Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: Monday, 17/08/2009, covering the week from 10th August to 17th August 2009

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

General weather patterns

During the week of Monday 10th – Monday 17th August 2009, seven weather bulletins were issued by the Department of Meteorology of Cambodia DOM. The weather charts of the August 10th and 17th bulletins are presented in the figures below.

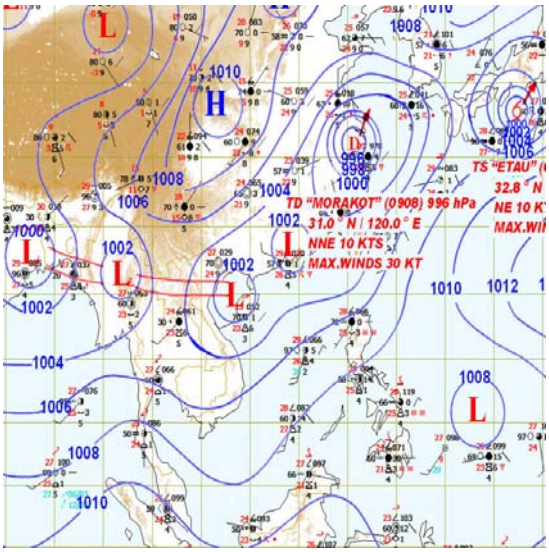


Figure 1: Weather map for 10th August 2009

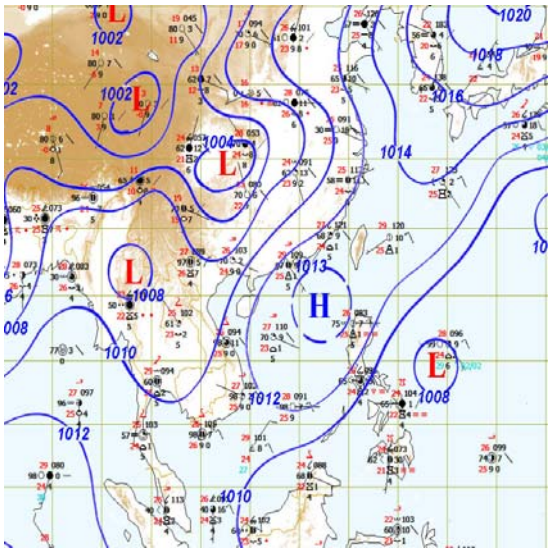


Figure 2: Weather map for 17th August 2009

Weakening South-West (SW) Monsoon

An active SW monsoon prevailed over the Indochina Peninsula at the beginning of the week and began gradually weakening by the 17th. (Figure 1 and Figure 2).

Inter Tropical Convergence Zone (ITCZ)

An ITCZ laid across Myanmar, Thailand, Northern Lao PDR, Northern Viet Nam and Hainan Island.

Tropical depressions, tropical storms or typhoons

The Tropical Depression (TD) "***MORAKOT***" passed over Eastern China and was moving NNE at a speed of 19 km/h. The maximum wind speed at the centre of the depression was 56 km/h. This downgraded in velocity over the week.

And another Tropical Storm (TS) "***ETAU***" occurred over the Japanese Sea and was moving NE at the start of the week at a speed of 19 km/h. The maximum wind speed at the centre of the TS was 74 km/h

A low pressure trough laid across Thailand, Lao PDR and Cambodia, with a ridge pressure system across Southern Viet Nam.

Other weather phenomena that affect the discharge of the Mekong River

No other weather phenomena affecting the discharge were observed.

Overall weather situation of the Mekong Basin

A normal weather situation prevailed between the 10th and 17th August 2009. There were scattered Cumulus (Cu) and Cumulonimbus (Cb) clouds were observed over Cambodia and Southern Viet Nam in the afternoon and evening during the week. Scattered thunderstorms and moderate rain occurred in Thailand, Lao PDR and Viet Nam and light rain occurred in Cambodia, mostly at night.

General behavior of the Mekong River

- There was some variation of water levels along the Mekong River in the time period monitored. While water levels in the upper reaches of the Lower Mekong River are below the long-term average, water levels in the middle reaches are at about the long-term average and in the lower part of the river water levels are above the long-term average. Water levels reached alarm levels at Tan Chau and Chau Doc monitoring stations during the week. This is normal for this time of the year for both stations.

For stations from Chiang Saen to Chieng Khan

Water levels dropped in the first half of the week and then rose up towards the end of the week. Most are somewhat below the long-term average for this time of the year.

For stations from Vientiane to Pakse

Water levels increased till mid-week and then reduced until the end of the week. Most stations are showing levels that are around the long-term average for this time of the year.

For stations from Stung Treng to Phnom Penh

Water levels were more-or-less stable, with an increasing trend towards the end of the week. Most stations are showing river levels that are somewhat above the long-term average for this time of the year.

Downstream of Phnom Penh

Water levels were rising and continued to do so throughout the week. Most stations are showing river water levels that are somewhat above the long-term average for this time of the year except at Tan Chau and Chau Doc where the water levels are about average for this time of the year. At Tan Chau, the water level is rising over the alarm level 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:

Alarm stage (where the forecast is expected to reach flood level within three days) was reported for Tan Chau in the mainstream Mekong River during the past week. While the water level is getting close to the alarm level at Chau Doc, and is expected to reach alarm level in the following weeks. Water in the river is still below the flood levels 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 F1: 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
10/08	537.45	6.37	12.34	10.66	7.23	7.78	9.47	9.12	10.22	8.76	7.89	9.71	7.96	8.28	19.03	13.67	8.51	7.52	6.97	6.02	7.32	2.91	2.17
11/08	537.42	5.46	12.12	11.22	8.16	8.72	10.22	9.46	10.56	9.41	8.48	10.67	8.63	8.35	18.87	13.49	8.45	7.42	6.93	6.01	7.29	2.92	2.20
12/08	536.93	5.18	11.48	11.17	8.50	9.16	10.88	9.80	10.88	9.76	8.95	11.39	9.30	8.56	18.91	13.40	8.43	7.45	6.91	6.02	7.28	2.93	2.24
13/08	536.32	4.95	10.52	10.81	8.40	9.10	11.13	9.95	11.03	9.98	8.97	11.61	9.60	8.79	19.09	13.42	8.43	7.45	6.90	6.02	7.29	2.96	2.28
14/08	536.08	4.75	10.52	10.32	8.04	8.80	11.13	10.01	11.10	10.16	8.99	11.87	9.76	8.75	19.24	13.49	8.48	7.45	6.92	6.04	7.32	2.99	2.31
15/08	535.85	4.50	10.28	10.27	7.66	8.42	10.92	9.93	11.00	10.17	8.97	11.95	9.92	8.67	19.19	13.51	8.50	7.52	6.93	6.07	7.35	3.02	2.35
16/08	537.32	4.91	10.32	10.08	7.70	8.42	10.56	9.67	10.75	9.95	8.78	11.83	9.84	8.68	19.15	13.49	8.51	7.53	6.93	6.08	7.38	3.05	2.40
17/08	537.98	5.18	10.34	9.90	7.42	8.20	10.44	9.39	10.48	9.66	8.48	11.53	9.75	8.53	19.12	13.49	8.53	7.55	6.93	6.09	7.44	3.11	2.48
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 F2: 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
10/08	0.0	0.0	0.0	0.0	0.0	0.4	1.3	52.8	228.0	19.3	19.2	3.2	0.0	0.0	22.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0
11/08	0.0	6.1	8.0	5.0	74.2	16.5	0.0	29.0	16.4	9.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0
12/08	9.0	0.0	0.0	0.8	59.5	14.0	0.7	0.5	1.2	0.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13/08	2.9	0.0	40.0	18.4	4.6	3.4	9.9	5.2	65.6	2.0	0.0	7.3	7.3	0.0	0.0	0.0	0.0	0.0	15.7	0.0	21.2	0.0	0.0
14/08	15.0	14.0	4.0	8.2	19.5	20.9	9.9	22.7	31.8	16.6	19.6	47.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0
15/08	0.0	26.1	66.0	2.5	2.0	1.2	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	6.5	0.0
16/08	7.3	1.9	228.0	28.8	2.4	21.4	15.9	8.8	12.4	2.0	0.8	18.3	2.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	5.2	1.0	2.0
17/08	24.5	7.0	0.0	0.0	0.0	0.0	0.0	1.3	0.4	0.0	0.0	20.5	5.0	0.0	0.0	0.7	19.3	0.0	22.2	0.0	0.0	0.0	0.0

