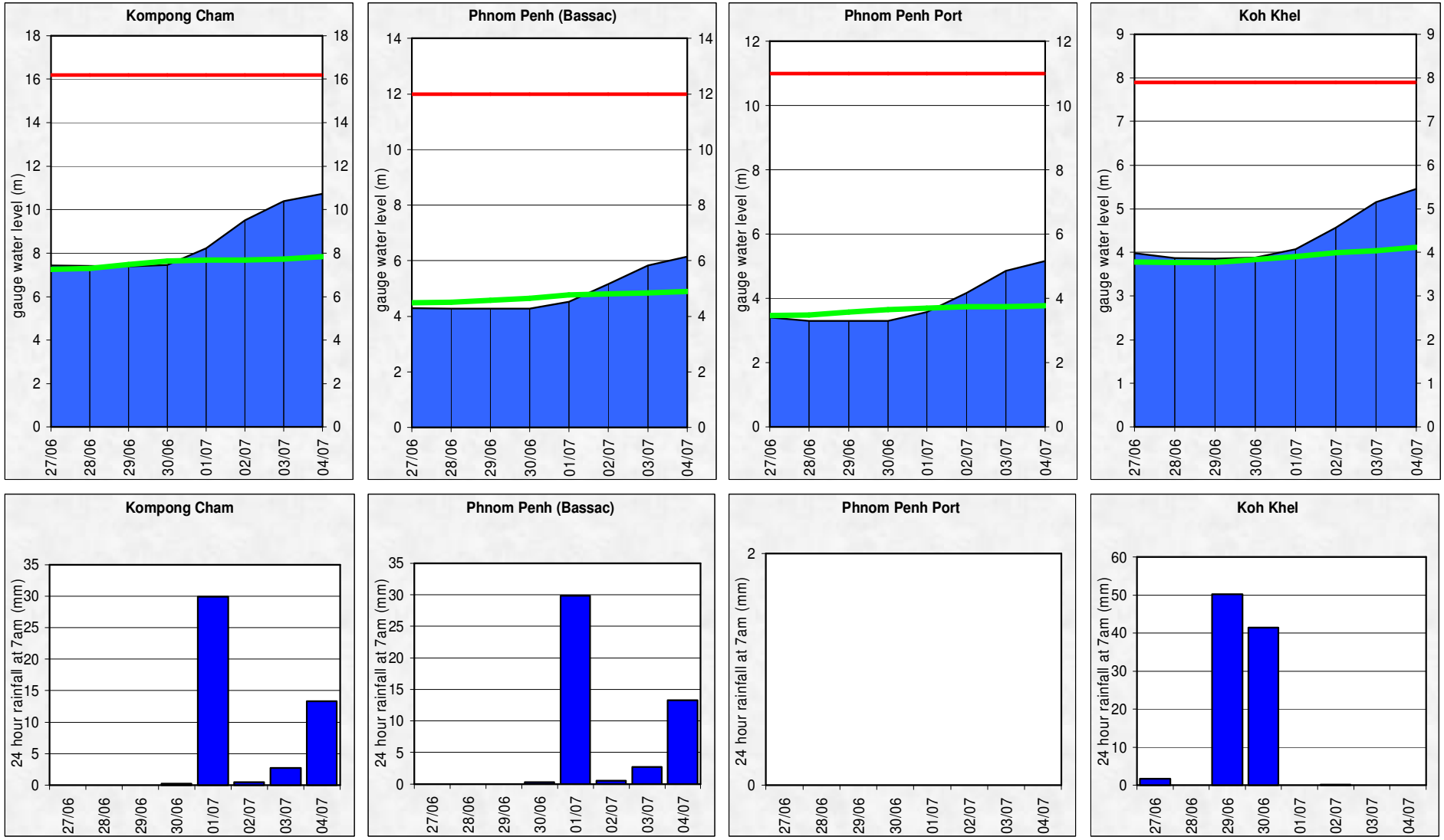
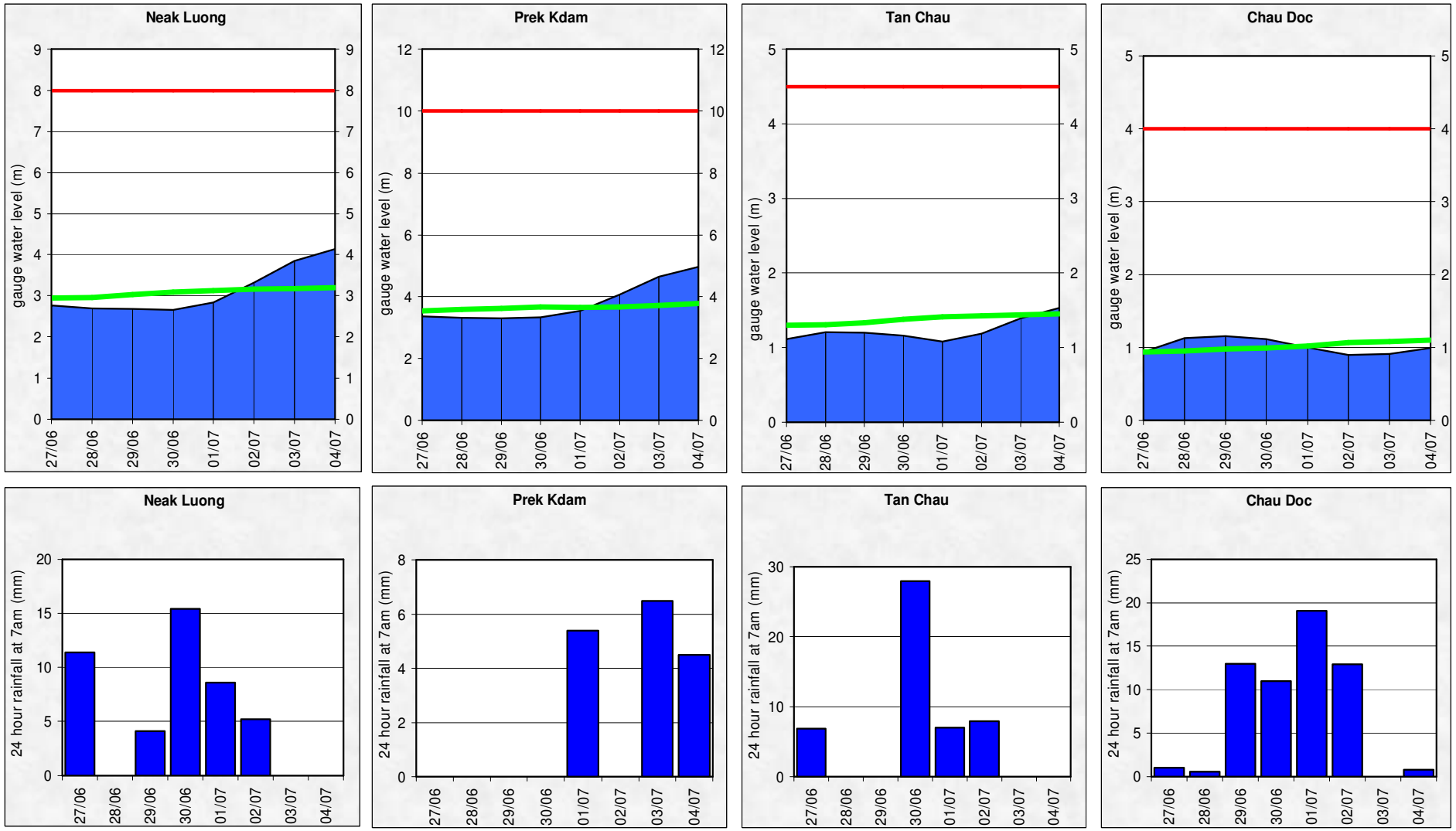


