Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 14/09/2009, covering the week from 7th to 14th September 2009

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

General weather patterns

Between the 7th and 14th of September, 2009, seven weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of 7 and 13 September bulletins are presented in the figures below:

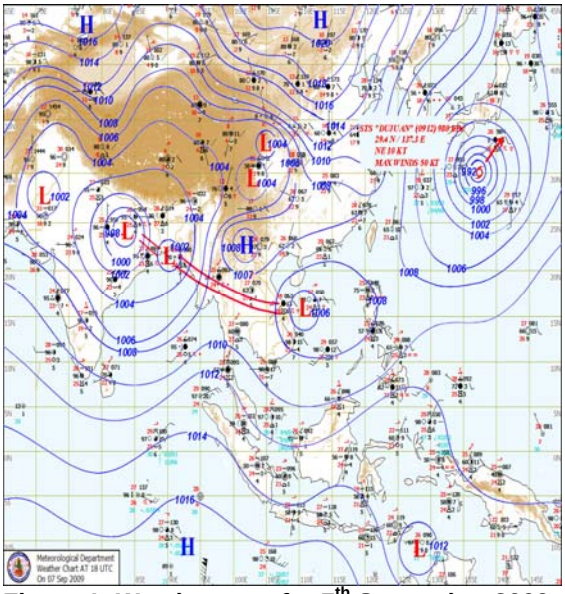


Figure 1: Weather map for 7th September 2009

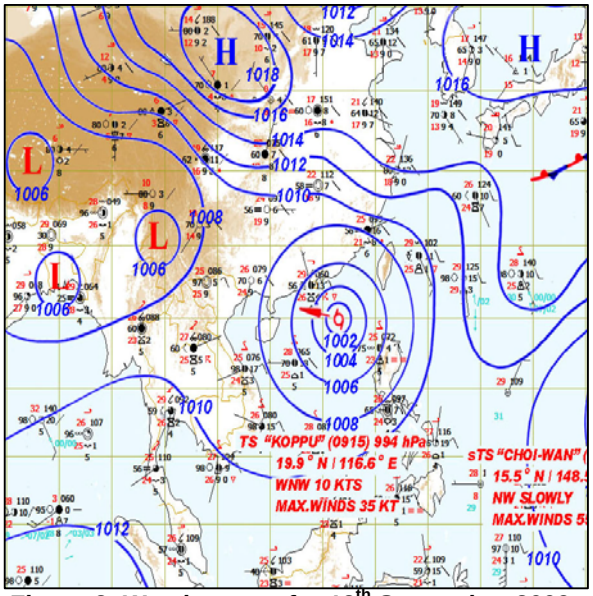


Figure 2: Weather map for 13th September 2009

Strong to Moderate South-West (SW) Monsoon

A strong SW monsoon prevailed over the Indochina Peninsula from the 7th to the 10th of September. From the 11th to the 14th of September, a moderate monsoon occurred over the Bay of Bengal, Gulf of Thailand and the Indochina Peninsula (Figure 1 and Figure 2).

ITCZ (Inter Tropical Convergence Zone)

From the 7th until the 10th of September an Inter Tropical Convergence Zone (ITCZ) lay across India, Bangladesh, the Bay of Bengal, Myanmar, Thailand, Lao PDR, Northern Cambodia, Viet Nam, the South China Sea and the Philippines.

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

The trough of TS ***MUJIGAE*** lay across Southern Viet Nam, Lao PDR, Cambodia and Thailand during between the 11th and the 12th of September.

Starting from the 13th of September a low pressure trough lay across Southern Viet Nam and Cambodia. In addition, the Tropical Storm "***KOPPU***" with central pressure of 994 hPa is moving towards WNW at a speed of 19 km/h with a maximum wind speed in the centre of 56 km/h. Another, Severe Tropical Storm (STS) "***CHOI-WAN***" with central pressure of 998 hPa is moving slowly towards the NW with a maximum wind speed in the centre of 102 km/h (Figure 2).

Other weather phenomena that affect the discharge of the Mekong River

No other weather phenomena affecting the discharge were observed.

Overall weather situation

A strong SW monsoon and Inter Tropical Convergence Zone (ITCZ) occurred from the 7th until the 10th of September. From the 11th of September a moderate SW monsoon prevailed over the Bay of Bengal, Gulf of Thailand and Indochina Peninsula. A trough from TS ***MUJIGAE*** lay across Southern Viet Nam, Lao PDR, Cambodia and Thailand between the 11th and 12th of September.

General behaviour of the Mekong River

Water levels were falling in the upper and middle reaches of the Lower Mekong River during the monitored period and most stations are recording levels that are somewhat below the long-term average. In the lower reaches of the Lower Mekong, water levels were rising and most stations were recording levels that are somewhat about the long-term average. Water levels have reached alarm levels at Tan Chau and Chau Doc monitoring stations since the mid of the week.

For stations from Chiang Saen to Paksane

Water levels were falling towards the end of the week. Most stations were recording levels that are somewhat below the long-term average for this time of the year.

For stations from Nakhon Phanom to Pakse

Water levels were more or less stable, falling towards the end of the week. Most stations were recording levels that are somewhat below the long-term average for this time of the year.

For stations from Stung Treng to Kratie

Water levels were rising until the mid of the week then fell towards the end of the week. Most stations were recording levels that are somewhat around the long-term average for this time of the year.

For stations from Kampong Cham to Koh Khel/Neak Luong

Water levels were rising towards the end of the week. Most stations were recording levels that are somewhat around the long-term average for this time of the year.

Tan Chau and Chau Doc

Water levels were rising towards the end of the week. Most stations were recording levels that are somewhat below the long-term average for this time of the year. The water levels at both stations were above the alarm levels as defined by the national agency.

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

Flood Situation

- Flood stage or alarm stage:

During the last week, the water levels at Tan Chau and Chau Doc were above alarm level as defined by the national agency. No alarm stage (where the forecast is expected to reach flood level within three days) was reported anywhere in the Mekong River during the past week. Water levels are still below flood levels (as defined by the national agencies) at all forecast stations.

- Damage or victims:

No damage or loss of life due to river flooding was recorded anywhere in the Mekong River Basin 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

2009	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
07/09	538.17	5.53	10.50	10.46	7.83	8.76	9.96	7.32	8.44	6.82	5.85	8.45	6.78	7.70	17.90	12.21	8.36	7.39	6.75	5.88	7.45	2.94	2.41
08/09	538.23	5.84	10.30	9.99	7.37	8.34	9.77	7.38	8.49	6.94	5.98	8.73	7.06	8.04	18.55	12.64	8.40	7.51	6.82	5.96	7.54	2.99	2.45
09/09	538.30	5.70	10.46	9.82	6.92	7.86	9.42	7.25	8.36	6.94	5.95	9.05	7.42	8.32	19.00	12.97	8.51	7.64	6.87	6.05	7.64	3.04	2.48
10/09	538.08	5.52	10.44	9.97	6.73	7.62	9.06	6.97	8.10	6.71	5.76	9.08	7.64	8.95	19.50	13.30	8.56	7.70	6.94	6.15	7.74	3.10	2.51
11/09	537.99	5.29	10.28	9.87	6.77	7.58	8.86	6.71	7.85	6.44	5.50	8.69	7.25	9.12	20.24	13.75	8.82	7.98	7.02	6.24	7.85	3.17	2.57
12/09	536.35	5.20	10.10	9.74	6.78	7.61	8.85	6.56	7.72	6.20	5.34	8.29	6.94	8.80	20.21	14.00	8.94	8.15	7.09	6.34	7.96	3.23	2.61
13/09	536.24	5.20	9.90	9.55	6.63	7.48	8.84	6.70	7.84	6.21	5.27	7.98	6.59	8.20	19.71	14.03	9.02	8.23	7.15	6.39	8.04	3.28	2.66
14/09	536.87	4.95	9.92	9.43	6.40	7.24	8.70	6.72	7.86	6.32	5.37	7.98	6.38	7.82	19.05	13.80	9.02	8.23	7.13	6.41	8.08	3.33	2.72
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

2009	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
07/09	3.4	11.2	15.4	0.0	0.0	18.7	0.0	25.1	10.4	12.7	18.0	31.8	0.8	12.0	41.8	54.8	10.2	0.0	32.0	10.2	21.3	24.0	21.0
08/09	0.0	8.9	7.4	1.4	0.0	0.0	0.0	8.3	0.6	7.0	7.4	5.8	0.0	33.2	53.8	15.2	6.5	0.0	6.5	5.6	6.2	1.0	0.0
09/09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.3	26.5	18.5	20.0	2.0	0.2	0.0	0.0	0.0	0.0	1.0	0.0
10/09	0.0	5.5	0.0	25.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	19.5	27.7	35.0	26.4	30.4	0.0	0.0	6.2	7.3	0.0	4.0
11/09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	4.8	4.5	6.3	0.0	0.5	0.2	2.5	0.0	0.1
12/09	0.0	0.0	9.6	0.0	0.0	0.0	32.2	0.6	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	74.6	0.0	2.7	0.0	0.0	6.0	0.2
13/09	24.8	2.3	7.6	2.7	0.0	0.0	0.6	5.7	8.5	19.7	15.2	0.0	0.0	0.0	18.6	0.0	20.4	0.0	26.0	0.0	0.0	0.0	0.1
14/09	1.4	9.8	0.0	0.0	1.0	0.0	0.0	23.4	34.0	0.0	0.0	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0