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

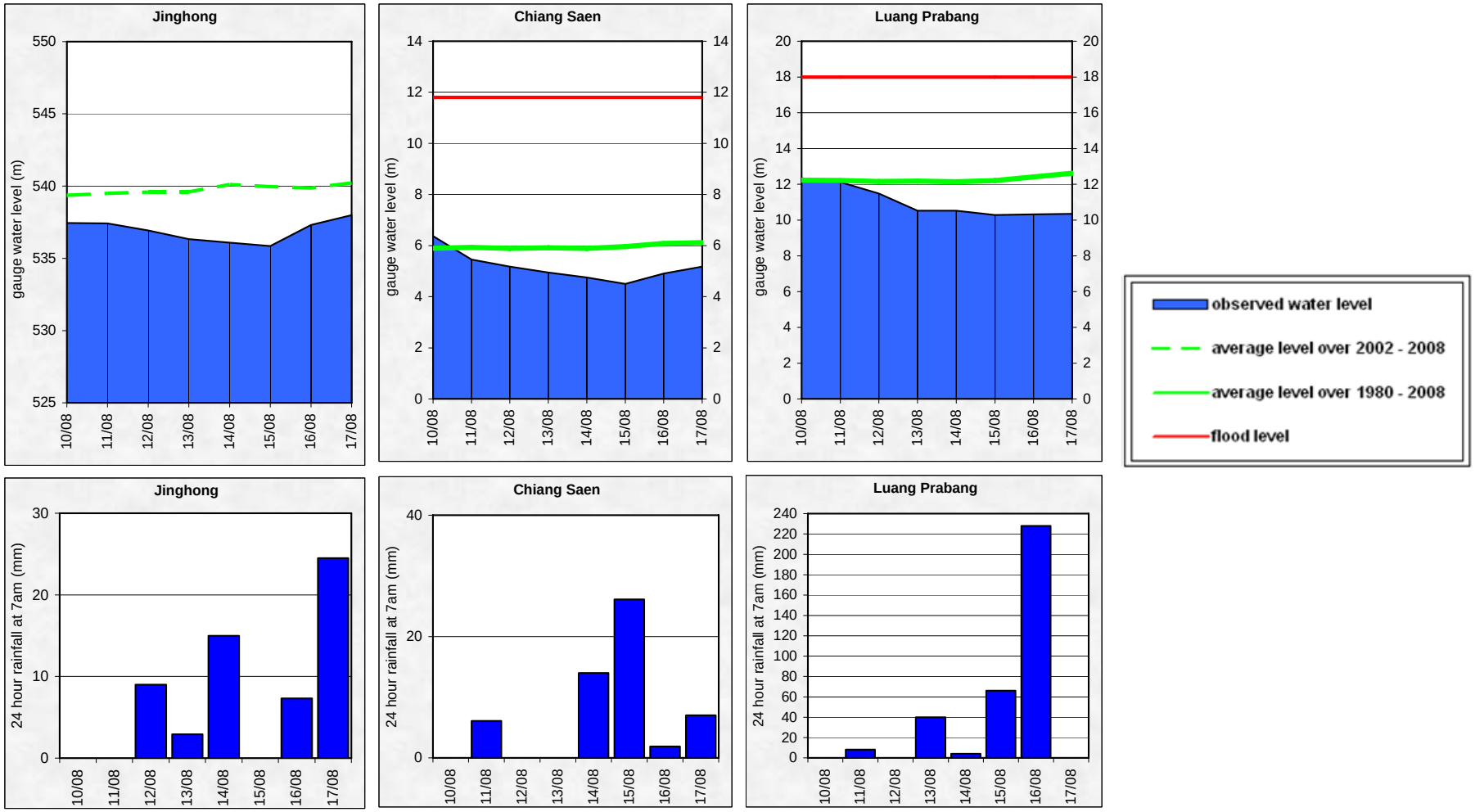


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

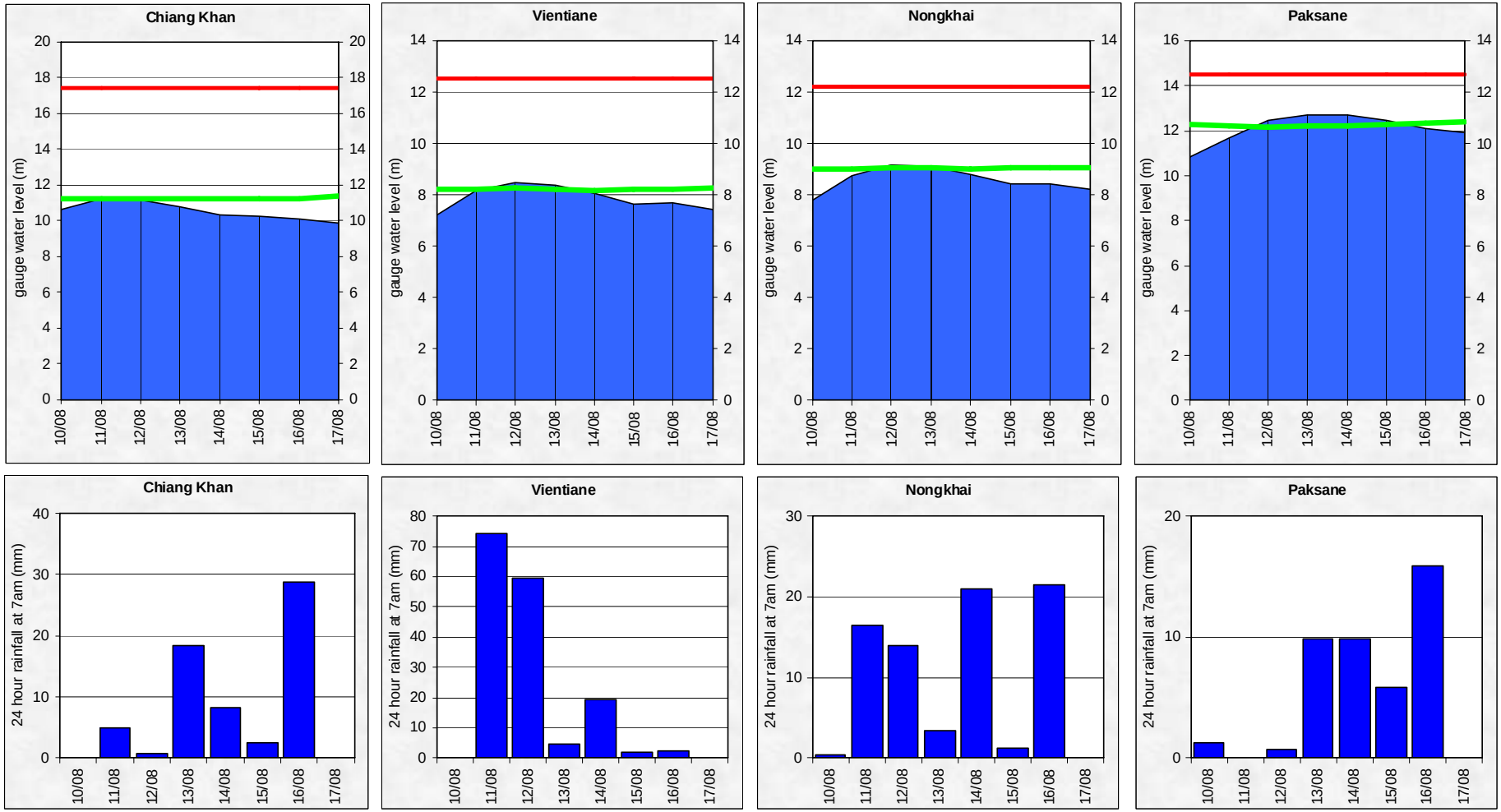


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

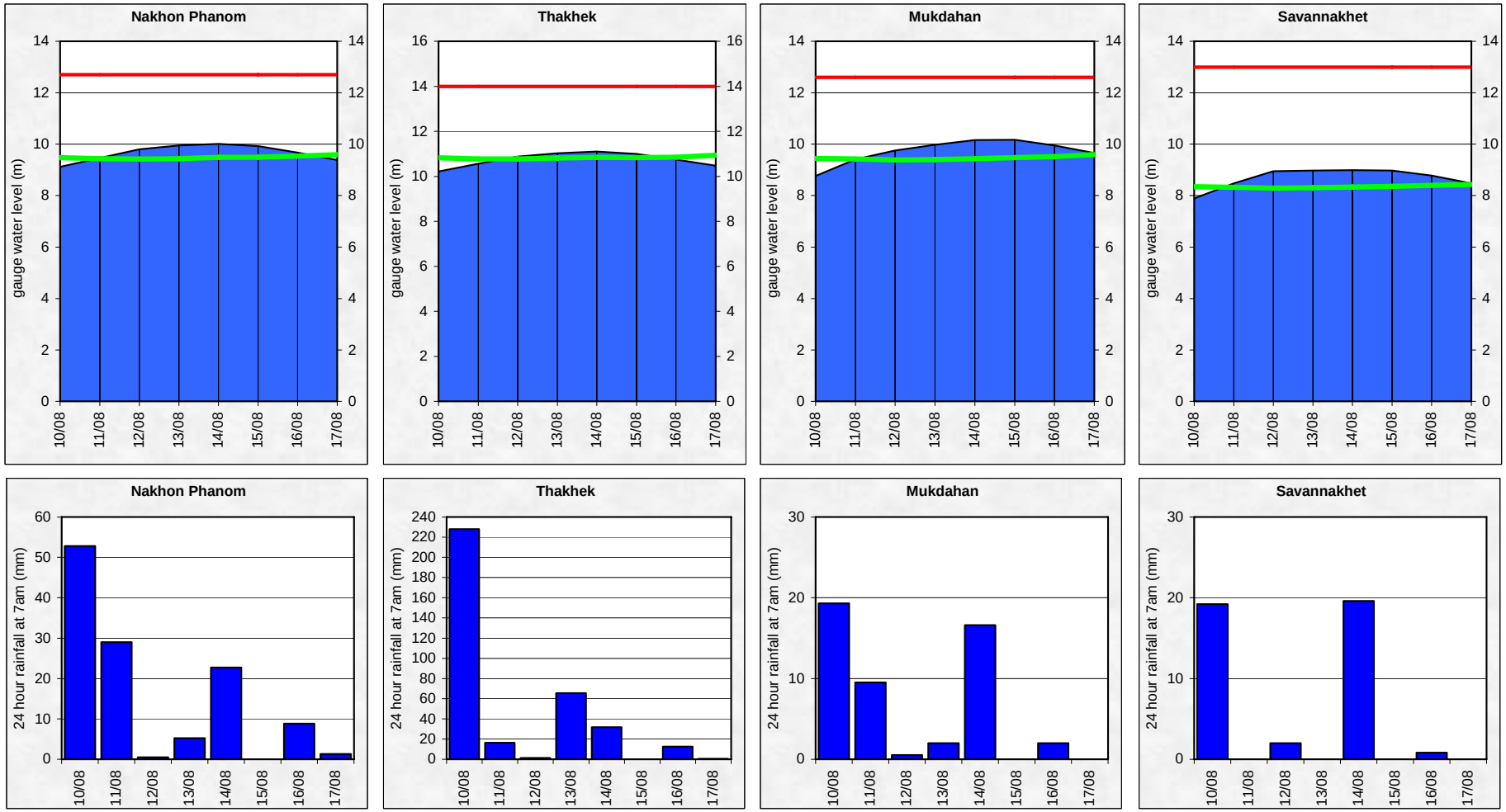


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

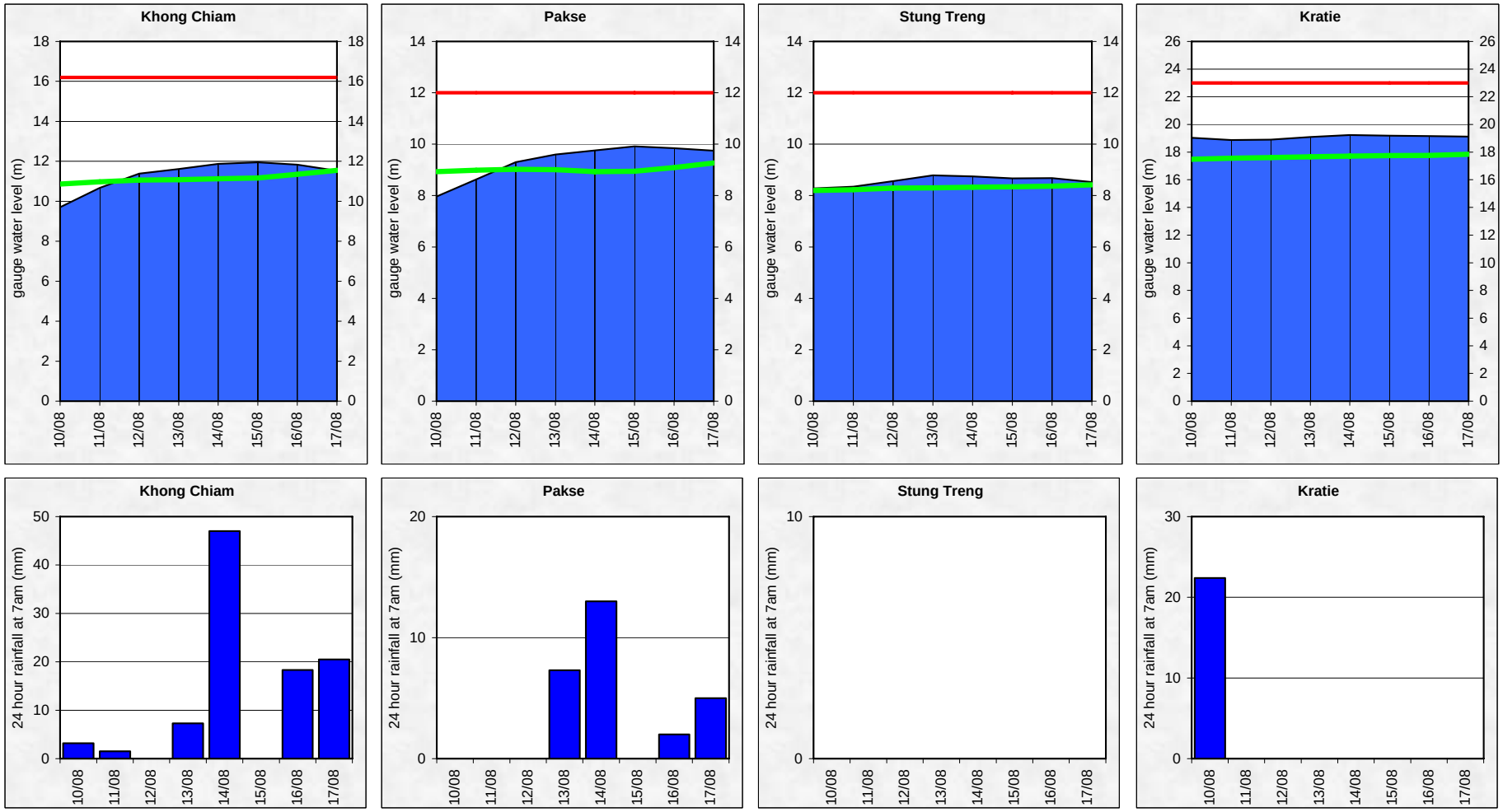


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

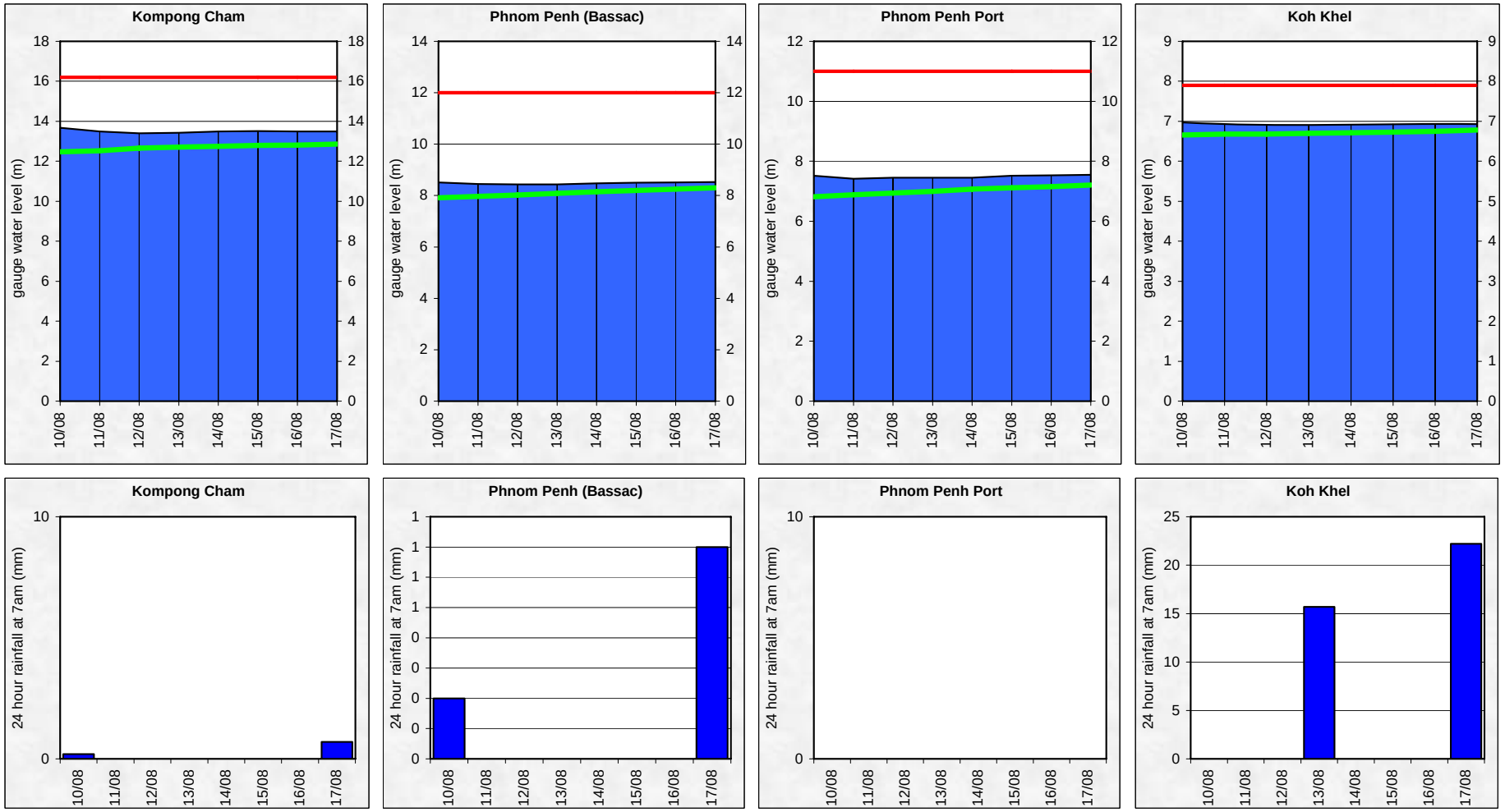