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

Accuracy

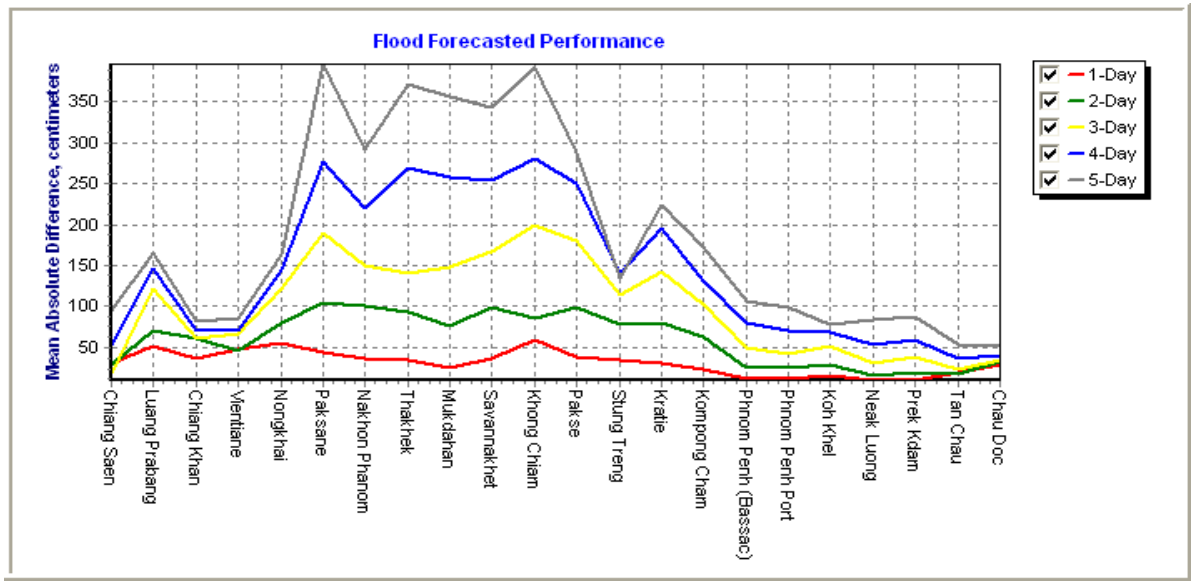
"Accuracy" describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster in Charge taking into consideration known biases in input data and his/her knowledge of the response of the model 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 in the upper reach were much better than that in the middle reach.

In general the overall accuracy is good for 1-day to 3-day forecast lead time at stations in the upper and lower reaches of LMB, however accuracies at stations Paksane, Nakhon Phanom/Thakhek, Mukdahan/Savannakhet and Kratie in the middle reach for 4-day and 5-day forecast were less than expected.

The differences due to 3 main factors: (1) high variability of the SRE and NWP when weather appearance by influences of strong SW; (2) internal model functionality in forecasting especially at those stations; (3)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	28.6	42.9	71.4	28.6	42.9	28.6	28.6	14.3	0.0	14.3	14.3	42.9	0.0	14.3	14.3	71.4	42.9	57.1	57.1	57.1	28.6	28.6	***33.1***
2-day	83.3	50.0	50.0	16.7	33.3	16.7	16.7	0.0	33.3	0.0	50.0	16.7	33.3	16.7	16.7	33.3	16.7	33.3	16.7	33.3	33.3	16.7	***28.0***
3-day	100.0	20.0	60.0	40.0	0.0	20.0	20.0	40.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0	***21.8***
4-day	75.0	25.0	25.0	50.0	0.0	25.0	25.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	25.0	25.0	0.0	0.0	***15.9***
5-day	66.7	33.3	33.3	33.3	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	***10.6***

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	*10:45*	*0*	*-*	*6*	*08:12*	*07:24*	*07:31*	*06:01*	*09:07*	*07:48*	*07:18*	*0*	*0*	*3*	*135*	*145*	*0*	*31*
month	*10:18*	*1*	*-*	*26*	*08:12*	*09:17*	*07:29*	*05:47*	*09:06*	*07:56*	*07:13*	*0*	*4*	*19*	*380*	*589*	*11*	*160*
season	*10:18*	*1*	*-*	*30*	*08:12*	*09:17*	*07:30*	*05:54*	*09:06*	*08:00*	*07:15*	*0*	*4*	*33*	*503*	*692*	*12*	*208*

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.

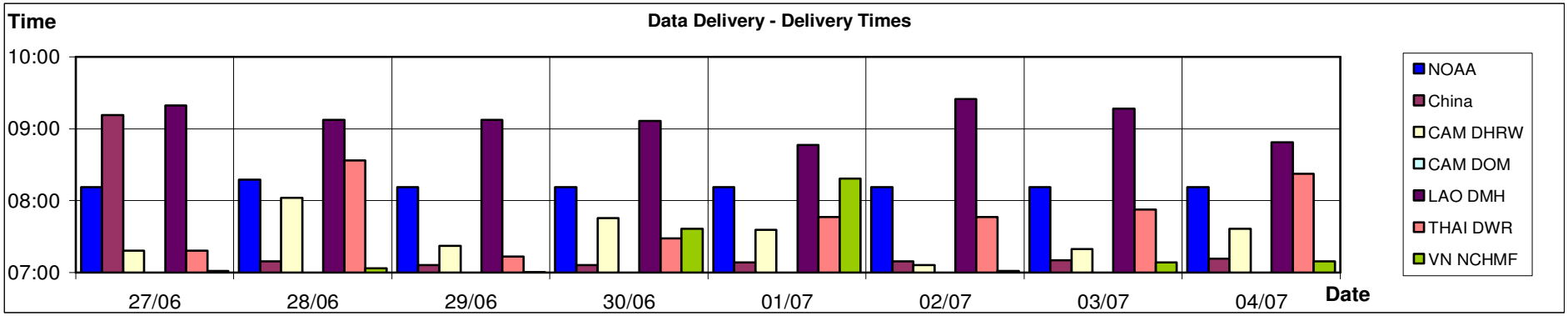


Figure B2: Data delivery times for the past 8 days including the current report date