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

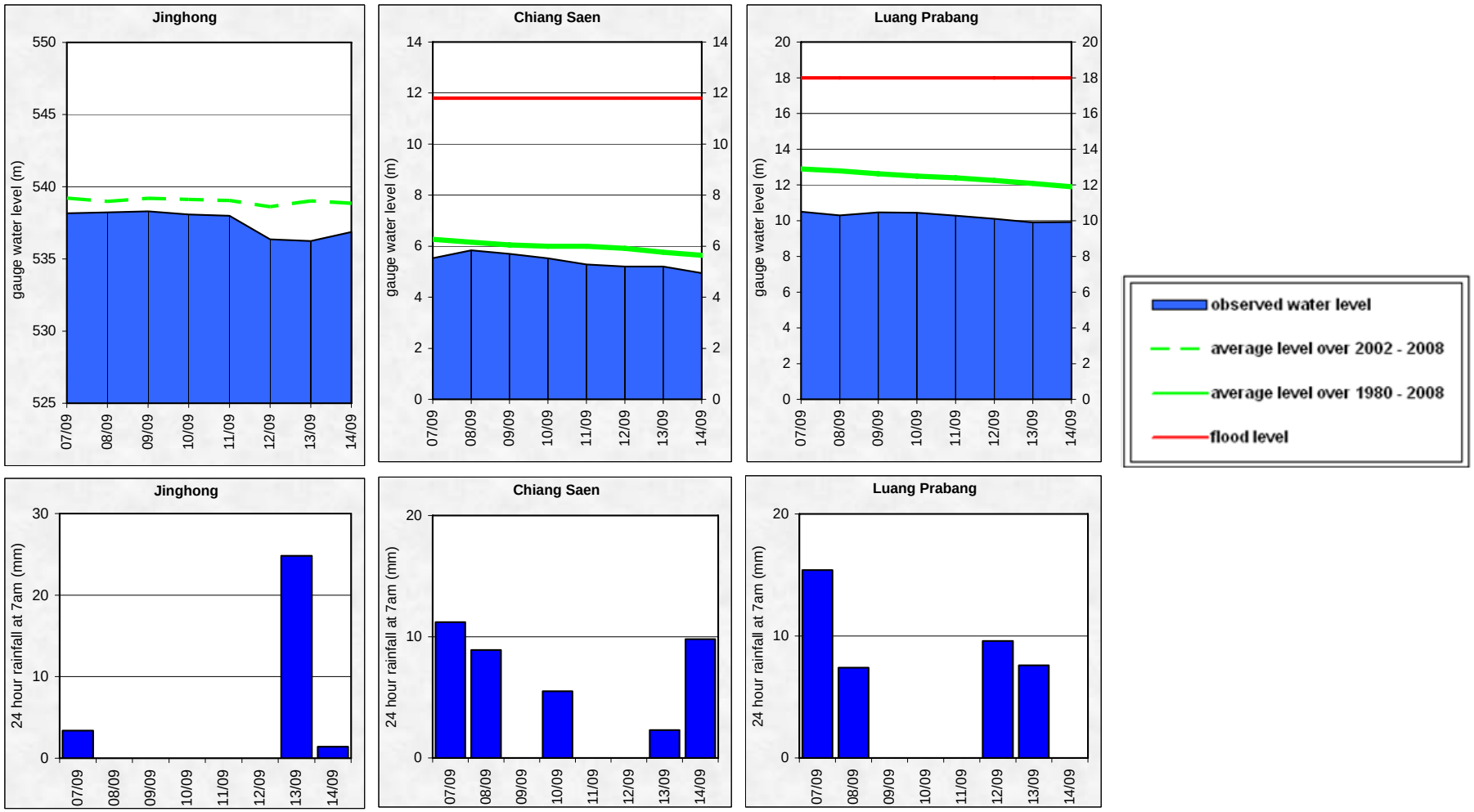


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

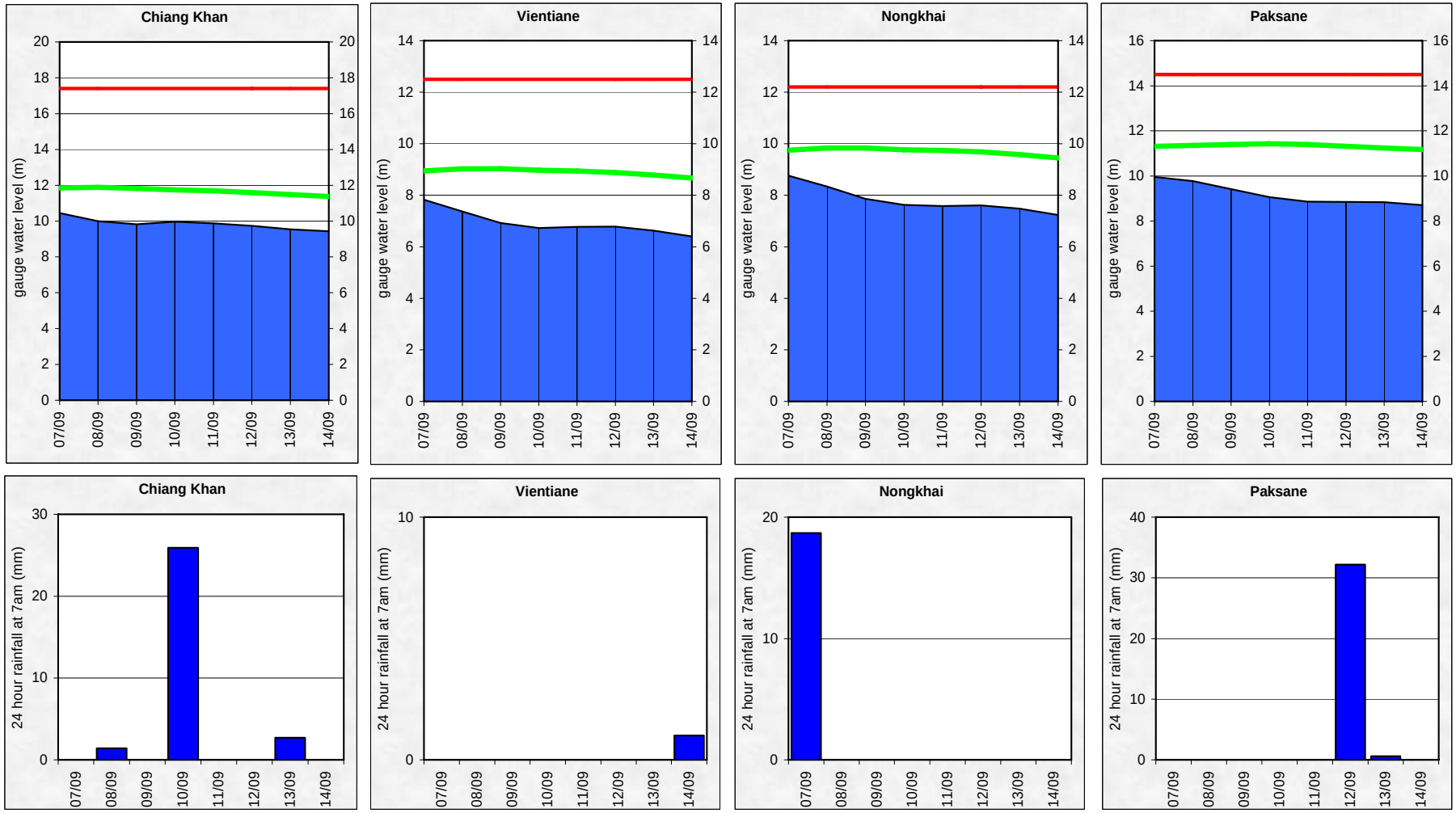


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

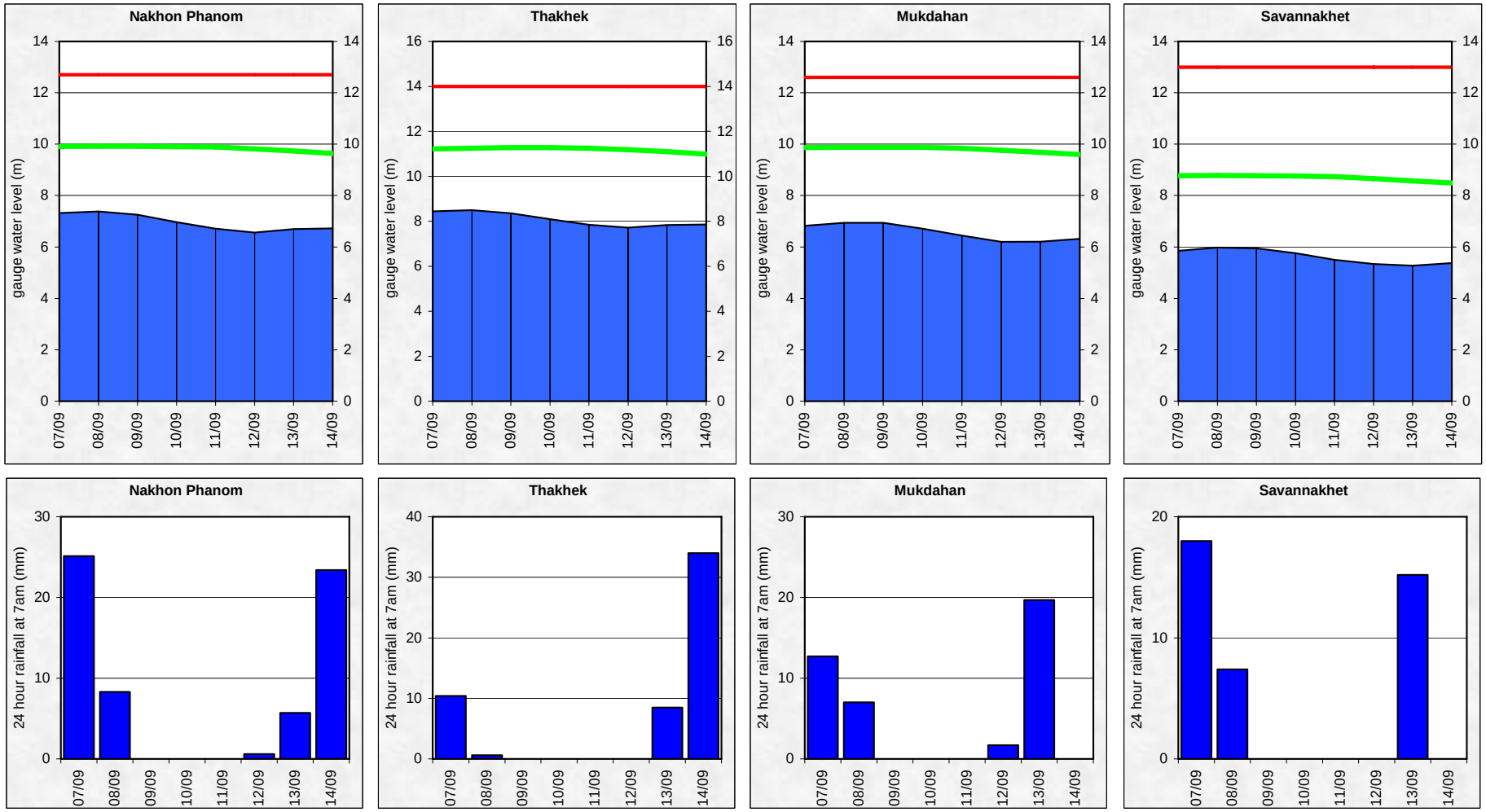


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

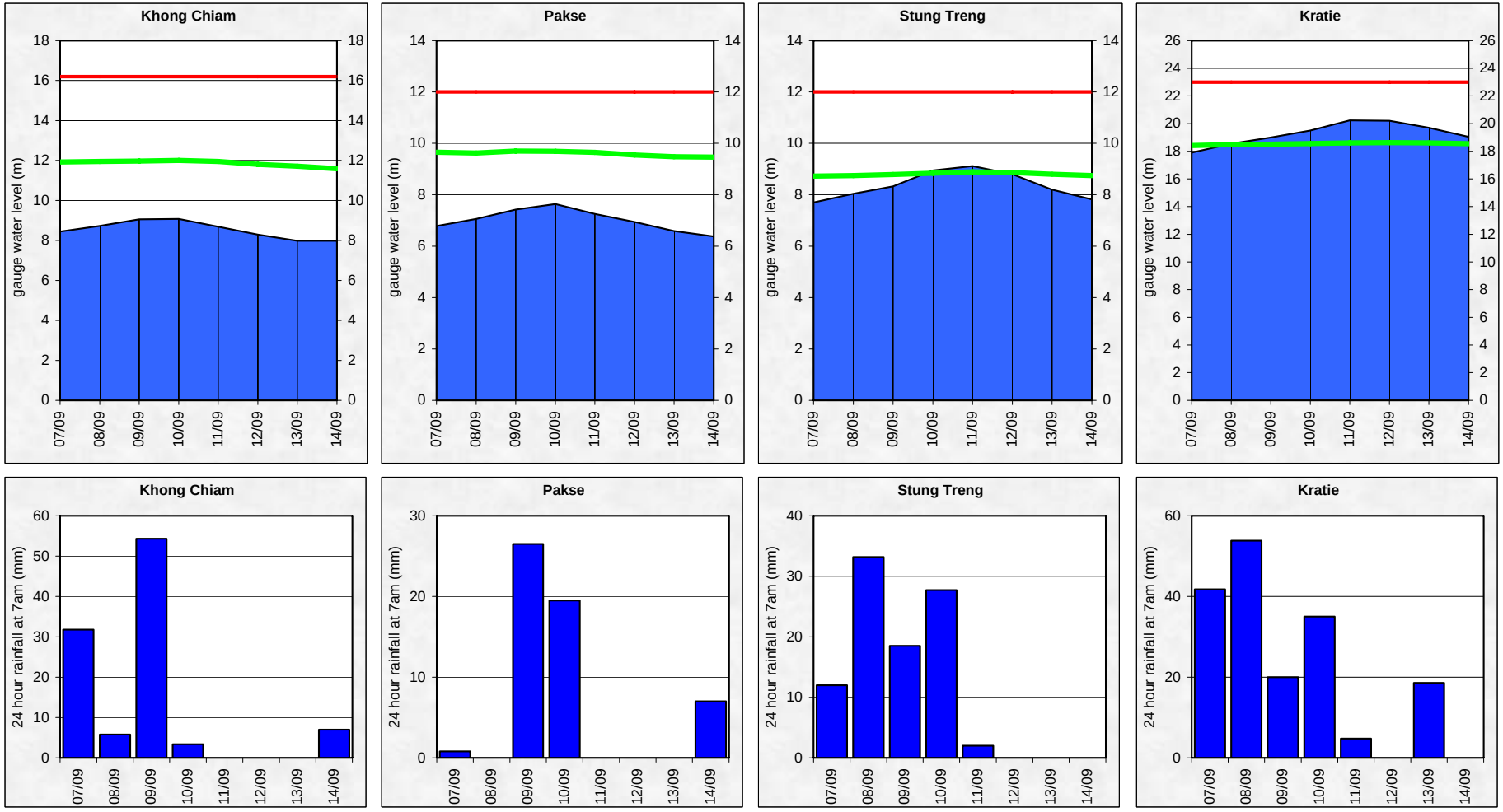


Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

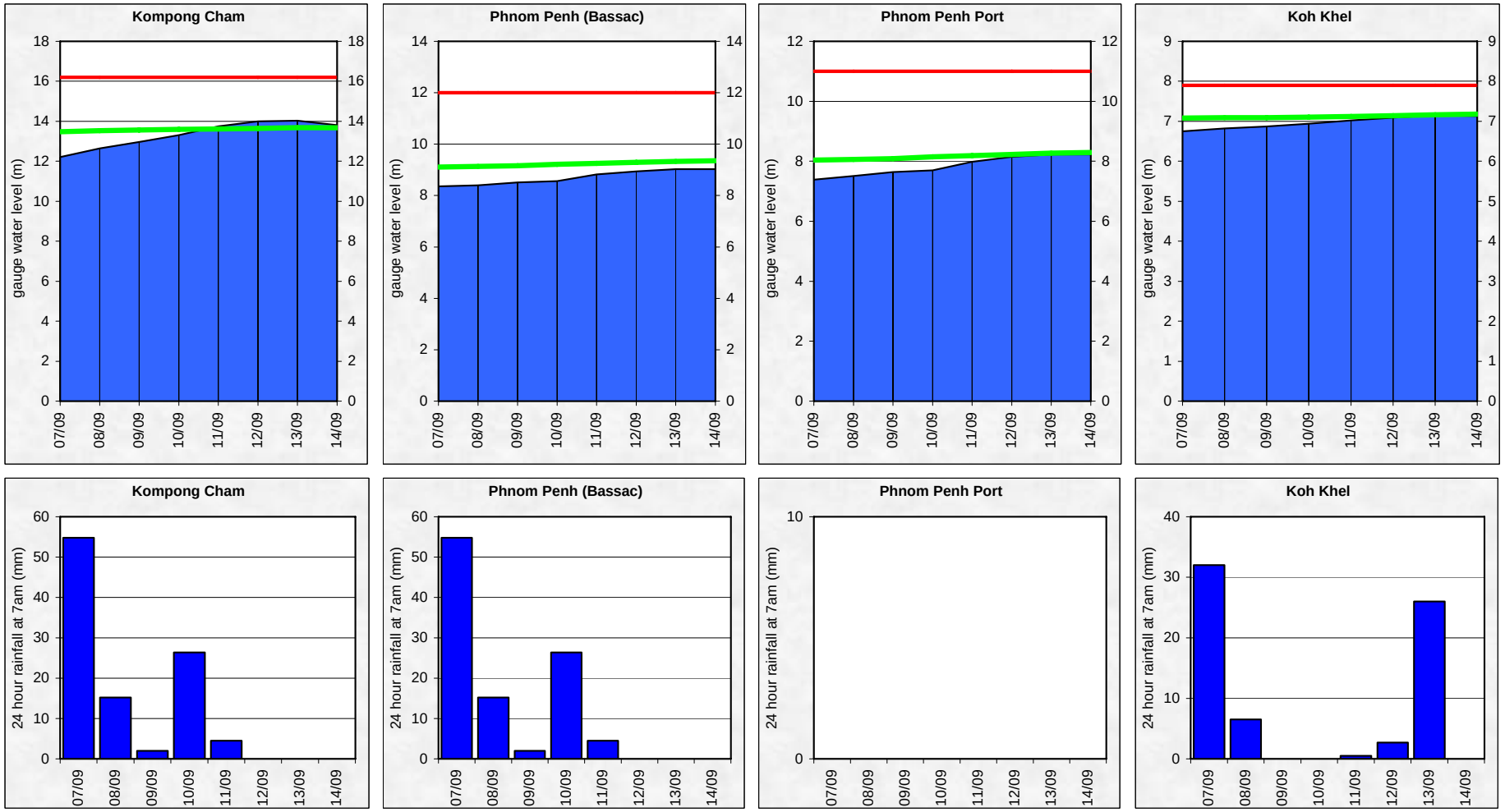
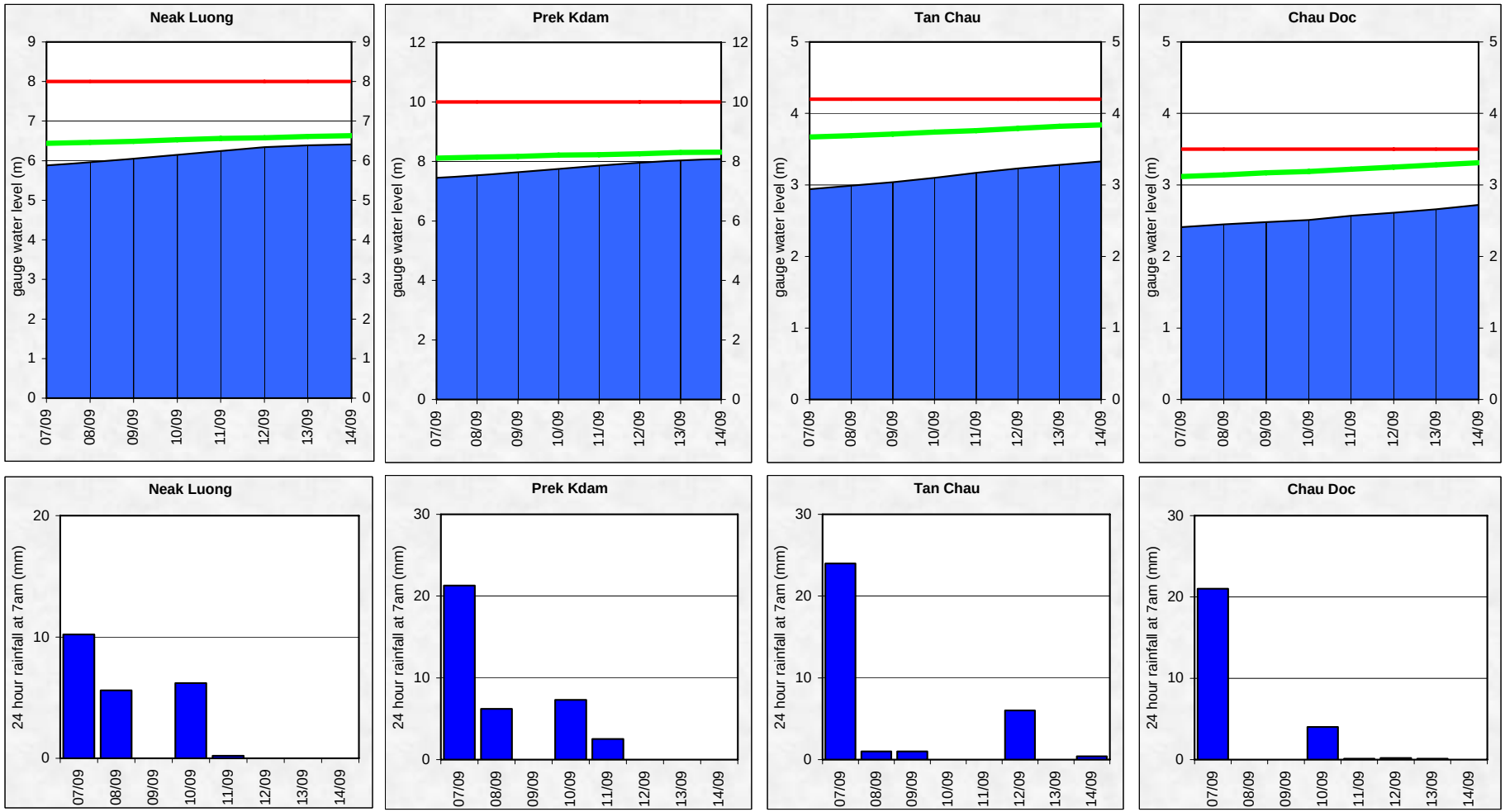


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



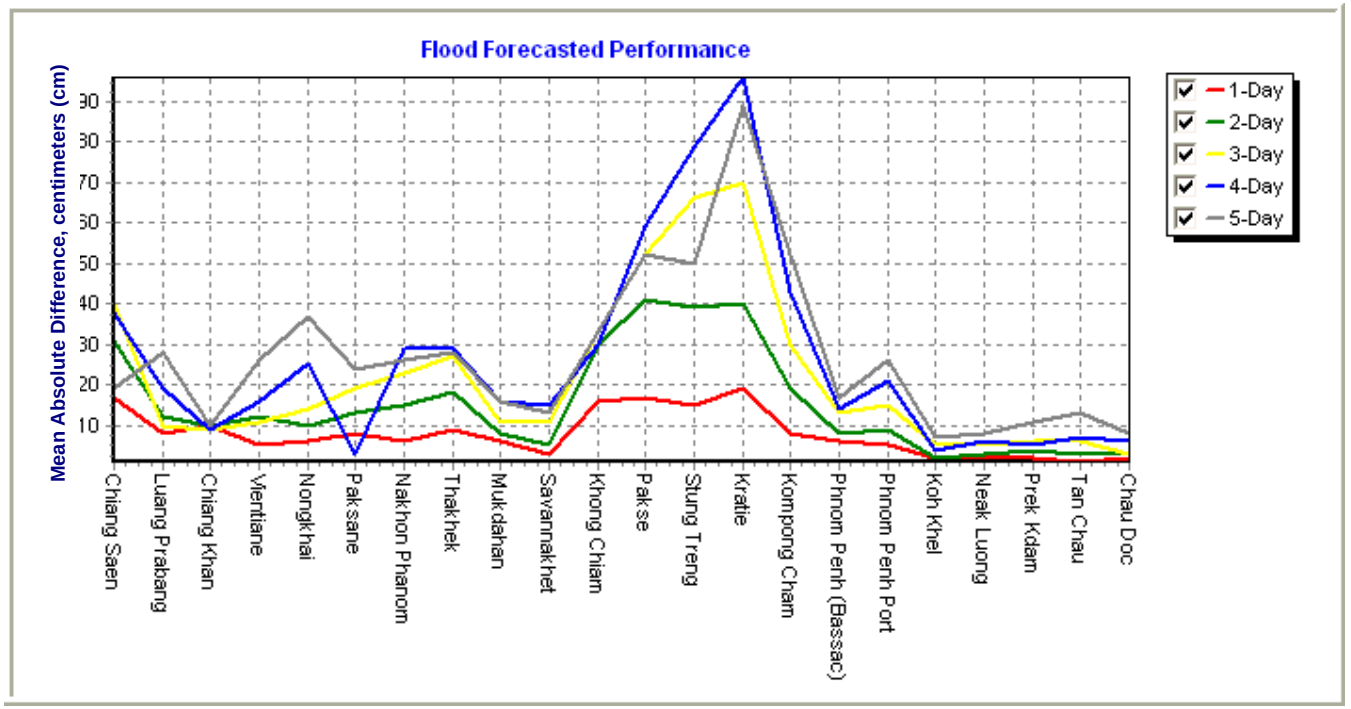
Annex B: Accuracy and performance

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 is observed with abnormal pattern for which the accuracy in the upper reach of the Mekong River is better than normal. In general the overall accuracy is pretty good for all locations and forecast lead times except between Pakse and Kratie where their accuracies are less than expected and this perhaps caused by internal model functionality due to limited parameters for model calibration as well as poor satellite rainfall estimates in the left bank tributaries of Se Kong, Se San, and Sre Pok rivers.