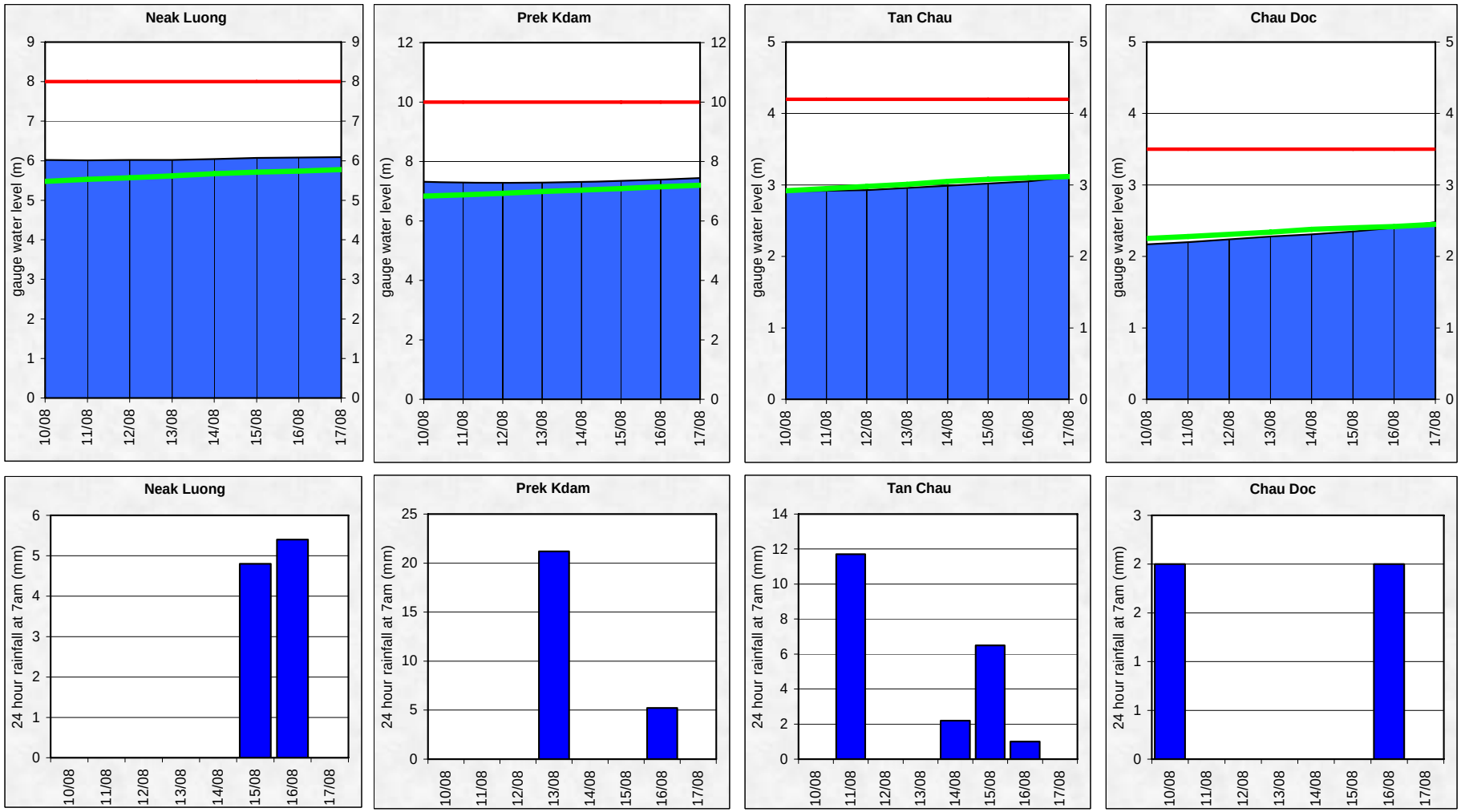


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

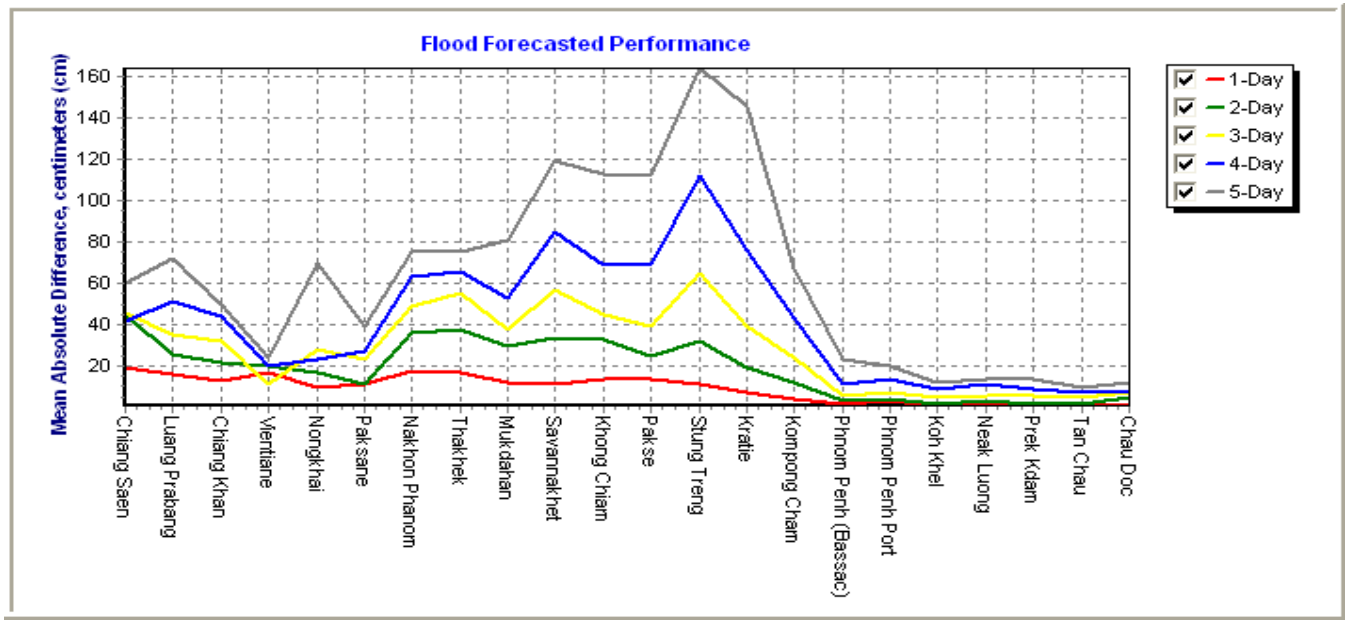
Accuracy

"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.

The graph of average forecasting differences for the past week generally shows the normal pattern. In general the accuracy is fairly good for 1-day to 3-day forecasts; however, the differences for 4-day and 5-day forecasts between Savanakhet and Kratie were less accurate than expected.

The above significant differences due to mainly two factors: (1) modeling results is normally less accurate than expected due to quality of model calibration (lack of historical data) for that portion and (2) forecast adjustment made by forecaster-in-charge due to the fact that the satellite rainfall estimation is normally higher than the observed records for the lower part of the Mekong Basin.

Figure A1: 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 A2).