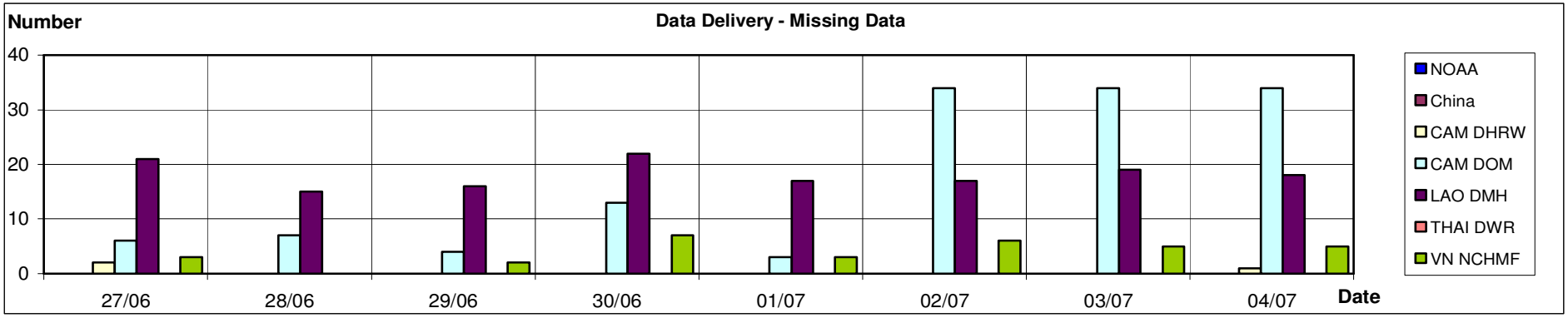


Figure B3: Missing data for the past 8 days including the current report date

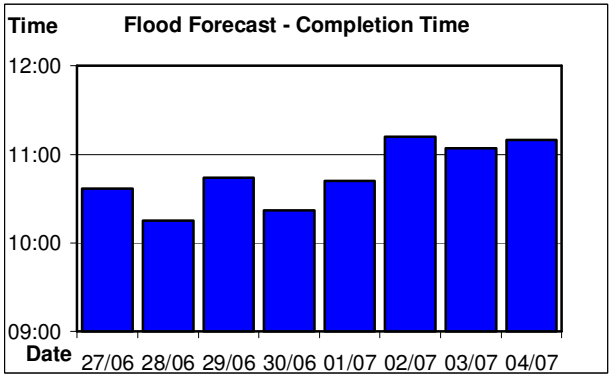


Figure B4: Flood forecast completion time

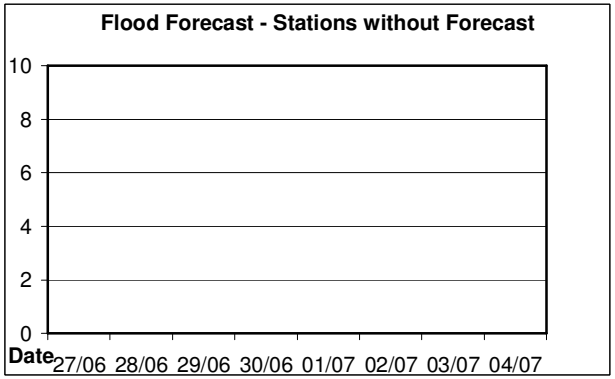


Figure B5: Flood forecast stations without forecast

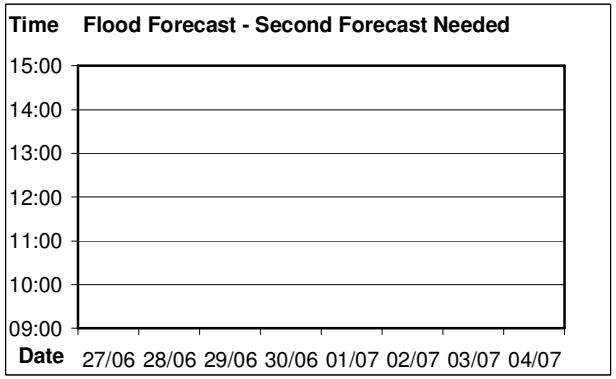


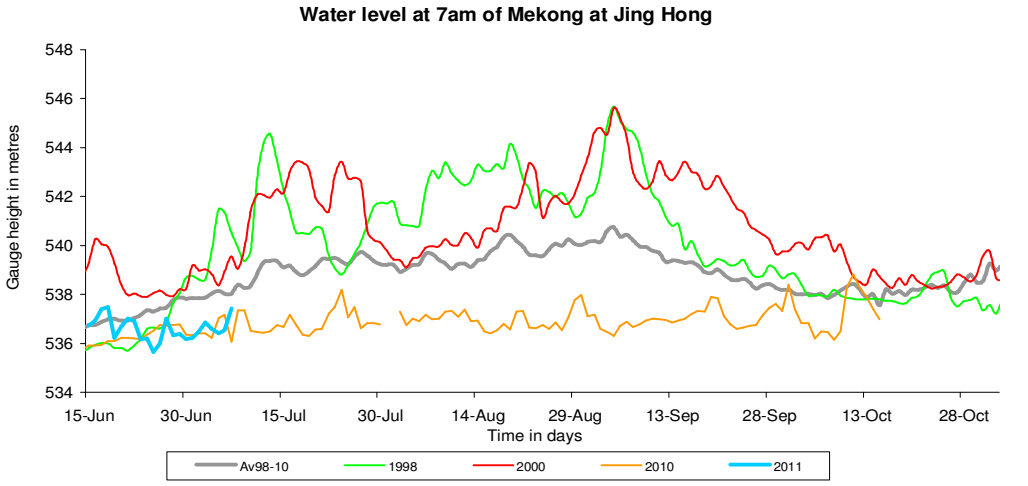
