Mekong River Commission

Regional Flood Management and Mitigation Centre

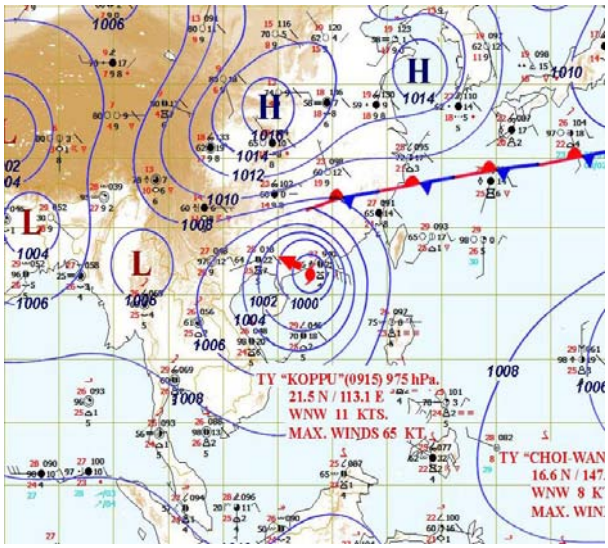
Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 21/09/2009, covering the week from the 14th to the 21st of September 2009

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

General weather patterns

During the week of the 14th to the 21st of September 2009, seven weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 14th and 20th September bulletins are presented in the figures below:



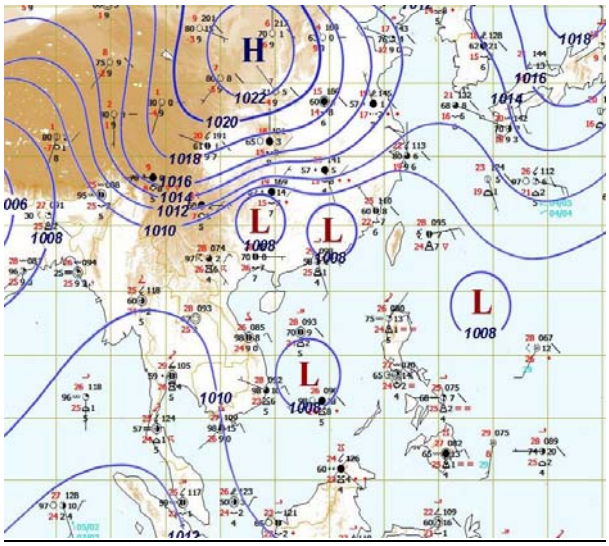


Figure 1: Weather map for 14th September 2009 Figure 2: Weather map for 20th September 2009

From Moderate to Weak South-West (SW) Monsoon

A moderate SW monsoon prevailed over the Bay of Bengal, Gulf of Thailand and Indochina Peninsula from 14 to 16 September and started weakening from the 17th. A SW monsoon intensified over the Bay of Bengal, Gulf of Thailand and Indochina Peninsula from 20 September 2009 (Figure 2).

ITCZ (Inter Tropical Convergence Zone)

From 14 to 17 September 2009 an Inter Tropical Convergence Zone (ITCZ) lied across Lao PDR, South of China, Viet Nam, the South China Sea and the Philippines.

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

The TY ***KOPPU*** (0915) with a central pressure 975 hPa made land at Guangxi Province, South of China. It had downgraded to a low pressure system by on 17 September.

On 19 September the Typhoon ***CHOI-WAN***, with a central pressure of 970 hPa moving at a speed of 48 km/h, and with a central maximum wind speed of 130 km/h, was located at latitude 32°7 N, longitude 145°1 E, which is over the Pacific Ocean, near Japan, moving North - Northeast.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Overall weather situation

A moderate SW monsoon and Inter Tropical Convergence Zone (ITCZ) occurred from 14 to 17 September 2009. A normal weather situation prevailed from 17 to 21 September. There were Cu and Cb clouds observed over Thailand, Lao PDR, Viet Nam and Cambodia in the evening. As the

result of these phenomena, isolated rain occurred in Myanmar, Thailand, Lao PDR, Viet Nam and Cambodia.

General behaviour of the Mekong River

Water levels along the Mekong River were more or less stable during the monitored period. Most stations are recording levels that are somewhat below the long-term average for this time of the year. Water levels at Tan Chau and Chau Doc monitoring stations were above alarm levels during the past week.