Table A1: 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	85.7	57.1	100.0	85.7	71.4	71.4	85.7	85.7	71.4	85.7	57.1	71.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	*87.0*
2-day	83.3	100.0	50.0	66.7	83.3	83.3	66.7	66.7	83.3	83.3	66.7	100.0	33.3	66.7	100.0	100.0	83.3	100.0	100.0	100.0	100.0	100.0	*82.6*
3-day	80.0	100.0	80.0	100.0	100.0	100.0	60.0	60.0	60.0	40.0	60.0	60.0	20.0	60.0	40.0	80.0	80.0	100.0	100.0	100.0	100.0	80.0	*75.5*
4-day	100.0	100.0	75.0	100.0	100.0	75.0	50.0	50.0	75.0	25.0	50.0	50.0	0.0	25.0	50.0	100.0	100.0	100.0	50.0	100.0	75.0	75.0	*69.3*
5-day	100.0	100.0	66.7	100.0	66.7	100.0	66.7	66.7	66.7	0.0	33.3	33.3	0.0	0.0	33.3	66.7	100.0	100.0	33.3	100.0	66.7	0.0	*59.1*

Table A2: 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 2 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 P1: 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	*10:32*	*0*	*-*	*8*	*08:19*	*08:20*	*07:58*	*08:04*	*08:22*	*08:23*	*07:55*	*0*	*0*	*1*	*147*	*78*	*9*	*73*
month	*10:20*	*1*	*11:38*	*26*	*08:25*	*08:27*	*08:01*	*08:33*	*08:32*	*08:21*	*08:01*	*0*	*2*	*33*	*485*	*273*	*36*	*273*
season	*10:41*	*26*	*12:39*	*44*	*08:23*	*08:25*	*08:09*	*08:20*	*08:44*	*08:25*	*07:50*	*0*	*2*	*228*	*1049*	*667*	*83*	*464*

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.

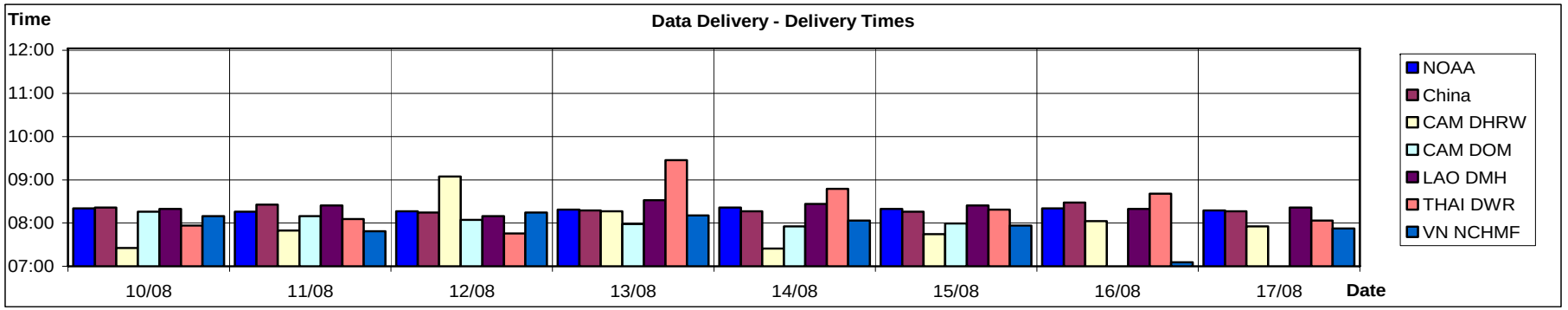


Figure P1: Data delivery times for the past 8 days including the current report date.

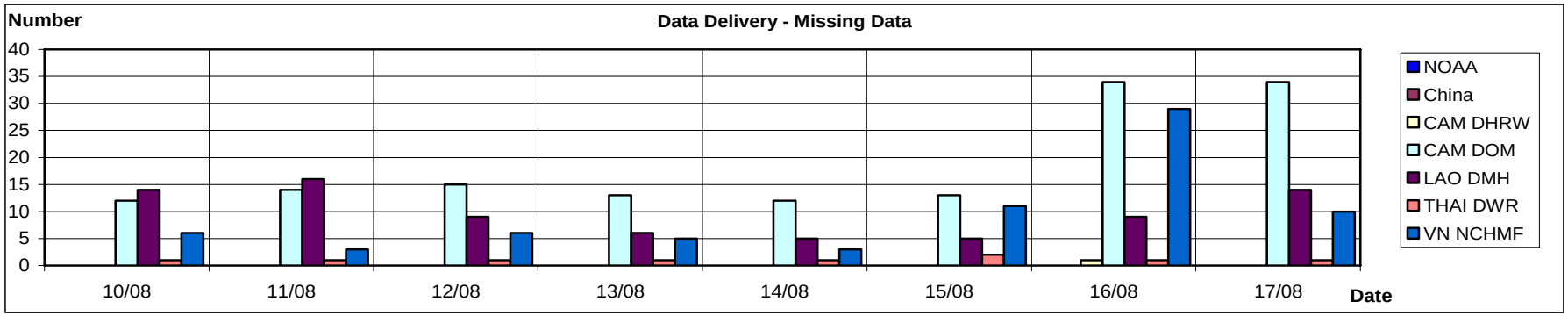


Figure P2: Missing data for the past 8 days including the current report date.