Figure B6: Second forecast needed

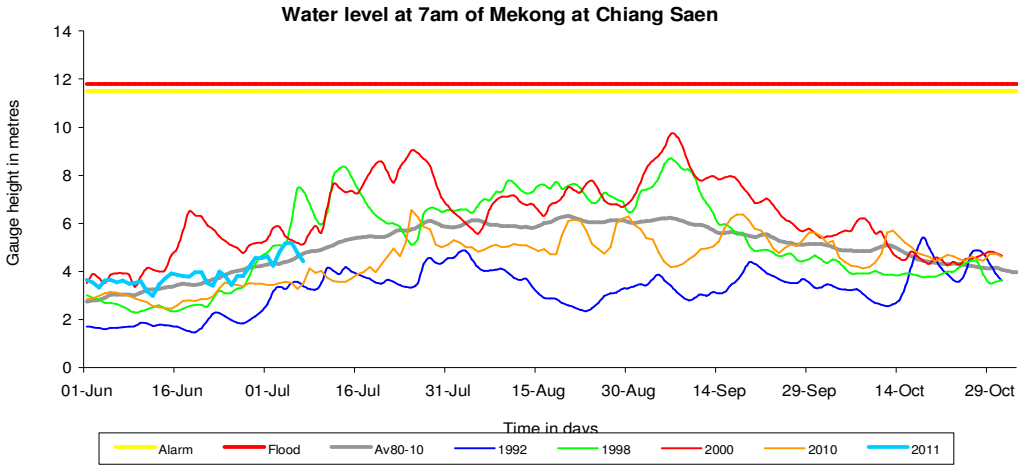
Annex C: Season Water Level Graphs

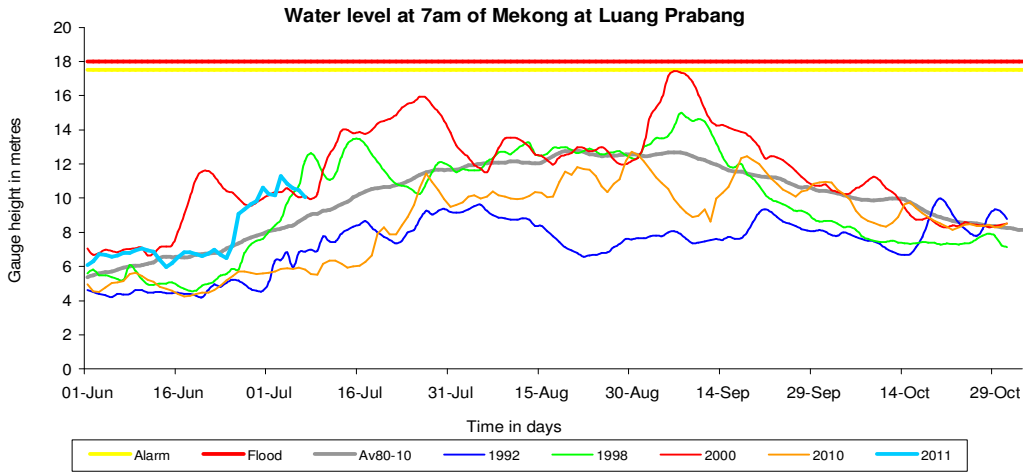
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

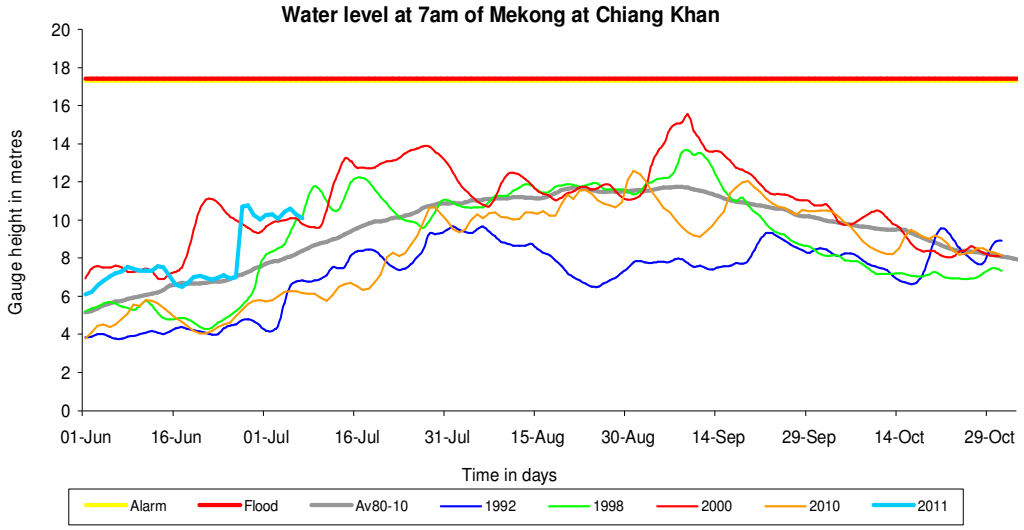
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

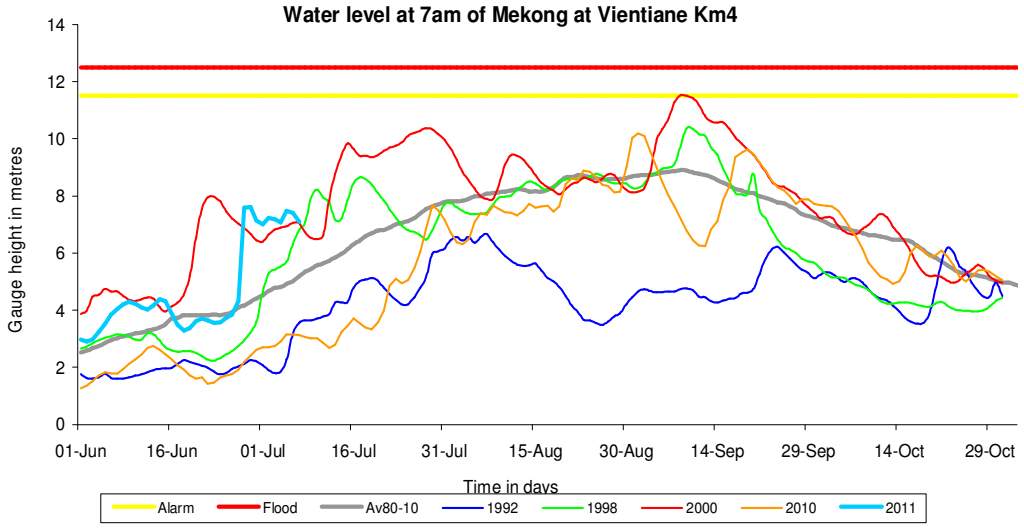
IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