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	100.0	100.0	85.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	85.7	85.7	42.9	28.6	71.4	85.7	85.7	100.0	100.0	100.0	100.0	100.0	*89.6*
2-day	100.0	100.0	83.3	100.0	100.0	83.3	100.0	100.0	100.0	100.0	100.0	66.7	33.3	16.7	100.0	66.7	83.3	100.0	100.0	83.3	100.0	100.0	*87.1*
3-day	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	60.0	20.0	20.0	20.0	40.0	20.0	80.0	80.0	80.0	80.0	100.0	*77.3*
4-day	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.0	100.0	100.0	100.0	50.0	25.0	25.0	50.0	100.0	75.0	100.0	100.0	100.0	75.0	75.0	*84.1*
5-day	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	66.7	33.3	0.0	33.3	66.7	33.3	100.0	100.0	100.0	66.7	66.7	*80.3*

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	50	50	25	25	25	25	25	25	25	25	25	25	10	10	10	10	10	10	10	10	10	10
2-day	75	75	25	25	25	25	50	50	50	50	50	50	25	25	25	10	10	10	10	10	10	10
3-day	75	100	50	50	50	50	50	50	50	50	75	75	50	50	25	10	10	10	10	10	10	10
4-day	100	*125*	75	50	50	50	50	50	75	75	75	75	50	50	50	25	25	25	10	25	10	10
5-day	100	*150*	75	75	75	75	75	75	75	75	75	75	50	50	50	25	25	25	10	25	10	10

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).*

In the future these indicators will be adjusted against a set of performance indicators that is established by combining international standards and the specific circumstances in the Mekong River Basin. An expert mission to establish these performance indicators is planned for the fourth quarter of 2009.

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 8 days including the current report date

	Flood Forecast: time sent				Arrival time of input data (average)							Missing data (number)						
2009	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	*10:14*	*7*	*13:47*	*7*	*08:17*	*08:21*	*07:58*	*08:24*	*08:32*	*08:26*	*08:18*	*0*	*0*	*2*	*151*	*76*	*4*	*66*
month	*10:09*	*7*	*12:52*	*27*	*08:17*	*08:20*	*07:50*	*08:35*	*08:34*	*08:19*	*08:08*	*0*	*0*	*9*	*571*	*345*	*31*	*253*
season	*10:33*	*33*	*12:44*	*69*	*08:21*	*08:23*	*08:03*	*08:23*	*08:42*	*08:24*	*07:56*	*0*	*2*	*236*	*1552*	*989*	*112*	*678*

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.

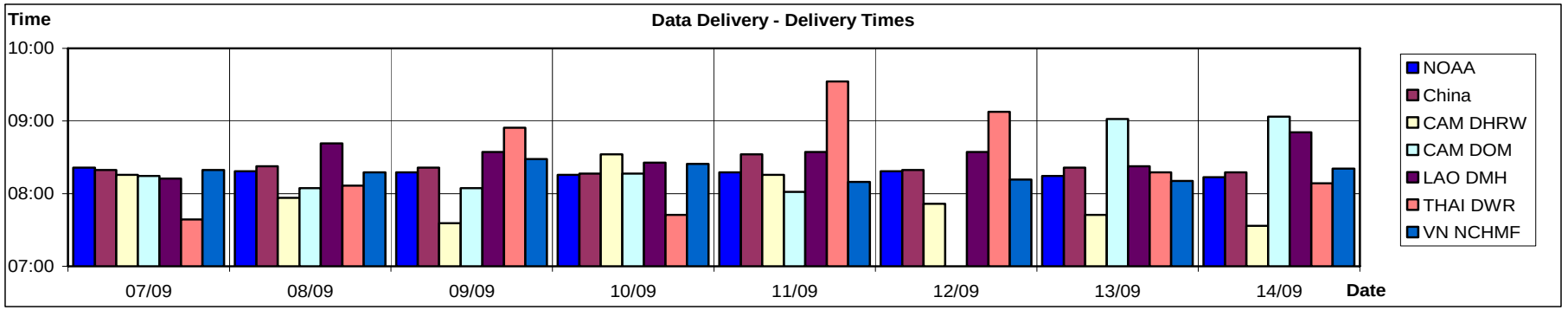


Figure B2: Data delivery times for the past 8 days including the current report date