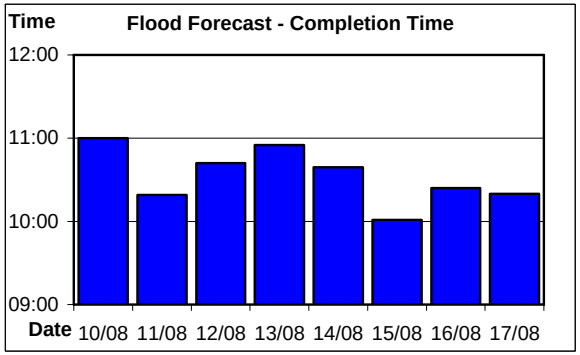


Figure P3: Flood forecast completion time

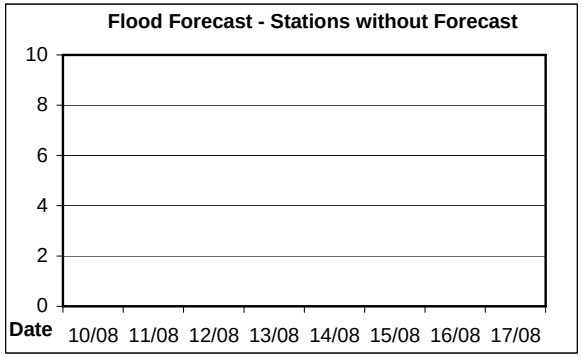


Figure P4: Flood forecast stations without forecast

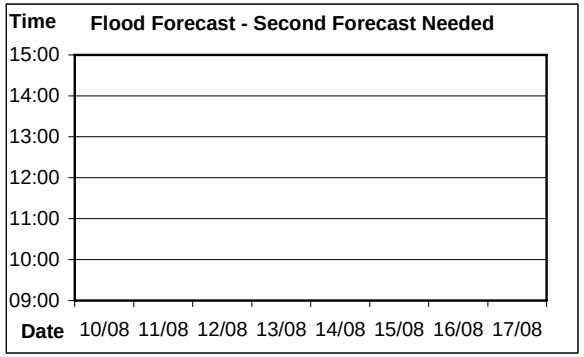


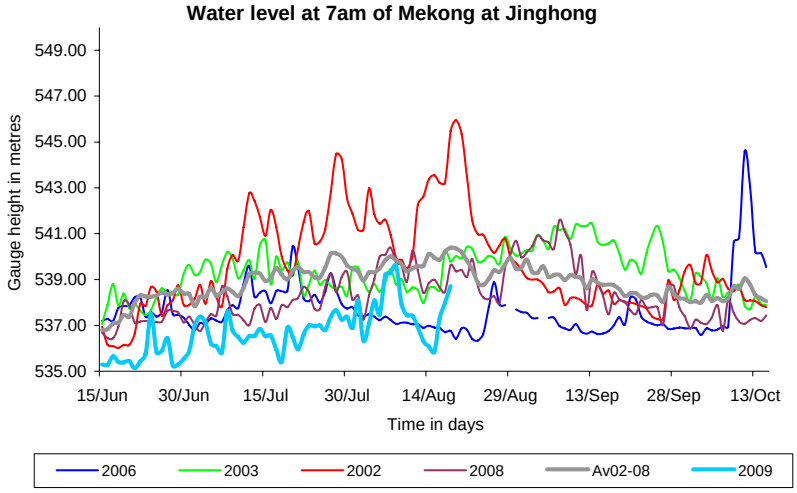
Figure P5: Second forecast needed

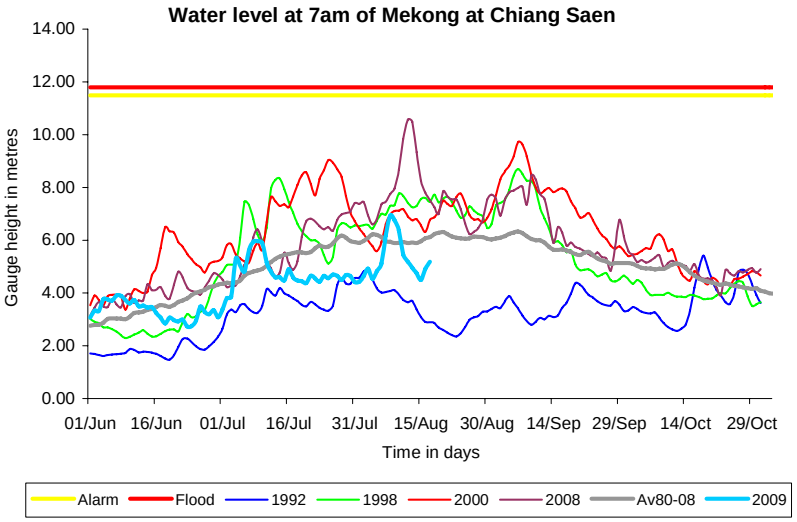
Annex C: Season Water Level Graphs

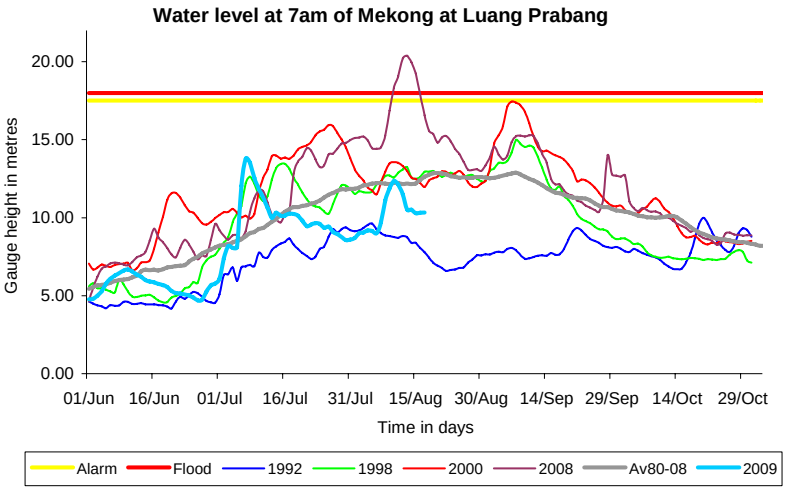
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

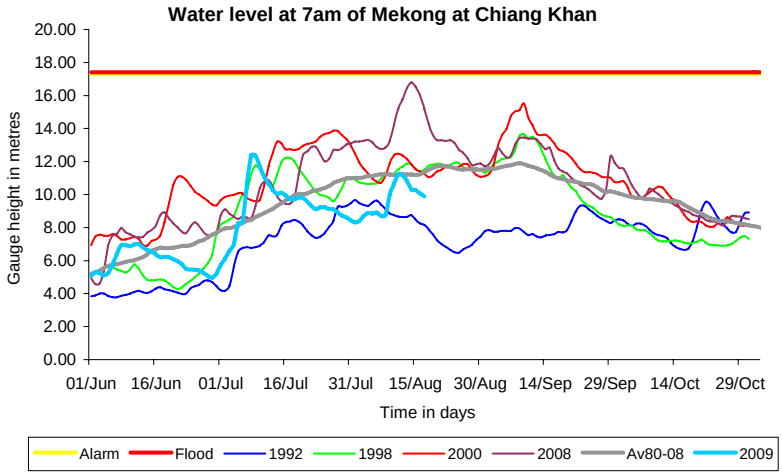
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

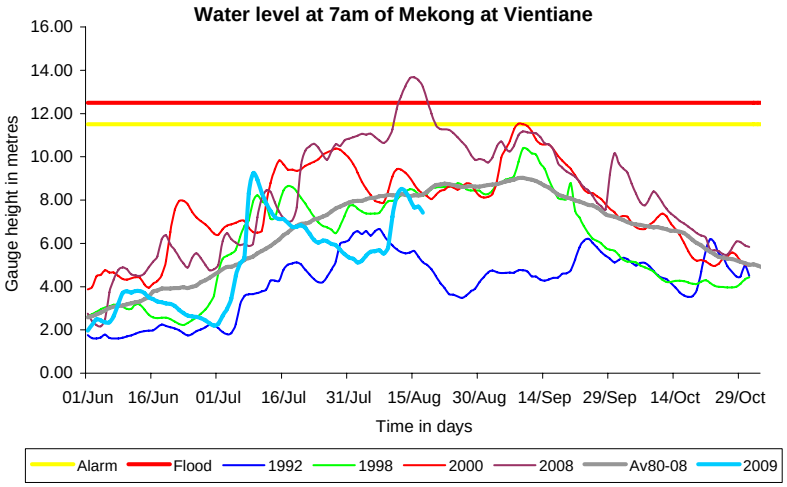
IN WET SEASON FROM 1 JUNE TO 31 OCTOBER

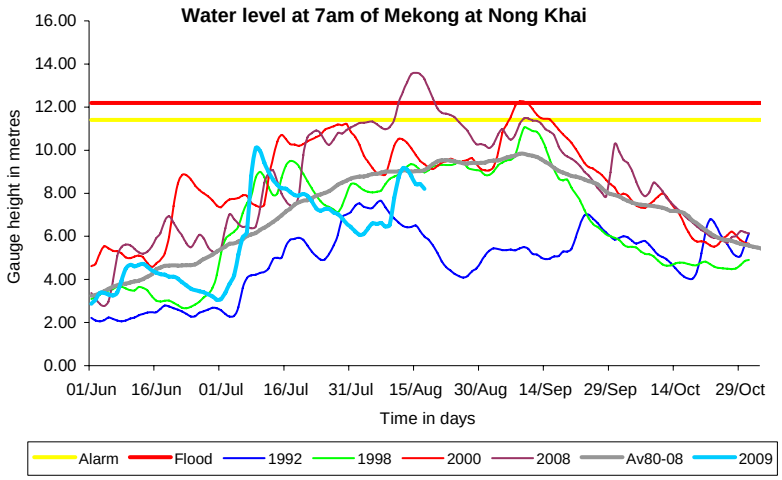


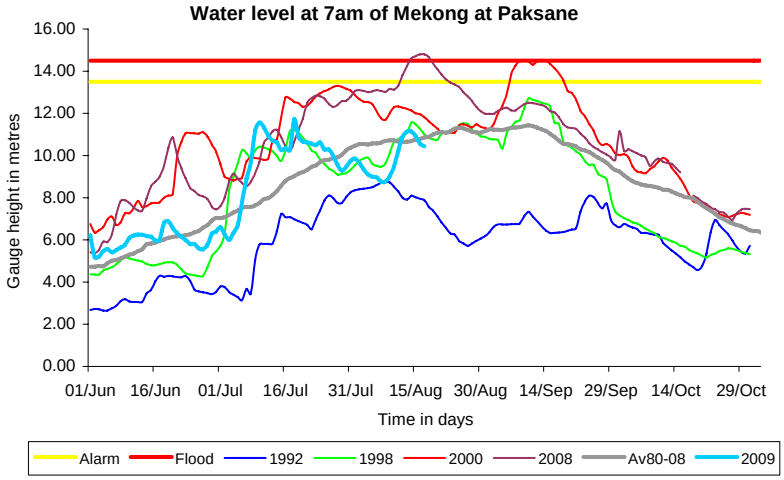


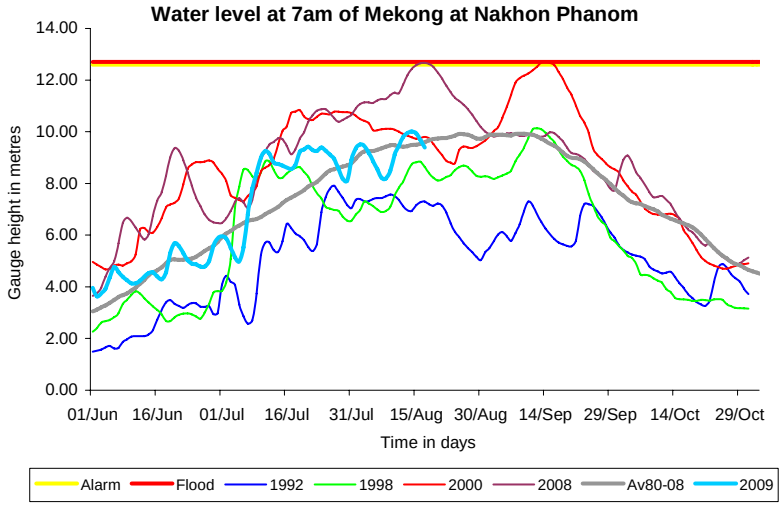

Water level at 7am of Mekong at Luang Prabang
Gauge height in metres
20.00
15.00
10.00
5.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