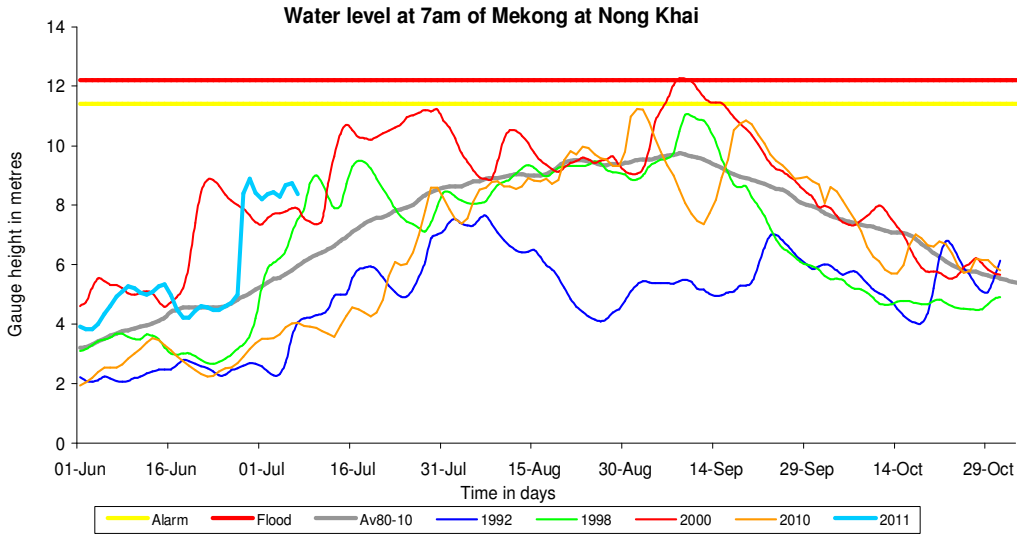


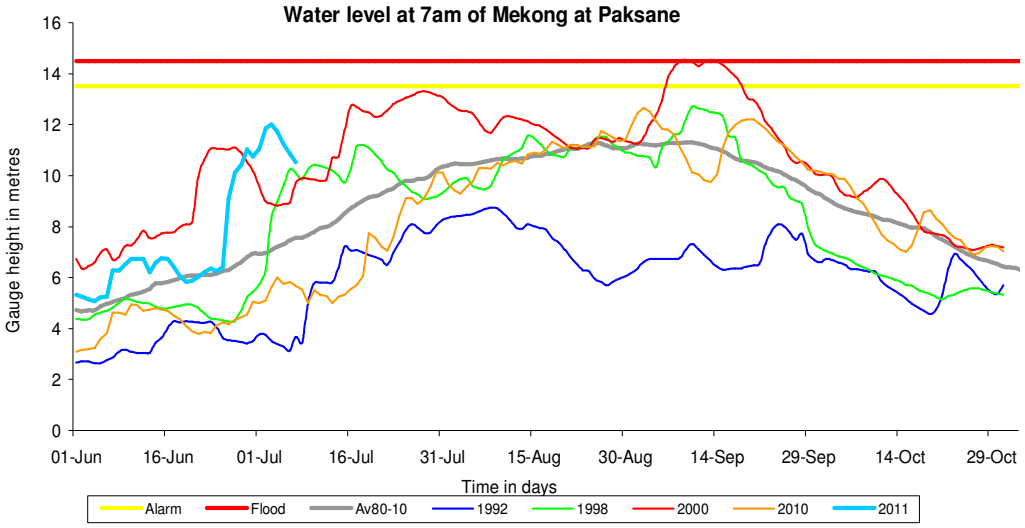


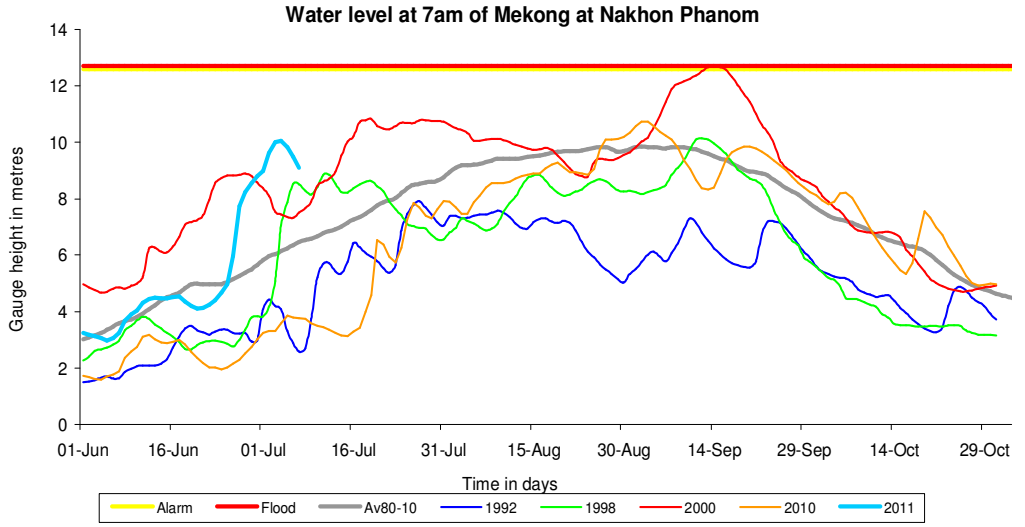


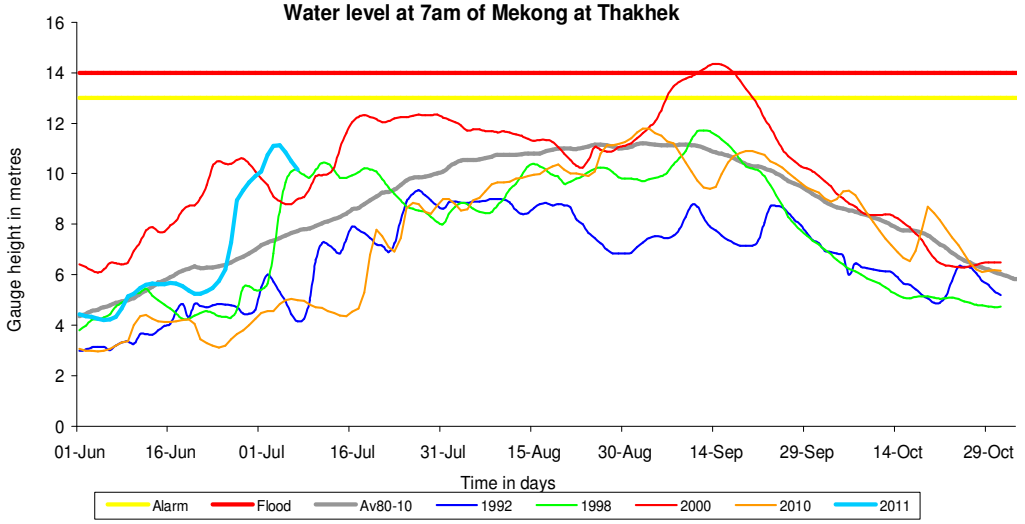

Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
20
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

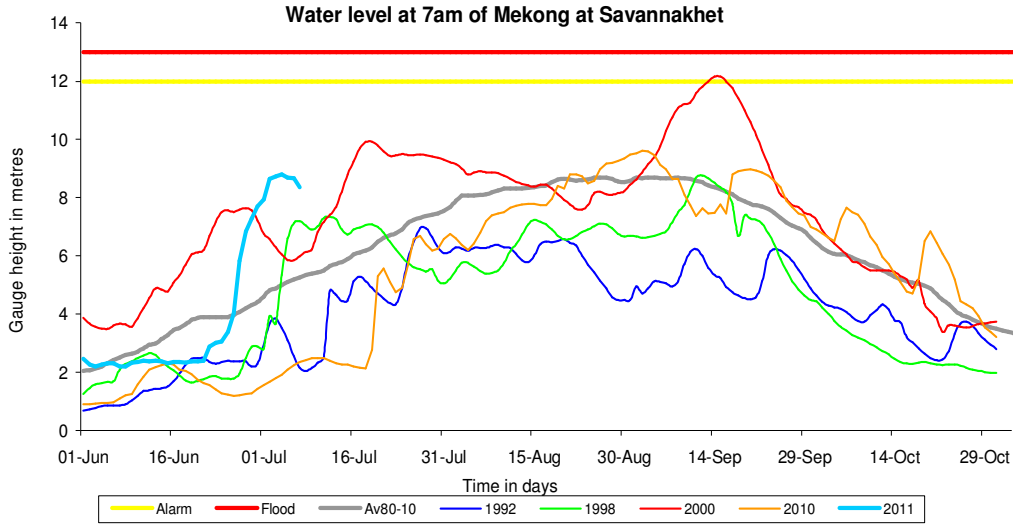

Water level at 7am of Mekong at Vientiane Km4
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