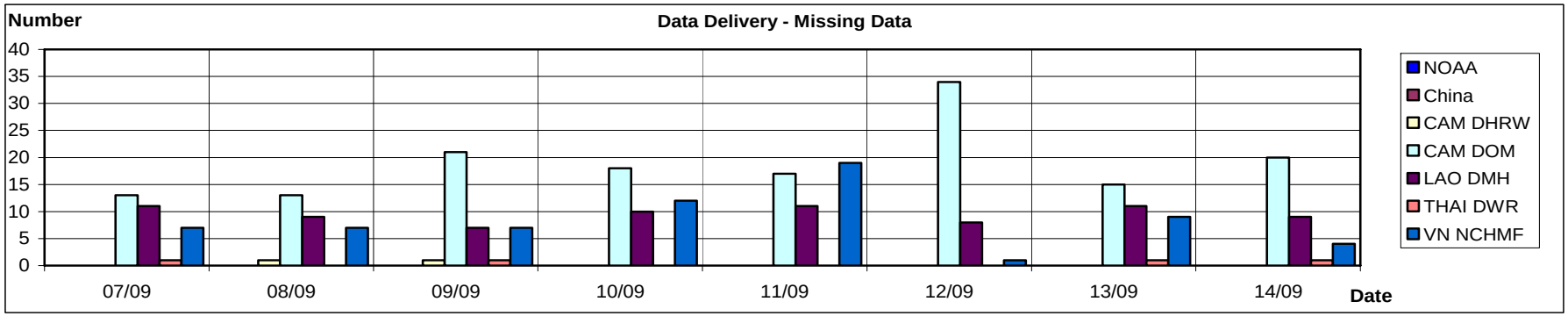


Figure B3: Missing data for the past 8 days including the current report date

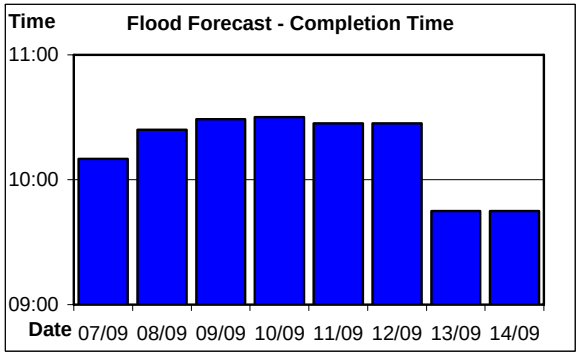


Figure B4: Flood forecast completion time

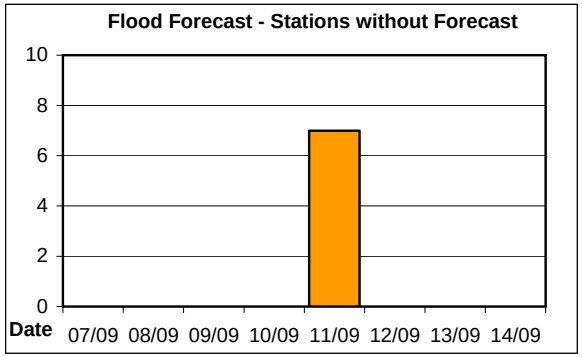


Figure B5: Flood forecast stations without forecast

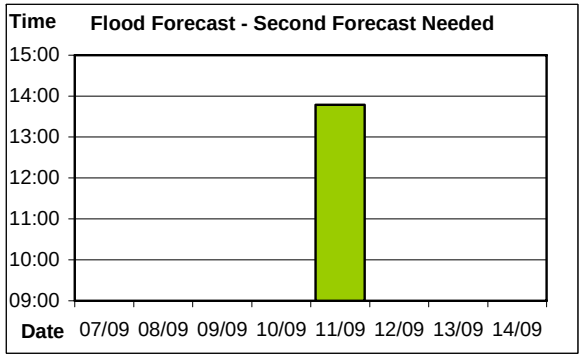


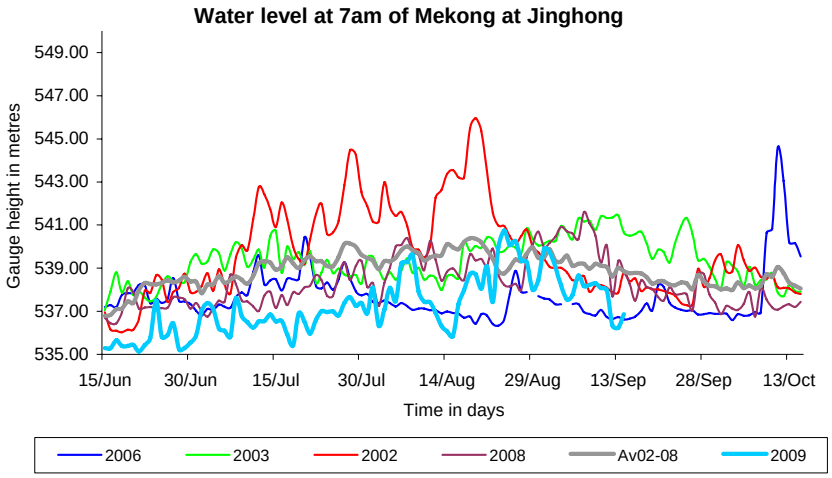
Figure B6: Second forecast needed

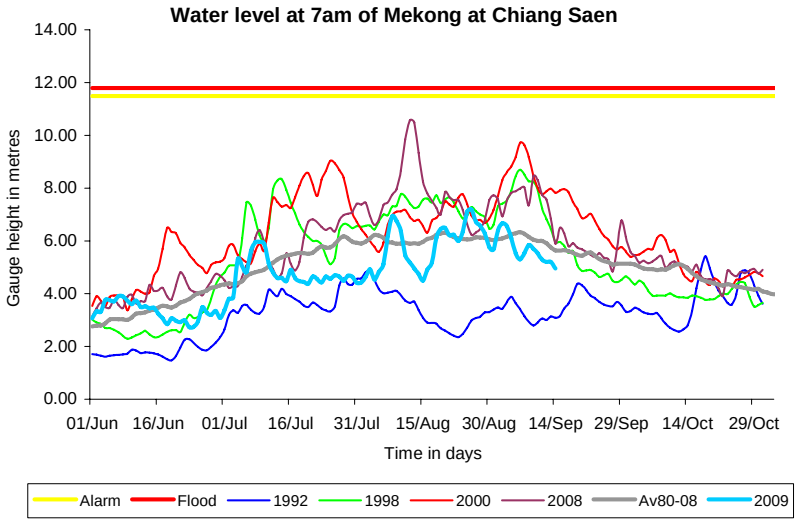
Annex C: Season Water Level Graphs

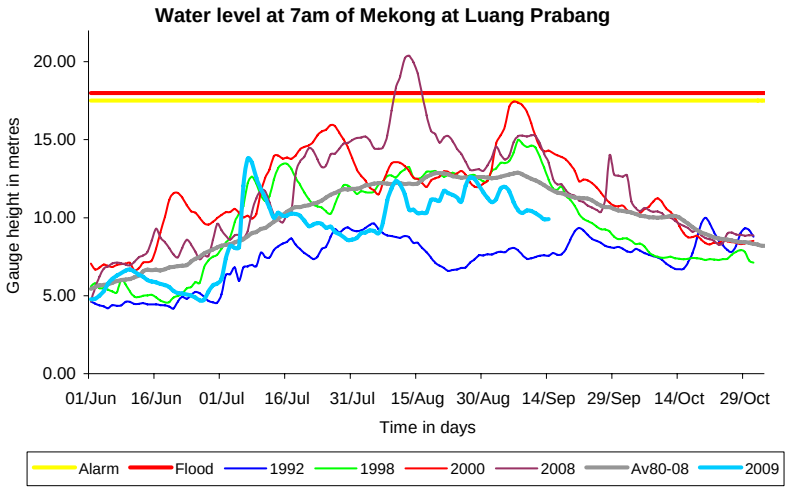
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

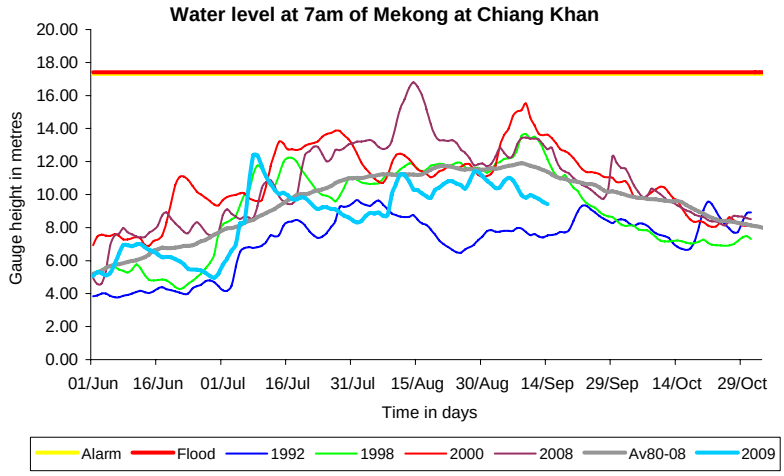
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

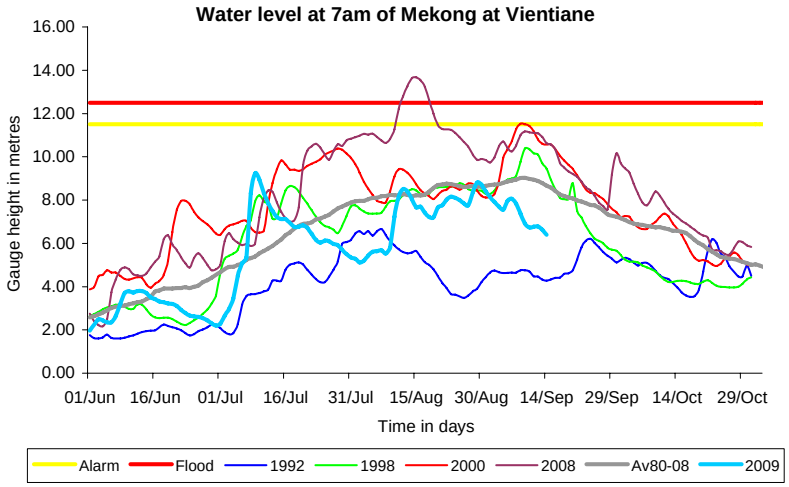
IN WET SEASON FROM 1 JUNE TO 31 OCTOBER

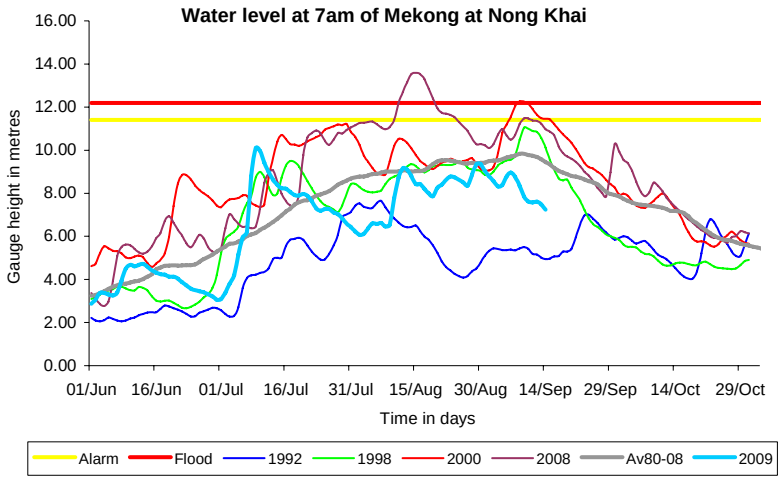


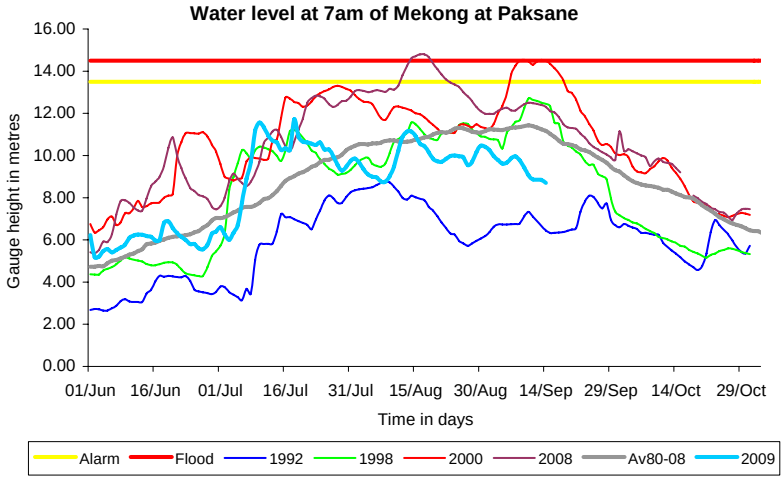


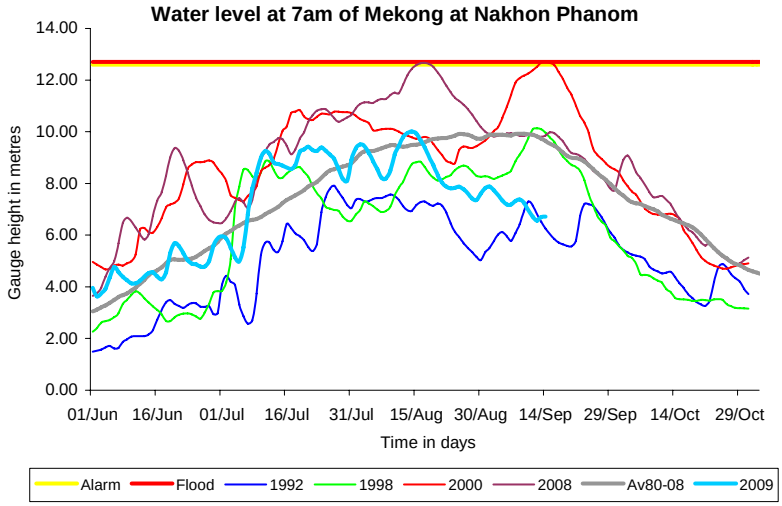

Water level at 7am of Mekong at Luang Prabang
Gauge height in metres
20.00
15.00
10.00
5.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