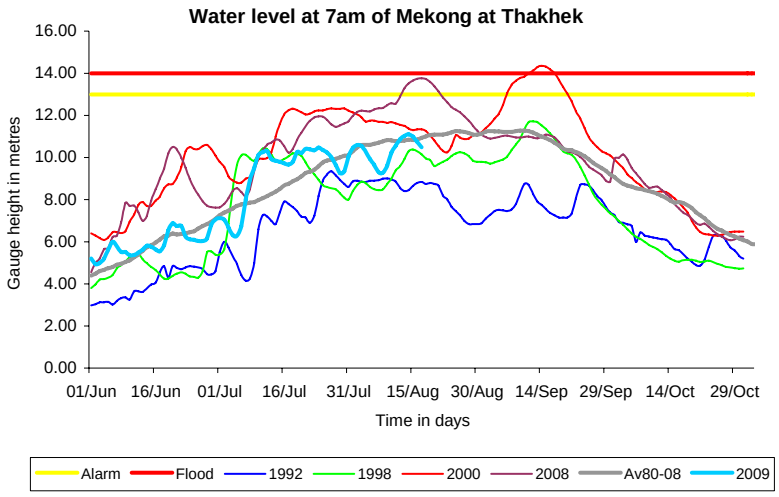

Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

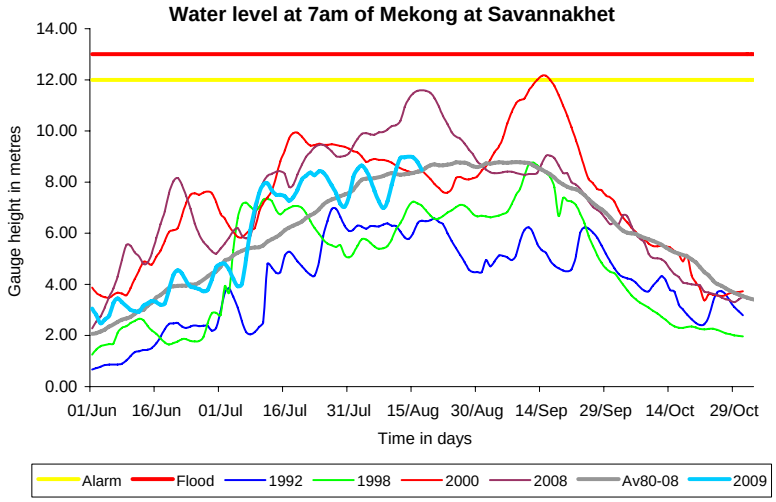

Water level at 7am of Mekong at Vientiane
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

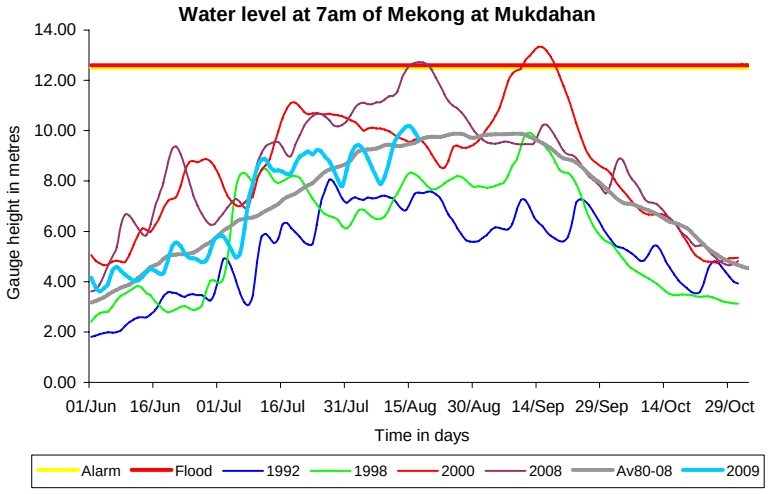

Water level at 7am of Mekong at Nong Khai
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

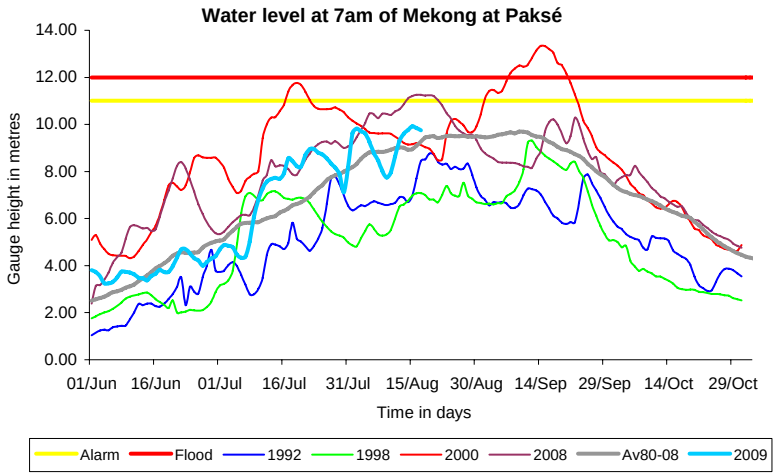

Water level at 7am of Mekong at Paksane
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

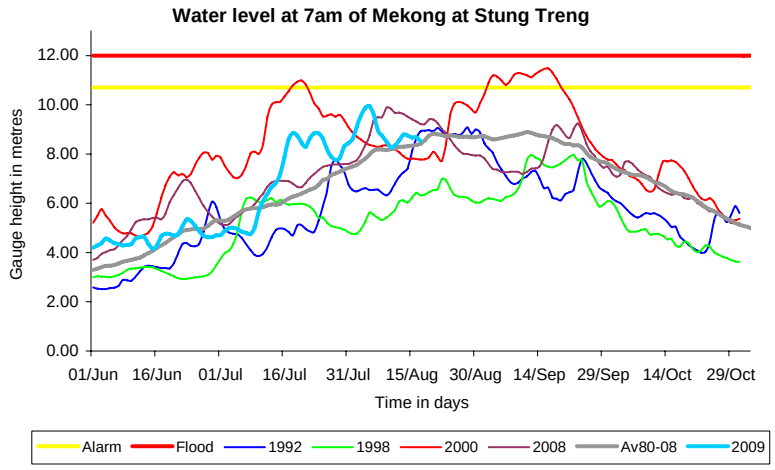

Water level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

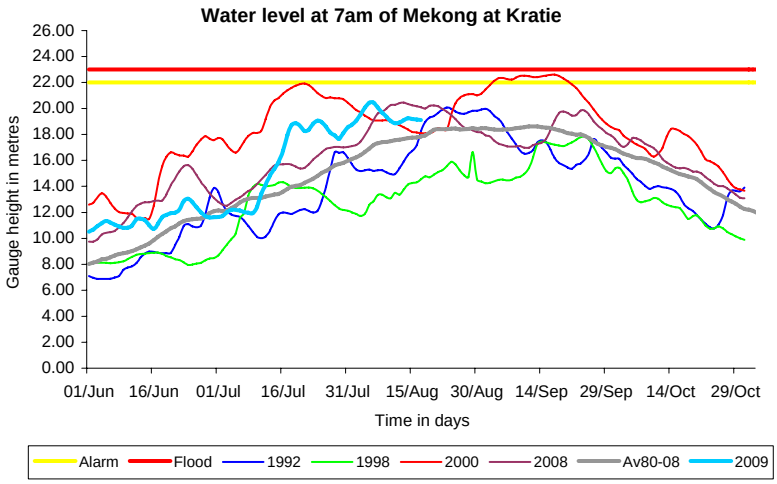

Water level at 7am of Mekong at Thakhek
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