For stations from Chiang Saen to Paksane

Water levels were more-or-less stable, slightly rising at the beginning of the week then falling at 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, slightly rising at the beginning of the week then falling at 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 Phnom Penh

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

For stations from Phnom Penh to Koh Khel/Neak Luong

Water levels were more or less stable, slightly falling 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 more or less stable, slightly 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 levels 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
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
15/09	536.88	4.92	9.88	9.46	6.28	7.07	8.57	6.71	7.85	6.41	5.45	8.12	6.54	7.57	18.45	13.48	8.99	8.21	7.12	6.41	8.08	3.37	2.79
16/09	537.32	5.03	9.62	9.44	6.35	7.14	8.66	6.71	7.84	6.41	5.47	8.54	6.92	7.28	18.07	13.22	8.94	8.17	7.08	6.39	8.05	3.40	2.85
17/09	537.33	4.99	9.94	9.50	6.45	7.24	8.99	6.89	8.03	6.48	5.50	8.44	6.88	7.27	17.78	12.98	8.94	8.17	7.08	6.37	8.04	3.43	2.89
18/09	537.05	5.27	10.24	9.97	6.51	7.35	9.43	7.13	8.26	6.66	5.69	8.34	6.78	7.07	17.75	12.89	8.90	8.11	7.07	6.38	8.03	3.44	2.91
19/09	536.22	5.40	10.18	10.27	7.09	7.86	9.36	7.24	8.23	6.84	5.88	8.44	6.83	6.90	17.20	12.56	8.94	8.16	7.08	6.39	8.07	3.45	2.93
20/09	536.36	5.34	10.26	10.03	7.22	8.12	9.58	7.15	8.26	6.79	5.82	8.49	6.91	6.80	16.88	12.39	8.90	8.11	7.06	6.39	8.07	3.43	2.92
21/09	536.89	5.24	10.27	9.86	6.93	7.84	9.57	7.20	8.32	6.73	5.78	8.41	6.83	6.85	16.65	12.14	8.85	8.06	7.04	6.37	8.04	3.41	2.89
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
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	4.2	3.0
15/09	0.0	1.1	0.0	0.0	2.0	2.1	35.9	4.6	2.6	2.7	45.0	6.0	1.5	10.7	5.4	0.0	20.3	0.0	3.6	8.6	6.4	0.0	0.0
16/09	0.0	0.0	0.0	8.0	42.5	34.8	125.7	12.5	0.0	5.7	0.0	30.1	31.0	10.3	1.8	0.7	2.8	0.0	21.3	0.0	0.0	2.8	21.0
17/09	16.4	25.3	16.8	63.0	11.6	50.5	24.1	42.2	59.9	3.0	2.0	0.5	3.5	0.0	5.2	0.0	0.0	0.0	3.2	5.2	43.4	0.0	0.0
18/09	0.0	19.2	20.0	4.3	0.0	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19/09	10.9	12.6	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	11.7	0.0	15.6	20.5	0.0	58.8	4.8	12.3	26.8	0.6
20/09	26.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0
21/09	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	0.0	0.6	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