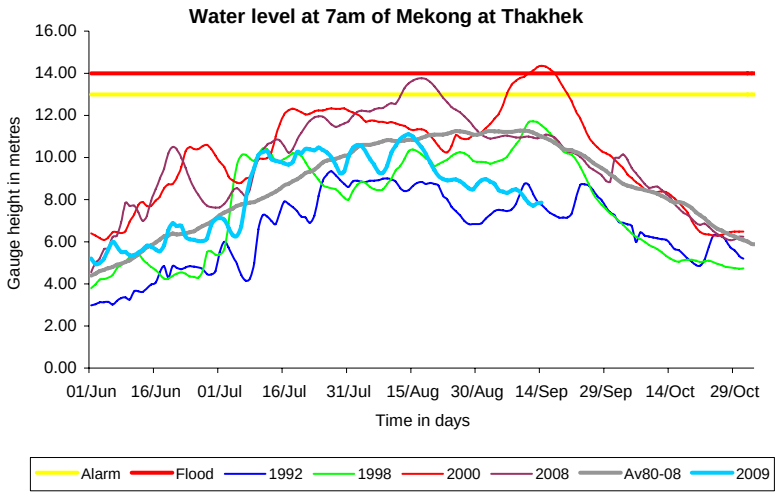

Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

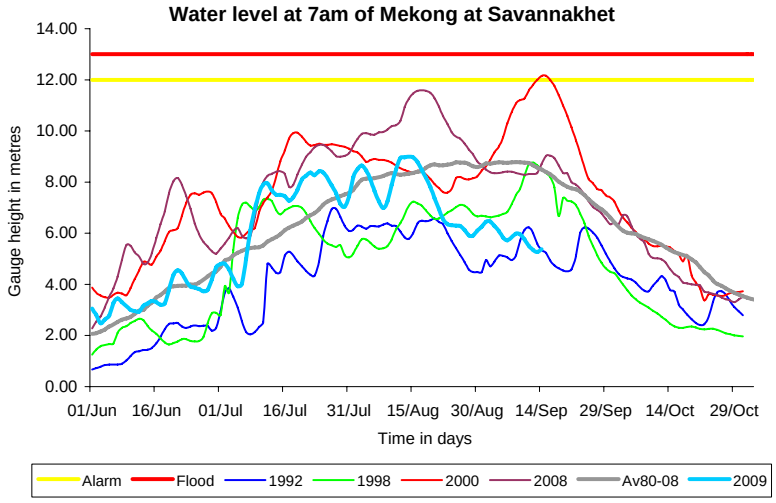

Water level at 7am of Mekong at Vientiane
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

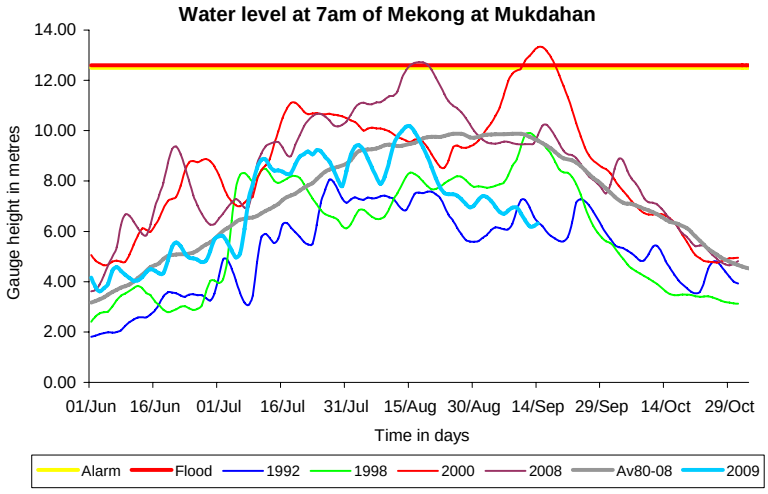

Water level at 7am of Mekong at Nong Khai
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

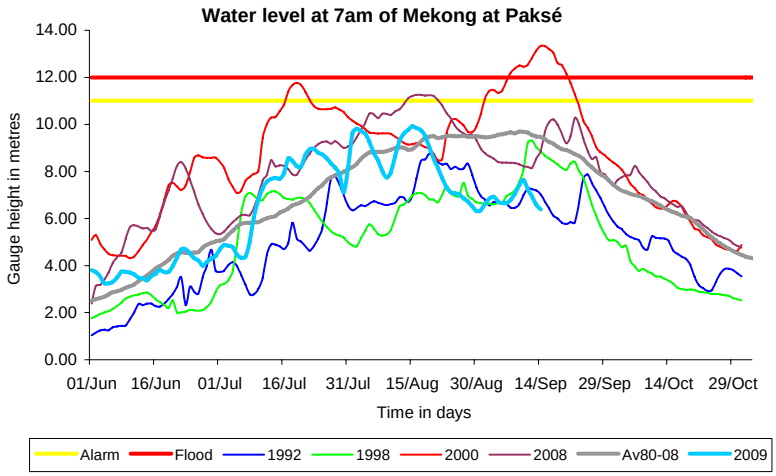

Water level at 7am of Mekong at Paksane
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

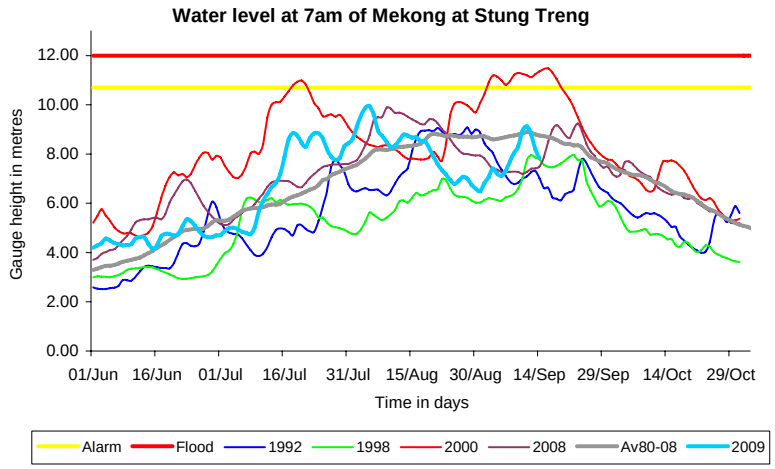

Water level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

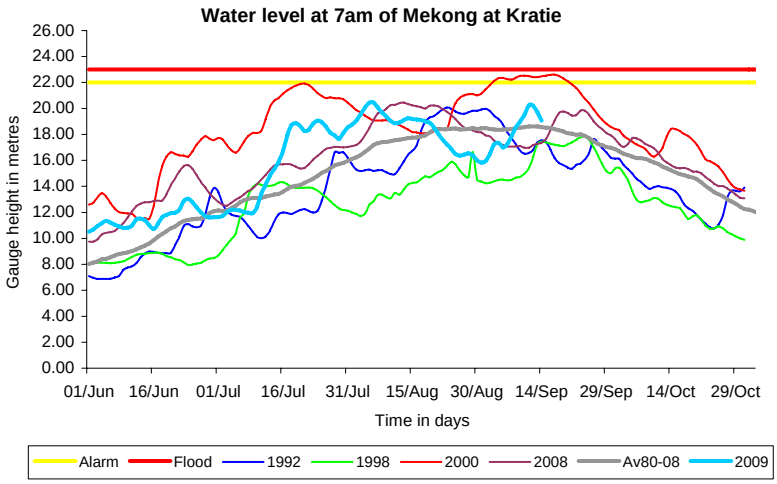

Water level at 7am of Mekong at Thakhek
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