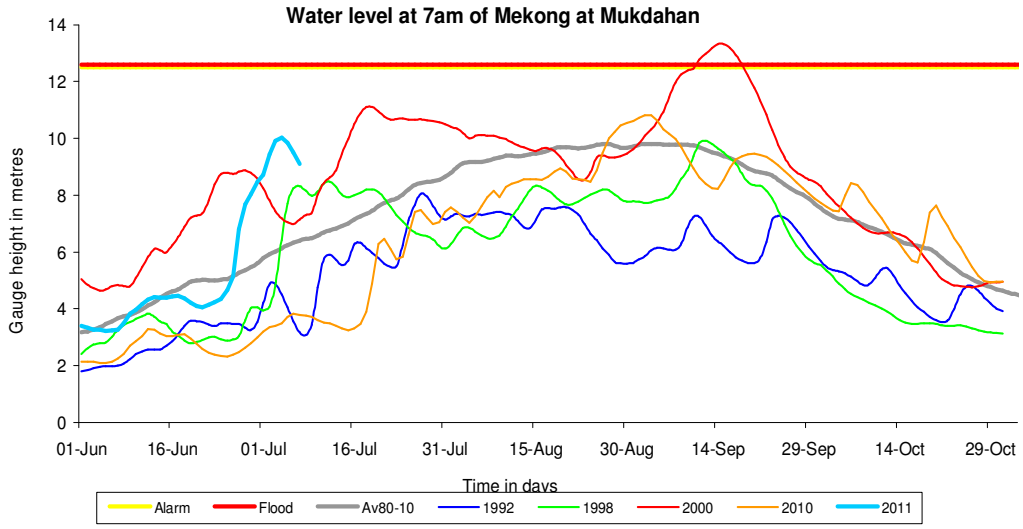

Water level at 7am of Mekong at Nong Khai
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

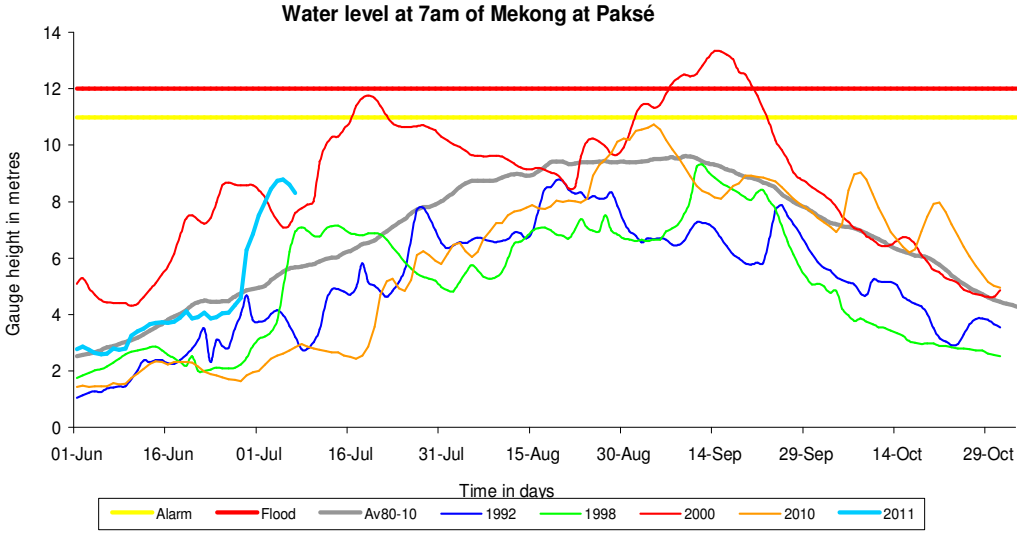

Water level at 7am of Mekong at Paksane
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

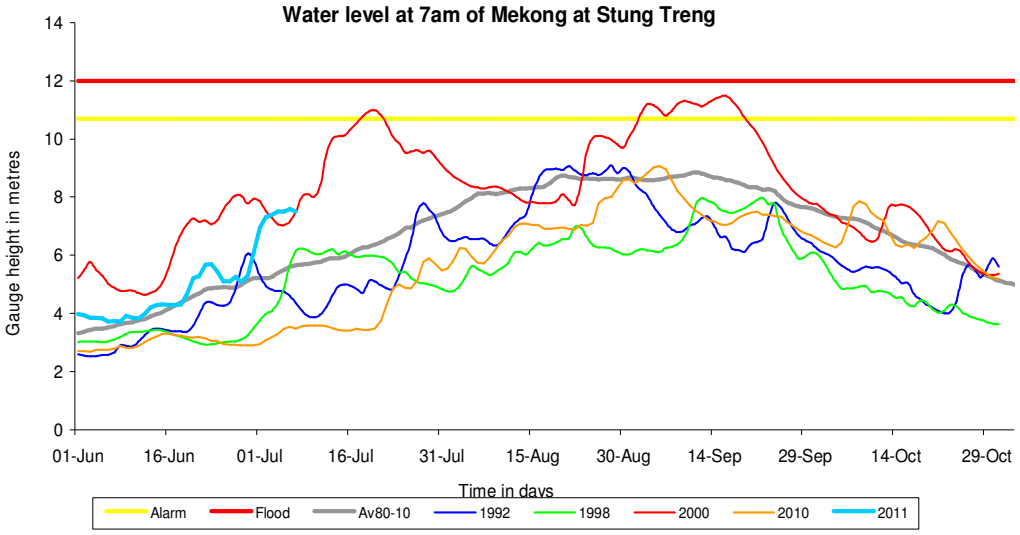

Water level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

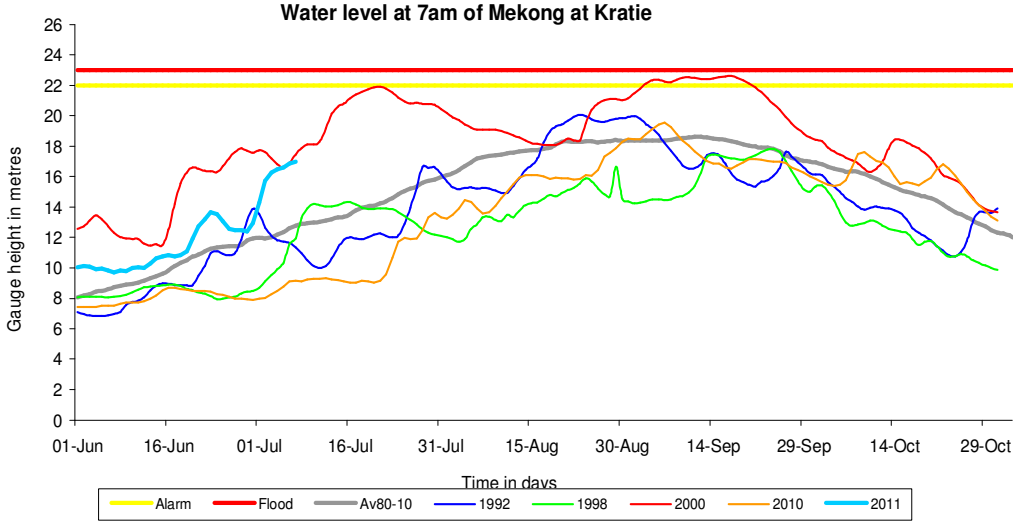

Water level at 7am of Mekong at Thakhek
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