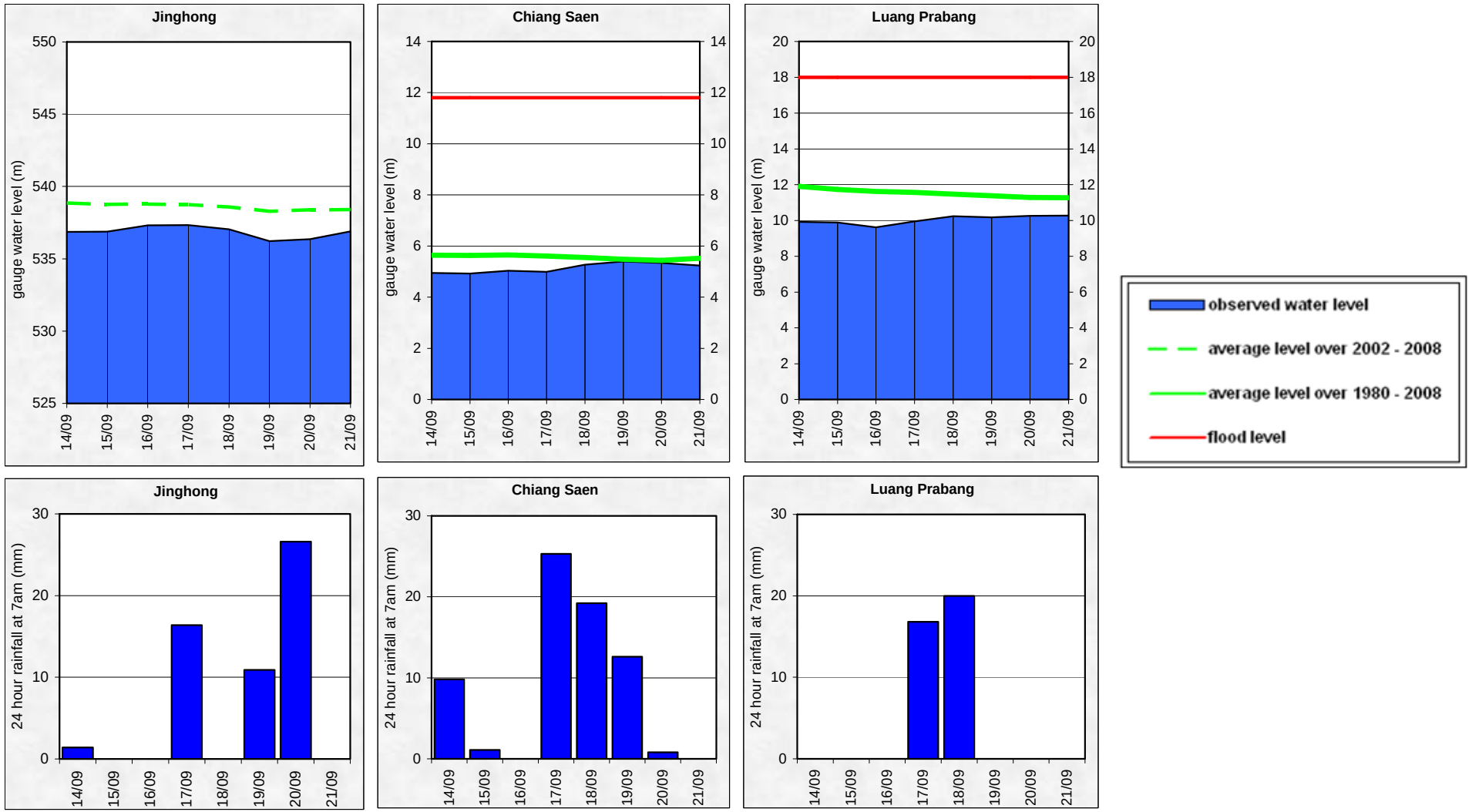


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

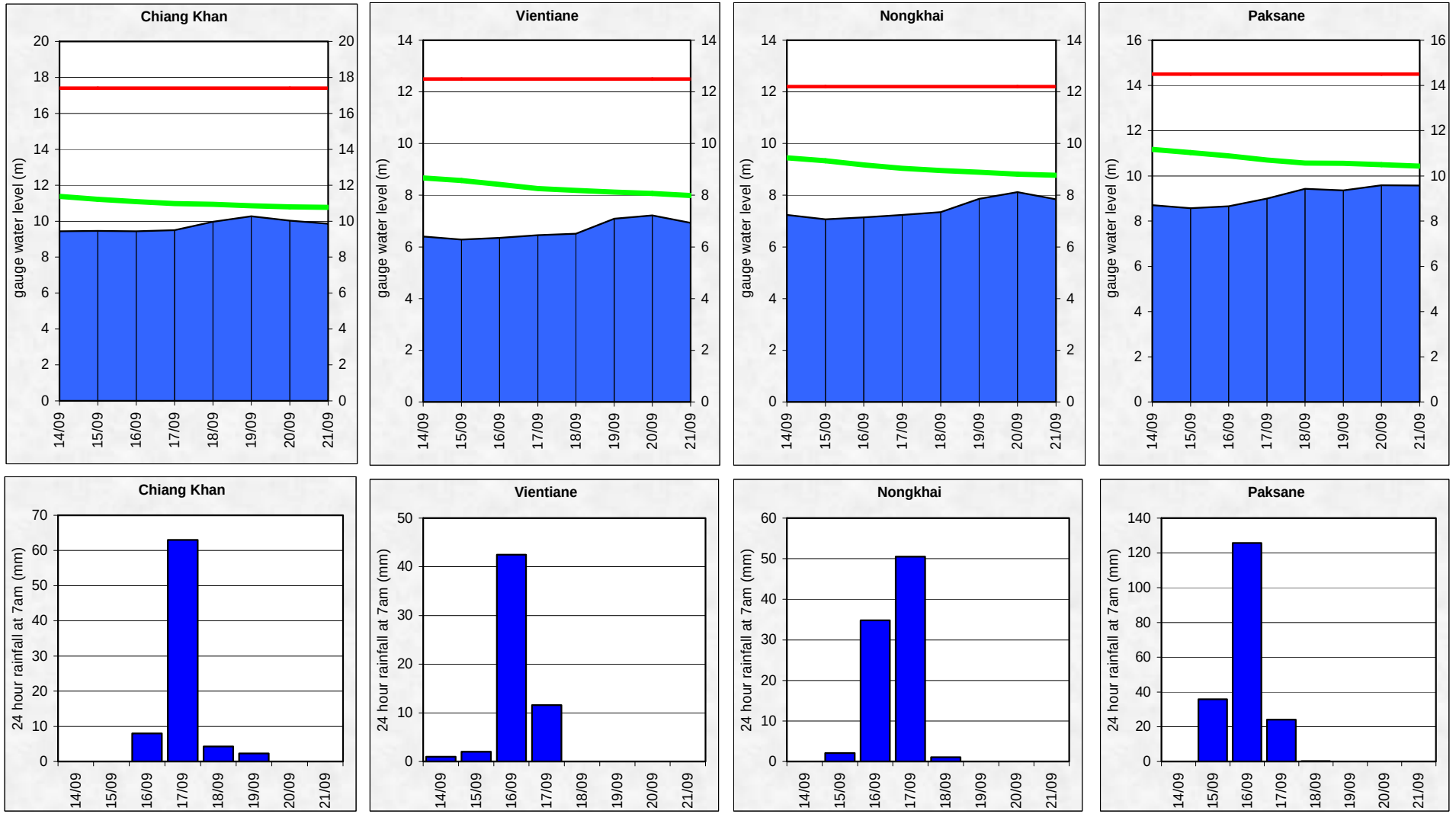