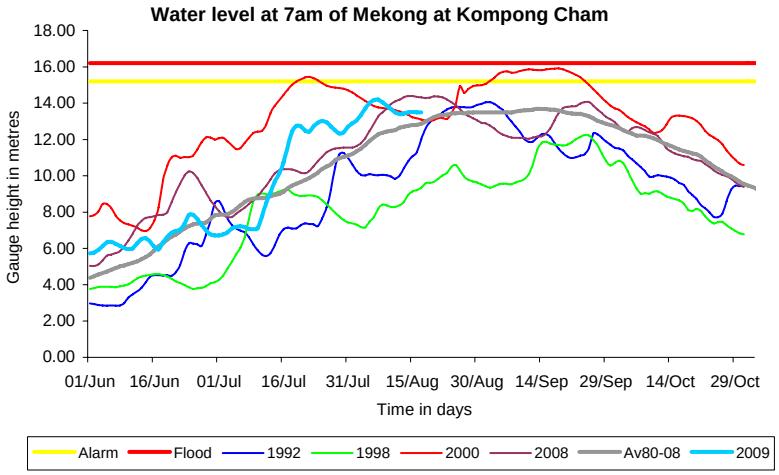

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

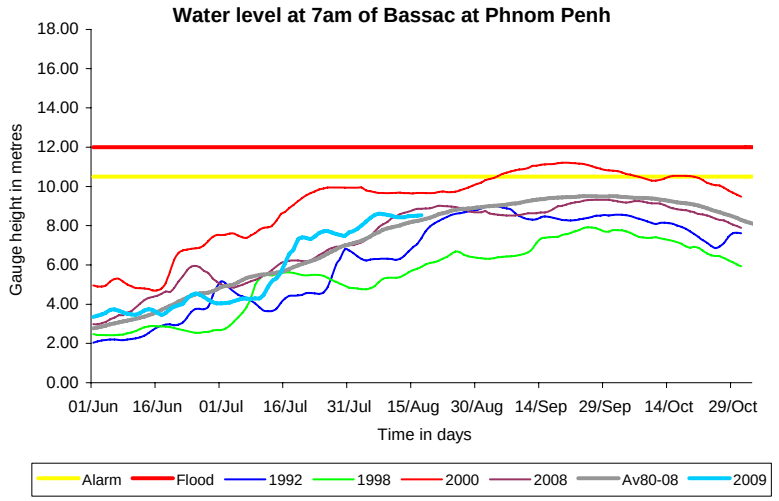

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

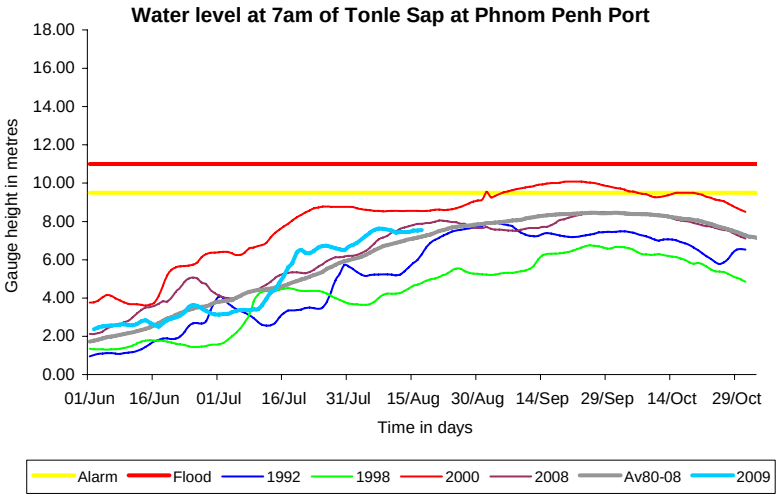

Water level at 7am of Mekong at Paksé
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

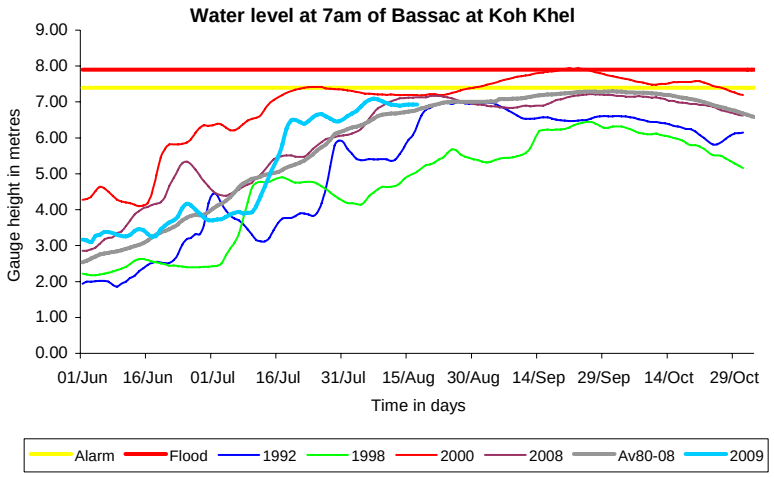

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

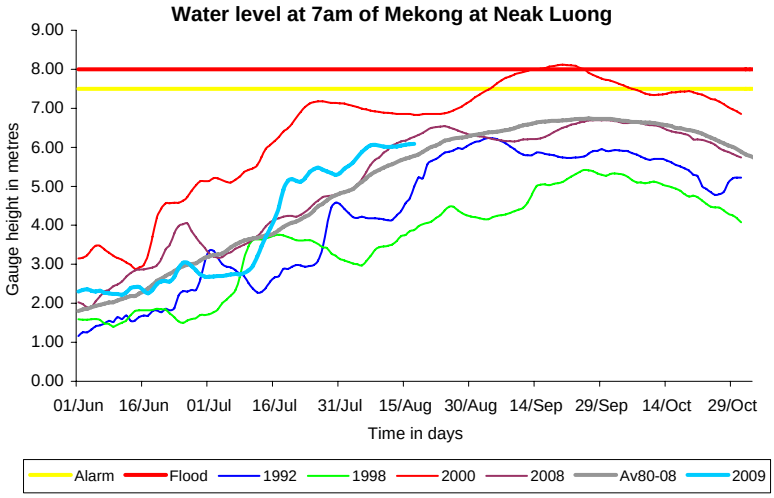

Water level at 7am of Mekong at Kratie
Gauge height in metres
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

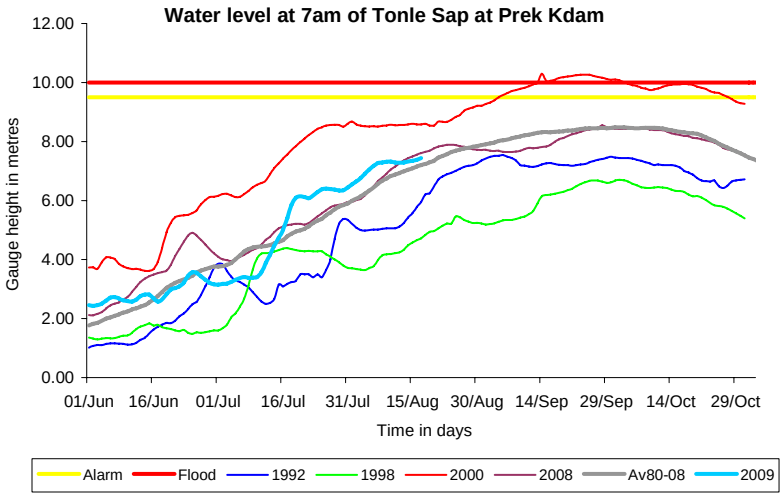

Water level at 7am of Mekong at Kompong Cham
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

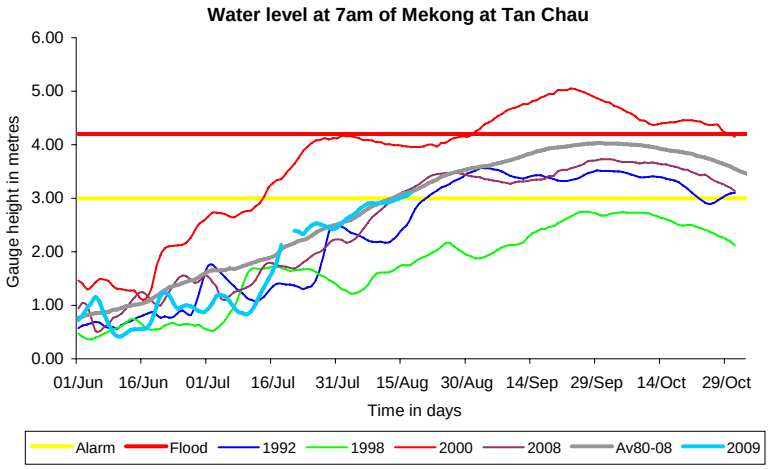

Water level at 7am of Bassac at Phnom Penh
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

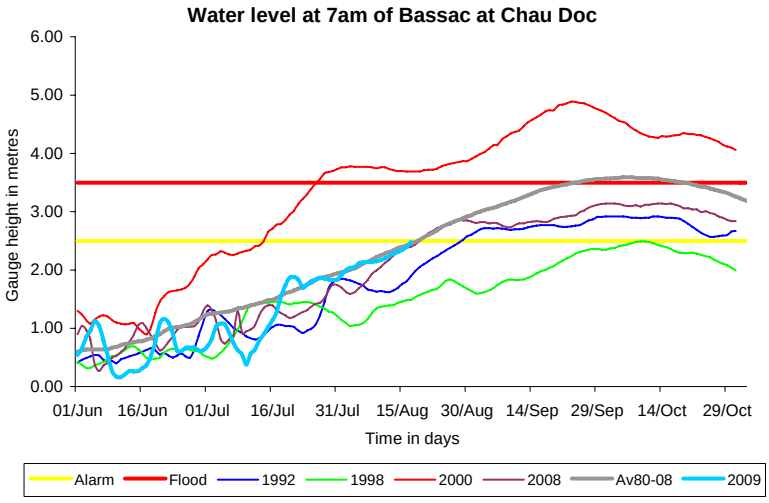

Water level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009


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