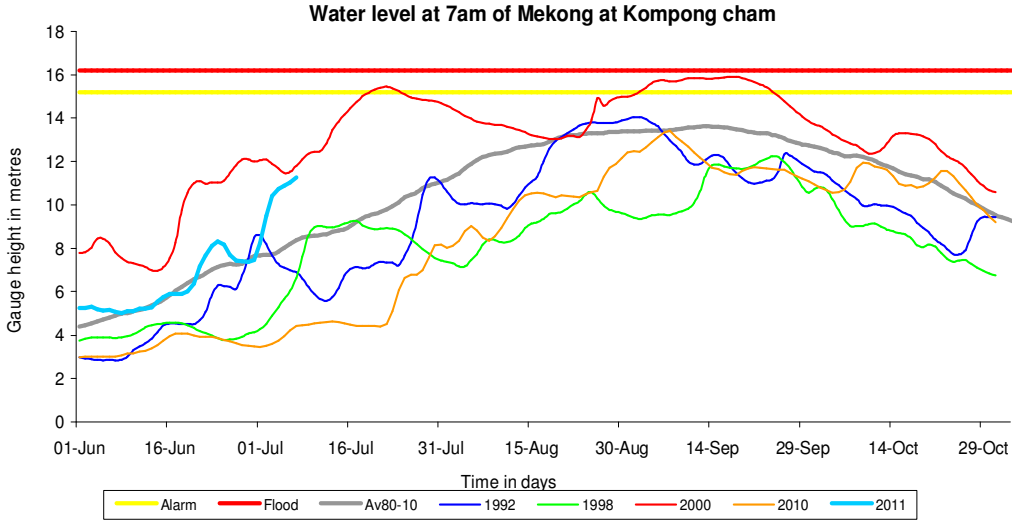

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

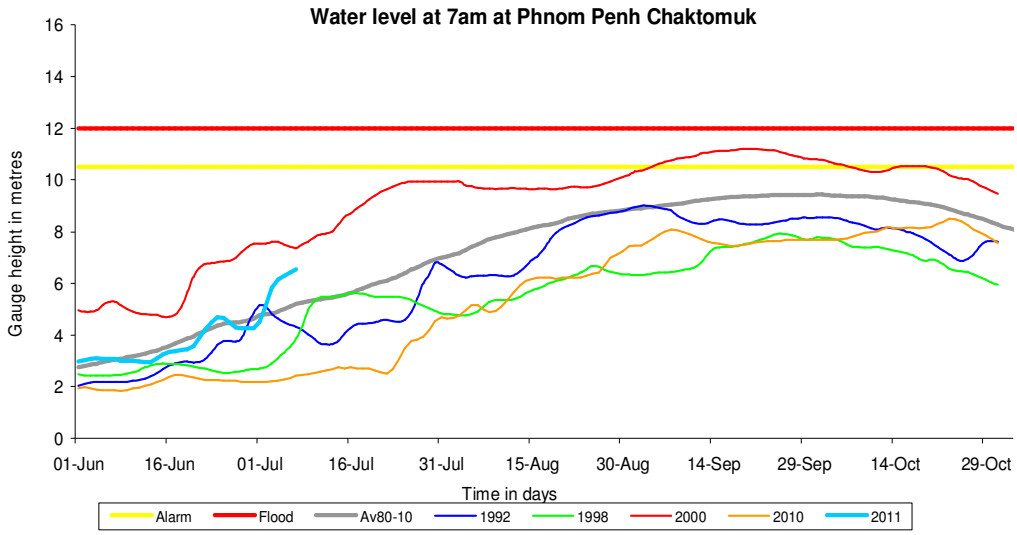

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

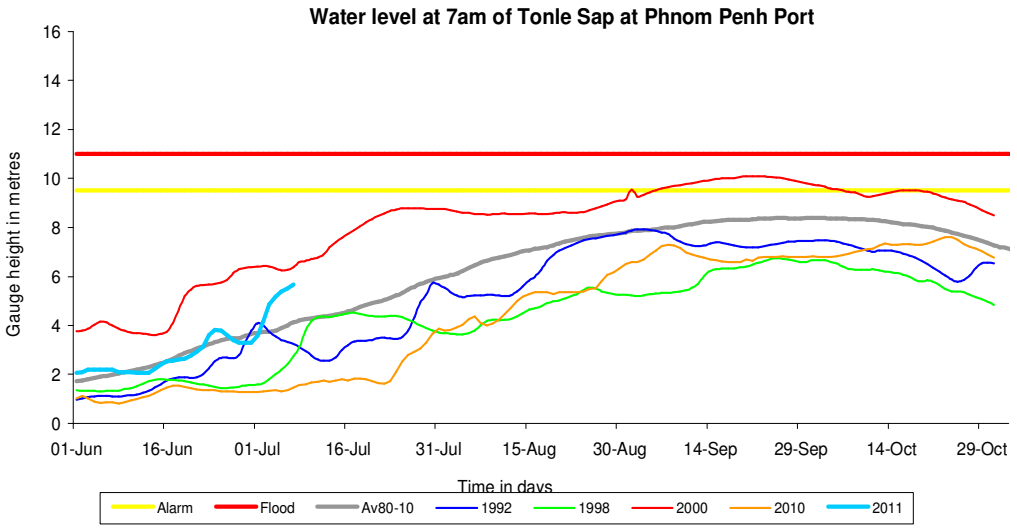

Water level at 7am of Mekong at Paksé
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