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

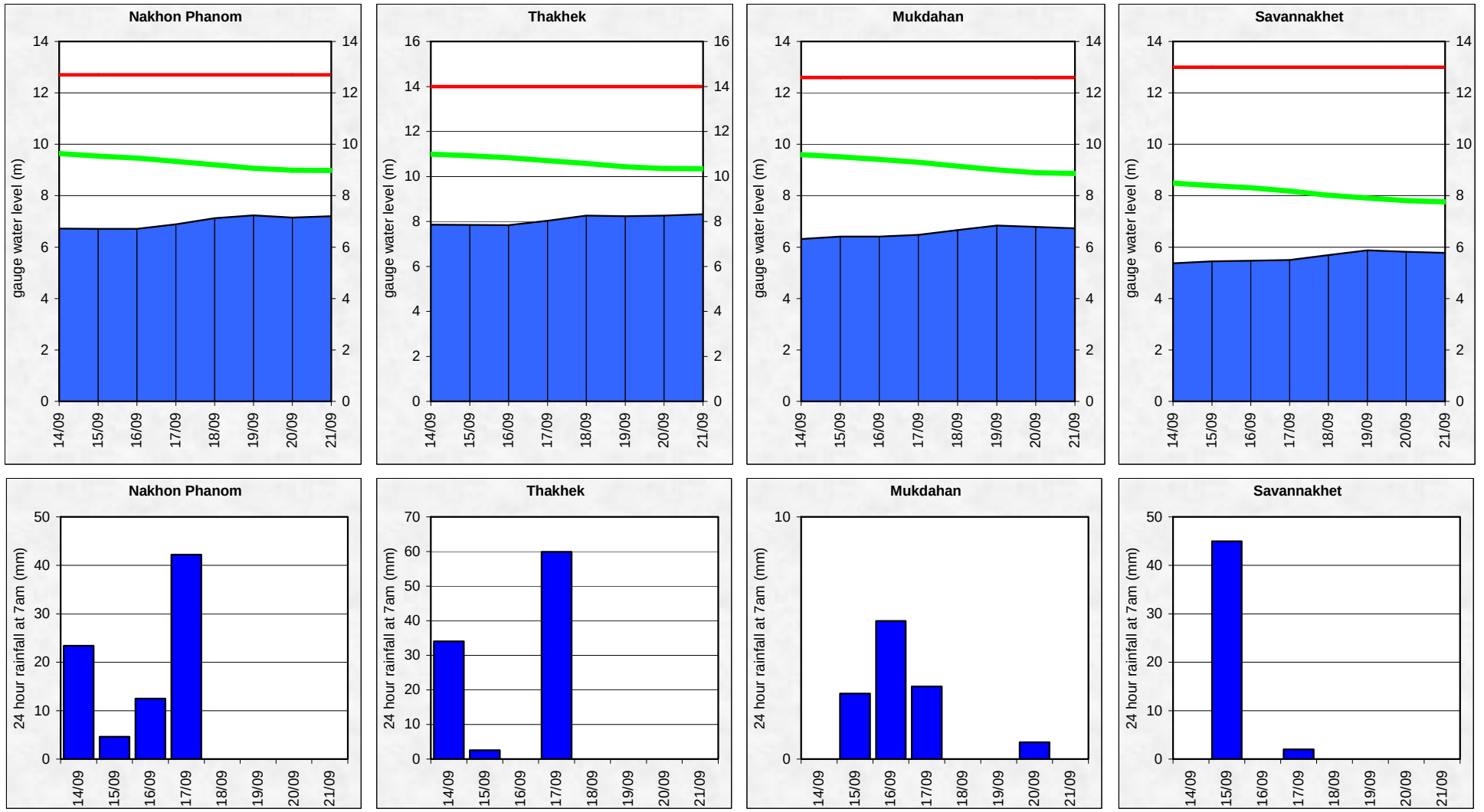