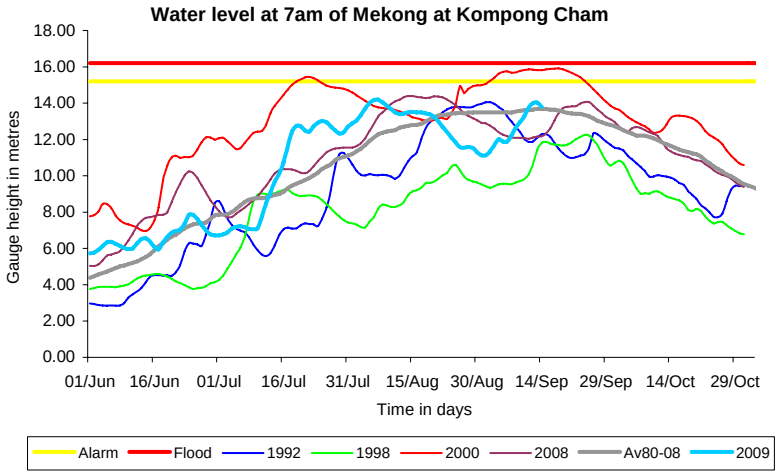

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

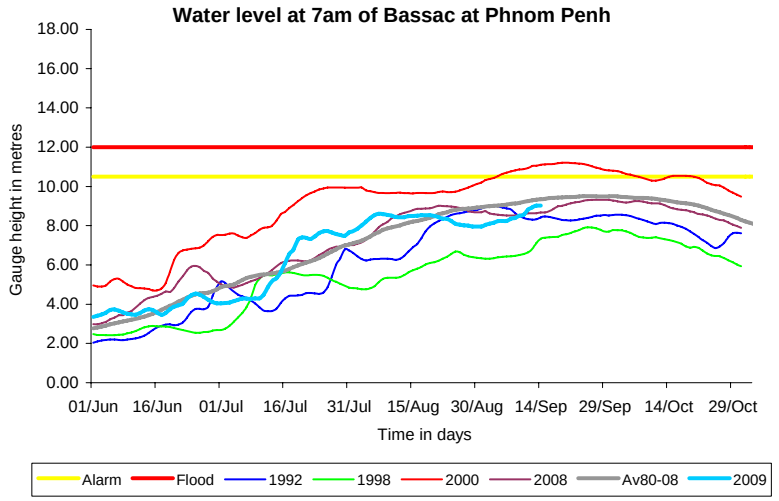

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

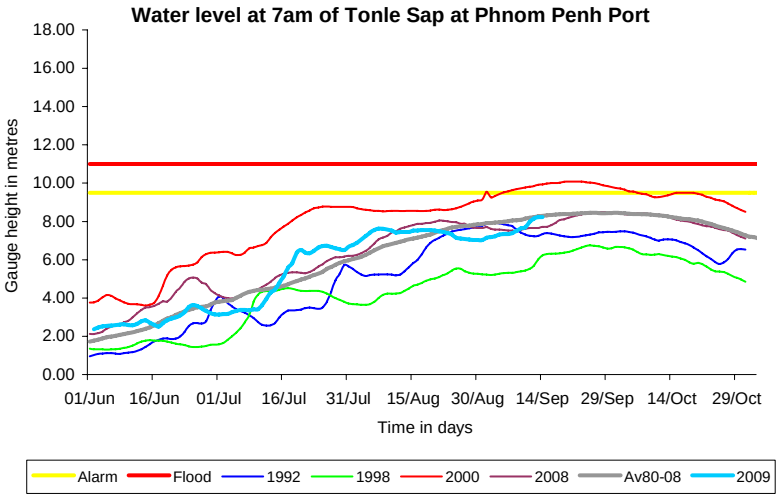

Water level at 7am of Mekong at Paksé
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

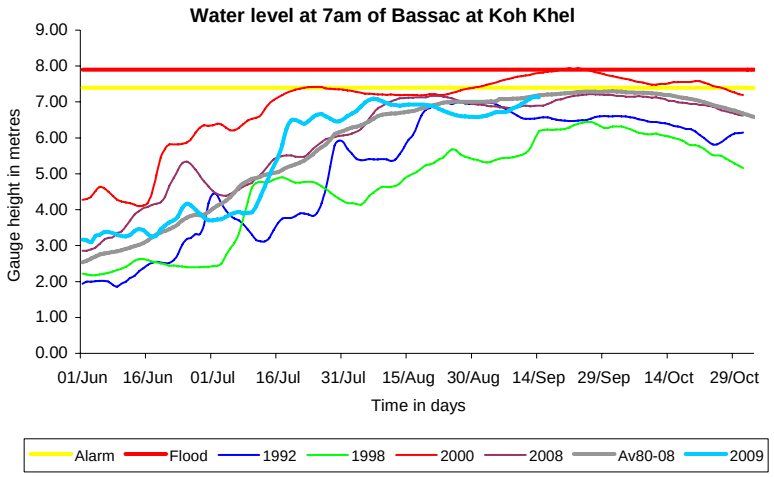

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

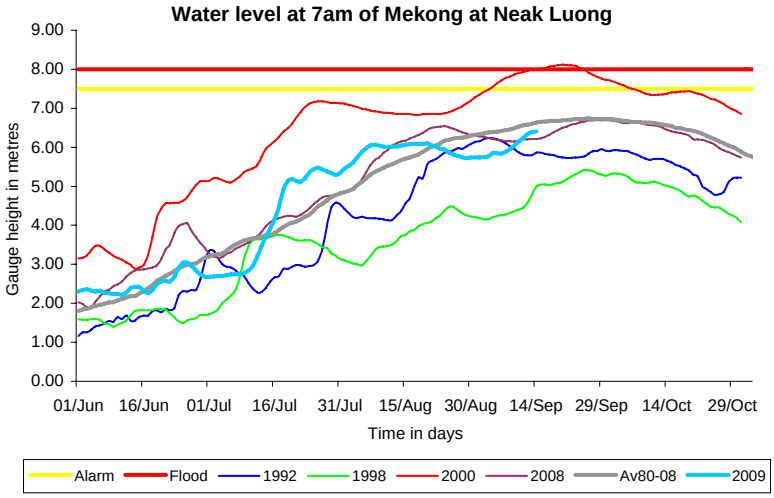

Water level at 7am of Mekong at Kratie
Gauge height in metres
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

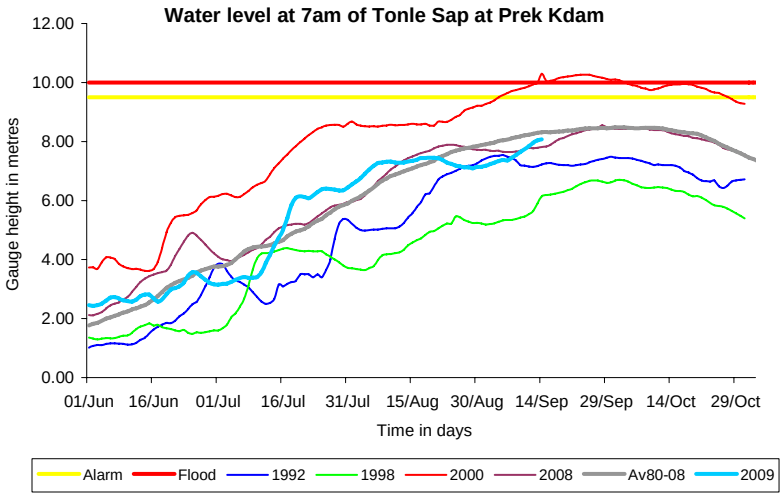

Water level at 7am of Mekong at Kompong Cham
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

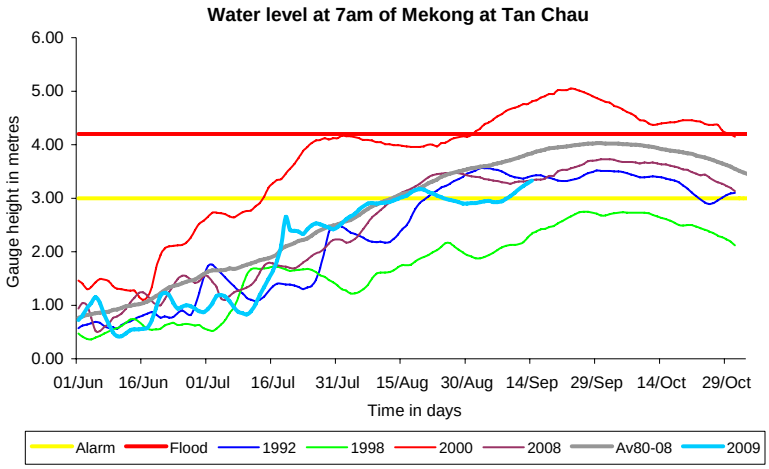

Water level at 7am of Bassac at Phnom Penh
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

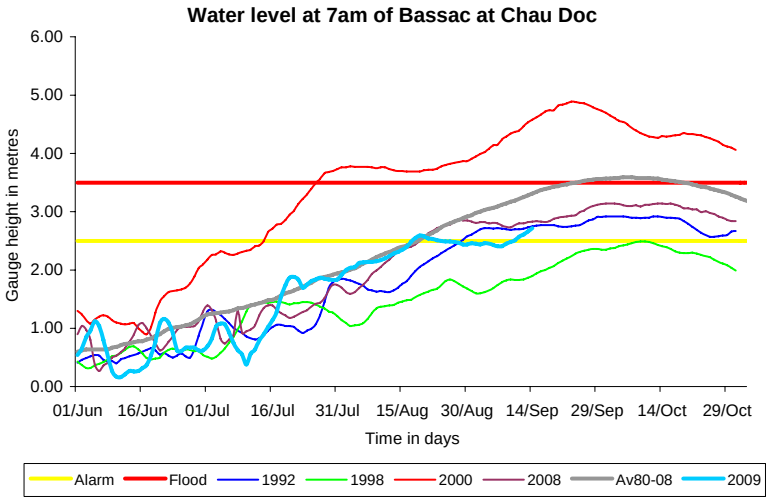

Water level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009


Water level at 7am of Bassac at Koh Khel
Gauge height in metres
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
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 1992 1998 2000 2008 Av80-08 2009


Water level at 7am of Mekong at Neak Luong
Gauge height in metres
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
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 1992 1998 2000 2008 Av80-08 2009


Water level at 7am of Tonle Sap at Prek Kdam
Gauge height in metres
12.00
10.00
8.00
6.00
4.00
2.00
0.00
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 1992 1998 2000 2008 Av80-08 2009


Water level at 7am of Mekong at Tan Chau
Gauge height in metres
6.00
5.00
4.00
3.00
2.00
1.00
0.00
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
1992
1998
2000
2008
Av80-08
2009


Water level at 7am of Bassac at Chau Doc
Gauge height in metres
6.00
5.00
4.00
3.00
2.00
1.00
0.00
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
1992
1998
2000
2008
Av80-08
2009