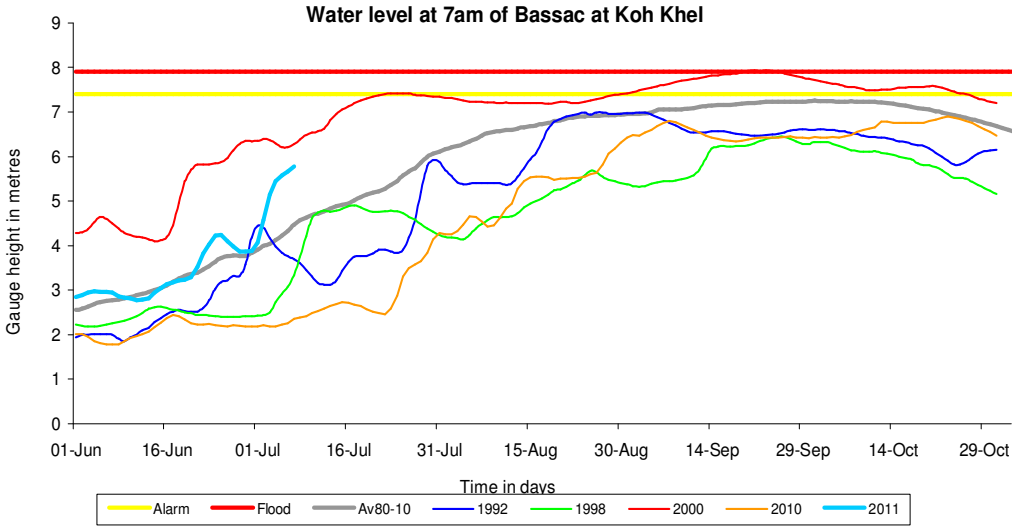

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

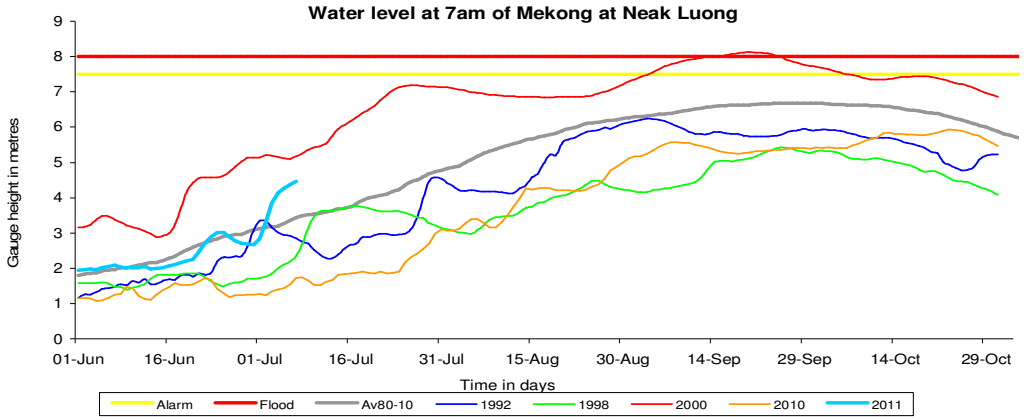

Water level at 7am of Mekong at Kratie
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
20
22
24
26
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

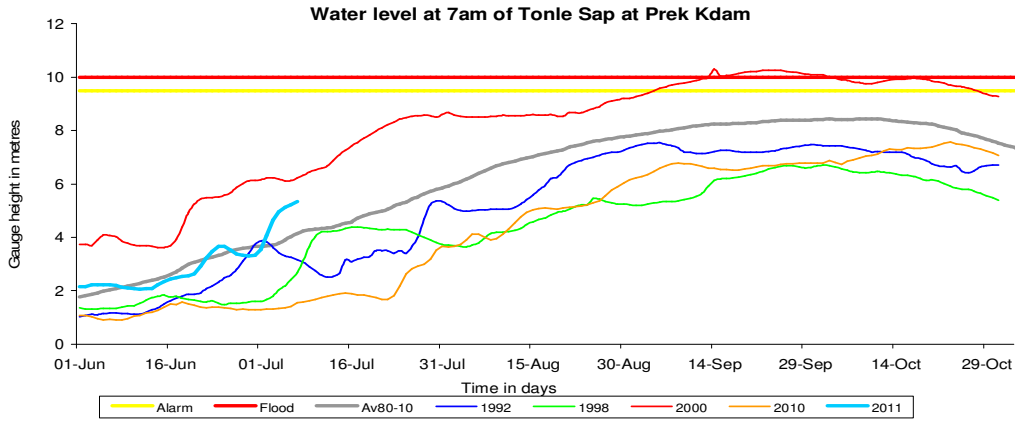

Water level at 7am of Mekong at Kompong cham
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

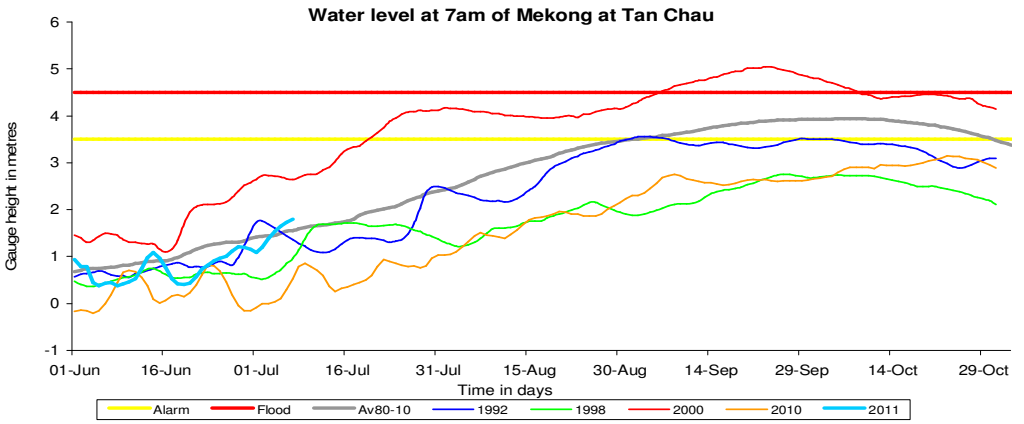

Water level at 7am at Phnom Penh Chaktomuk
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011

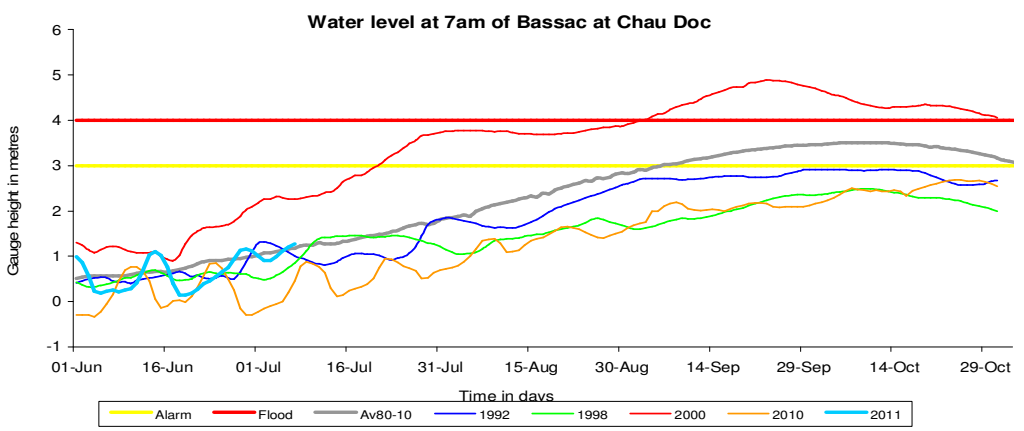

Water level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011


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
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
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
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
Time in days
Alarm
Flood
Av80-10
1992
1998
2000
2010
2011