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

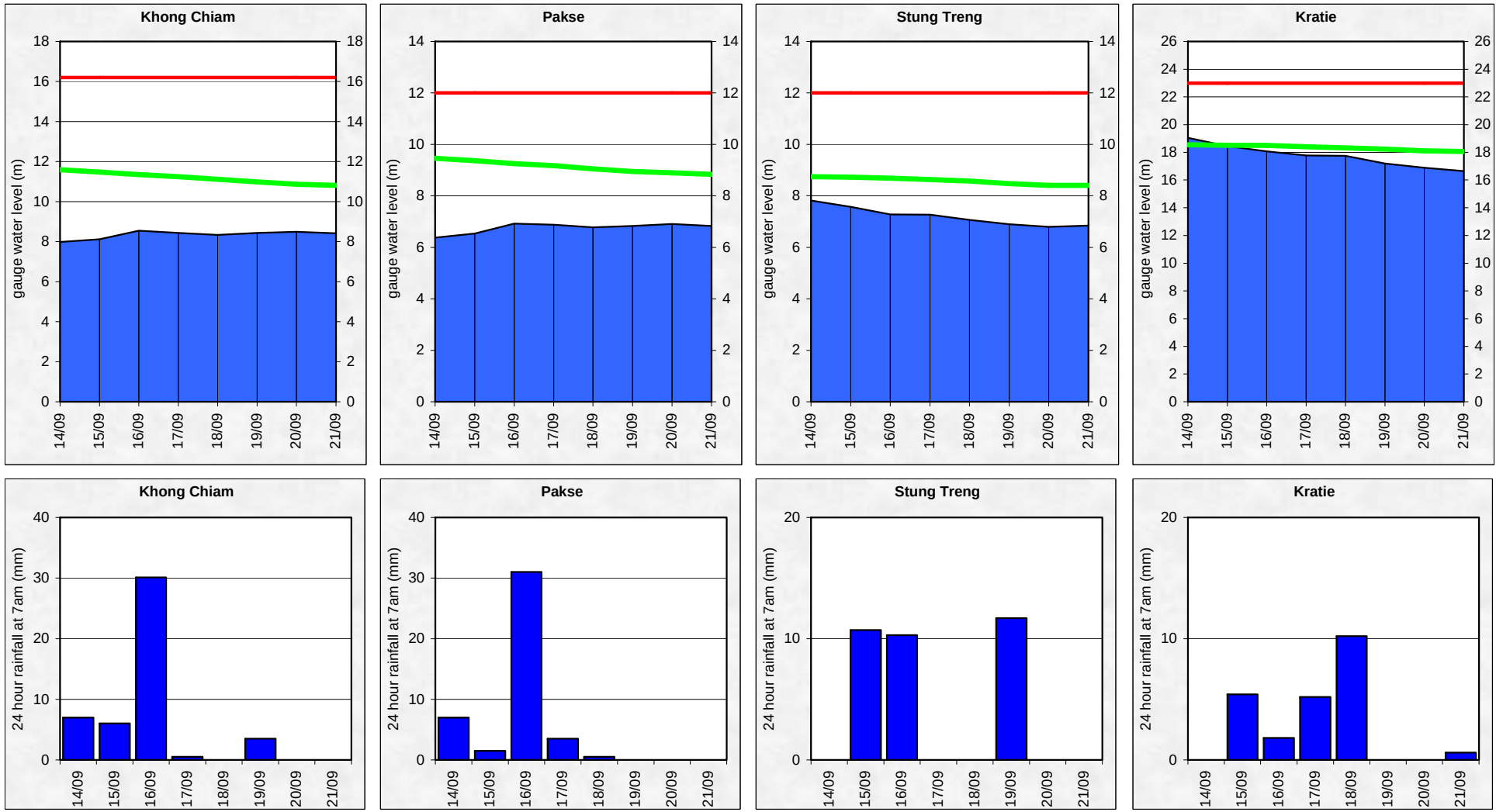


Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

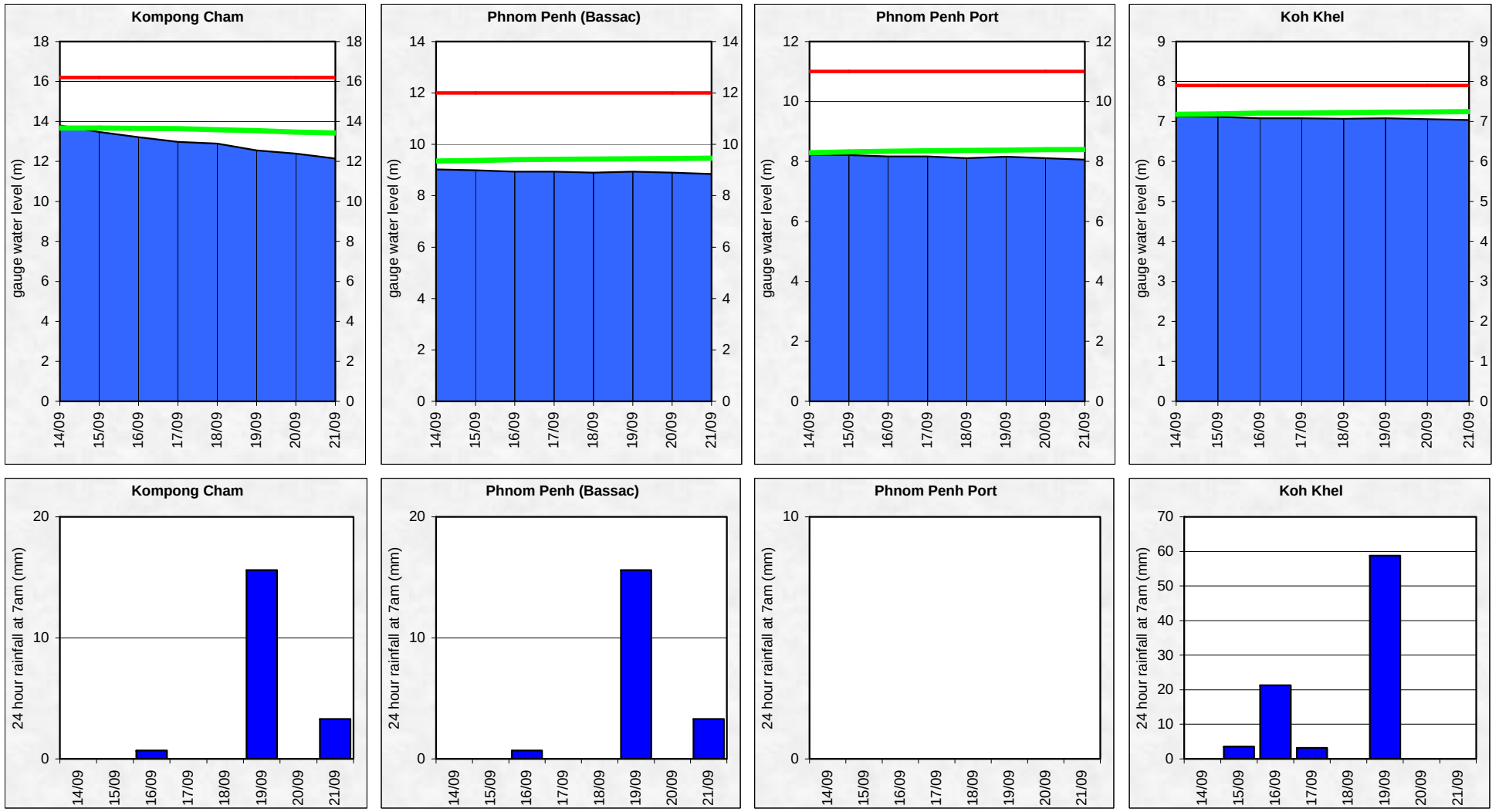
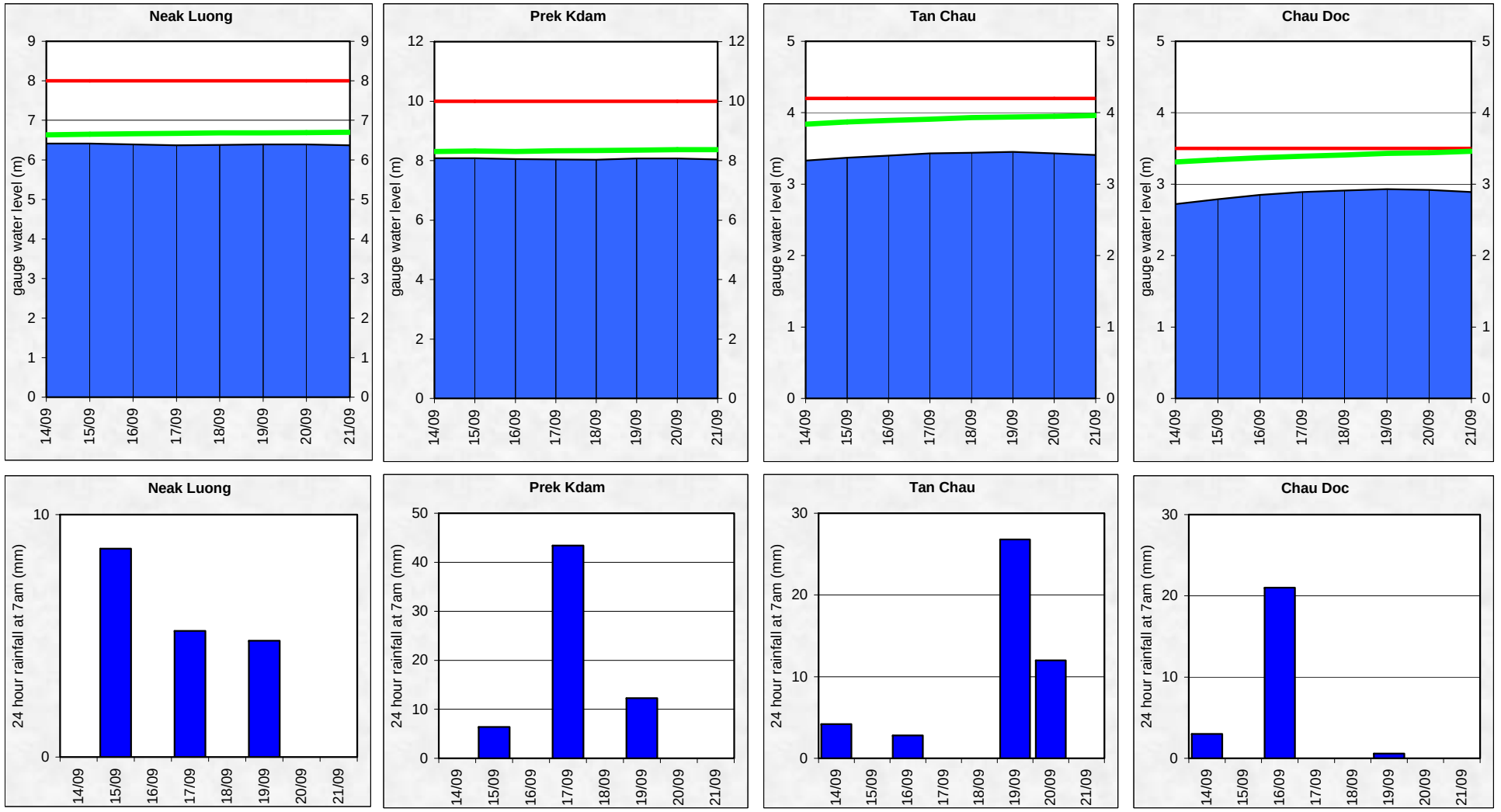


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



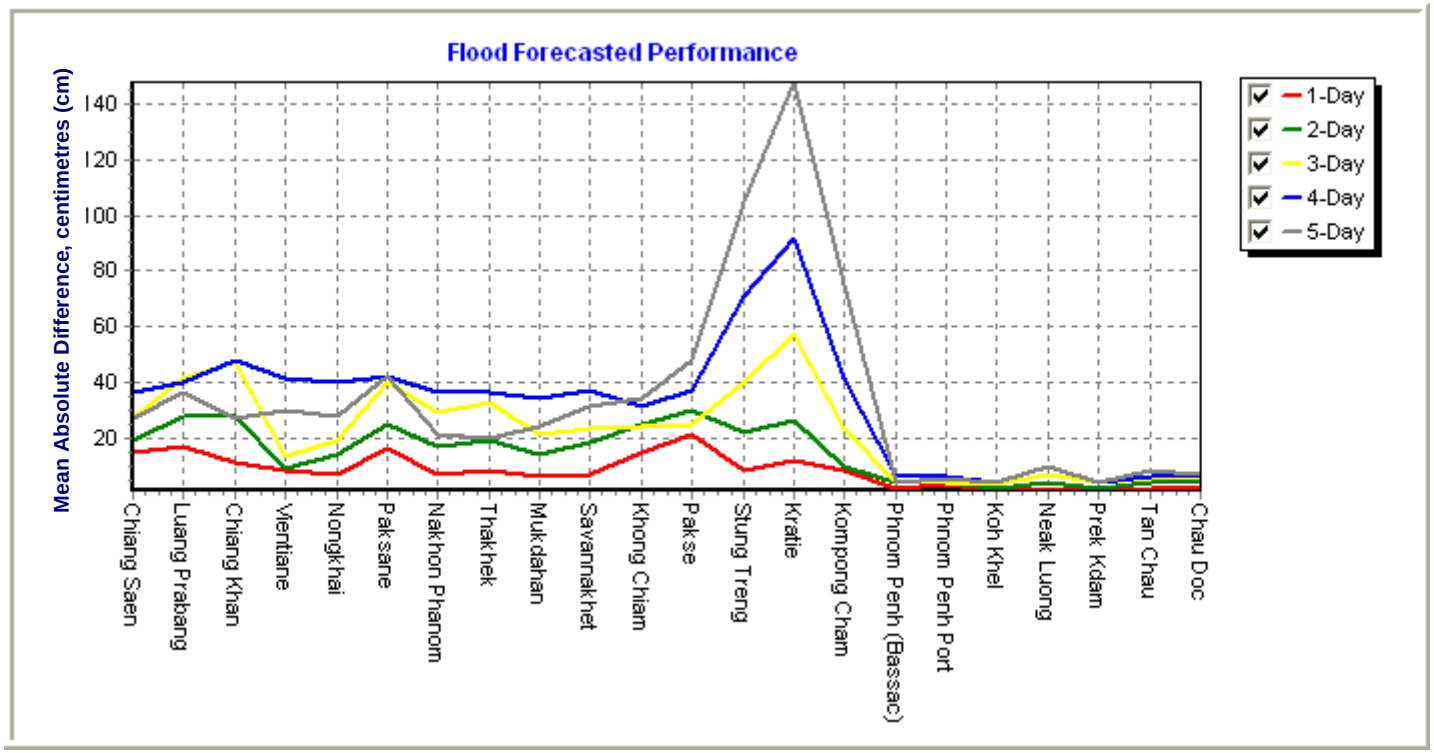
Annex B: Accuracy and performance

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 Stung Treng and Kratie where their accuracies are less than expected and this perhaps caused by internal model functionality due to limited parameters for model calibration. The adjustment by utilising the practical knowledge and experience of forecaster-in-charge is desirably needed towards improved forecasts at these 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	100.0	100.0	85.7	100.0	100.0	85.7	100.0	100.0	100.0	100.0	71.4	85.7	71.4	71.4	71.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	*92.9*
2-day	100.0	100.0	50.0	83.3	83.3	66.7	100.0	100.0	100.0	100.0	83.3	66.7	66.7	66.7	83.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	*88.6*
3-day	100.0	100.0	40.0	100.0	100.0	60.0	100.0	80.0	100.0	100.0	100.0	80.0	60.0	40.0	40.0	80.0	80.0	100.0	80.0	100.0	100.0	80.0	*82.7*
4-day	100.0	100.0	75.0	75.0	50.0	50.0	50.0	75.0	100.0	100.0	100.0	75.0	25.0	25.0	75.0	100.0	100.0	100.0	50.0	100.0	100.0	75.0	*77.3*
5-day	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	66.7	66.7	66.7	0.0	0.0	33.3	100.0	100.0	100.0	33.3	100.0	100.0	66.7	*78.8*

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	*09:49*	*1*	*-*	*8*	*08:14*	*08:27*	*07:40*	*08:28*	*08:26*	*08:15*	*08:06*	*0*	*0*	*2*	*190*	*85*	*1*	*91*
month	*10:07*	*8*	*12:52*	*28*	*08:16*	*08:21*	*07:46*	*08:34*	*08:31*	*08:21*	*08:11*	*0*	*0*	*8*	*592*	*334*	*24*	*253*
season	*10:30*	*33*	*12:44*	*77*	*08:21*	*08:24*	*08:02*	*08:23*	*08:40*	*08:23*	*07:56*	*0*	*2*	*238*	*1722*	*1065*	*112*	*765*

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.

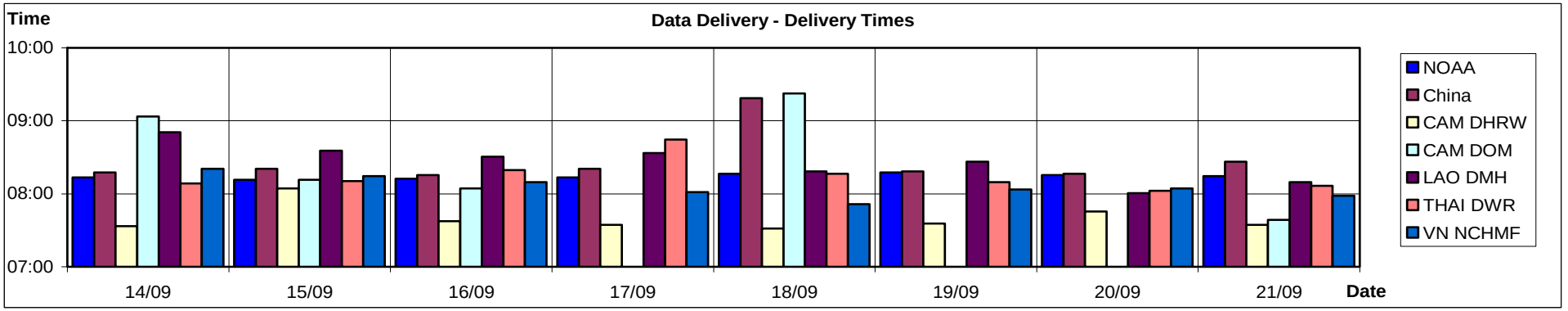


Figure B2: Data delivery times for the past 8 days including the current report date

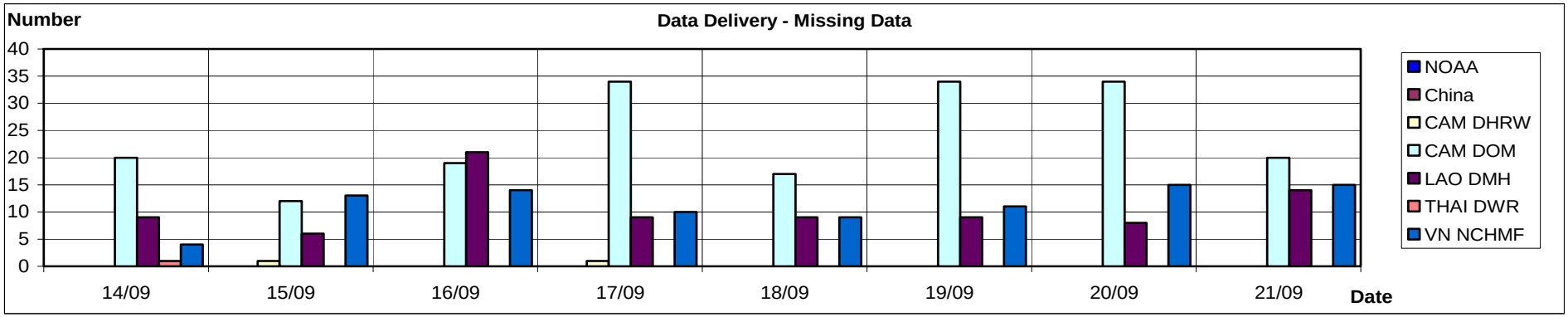


Figure B3: Missing data for the past 8 days including the current report date

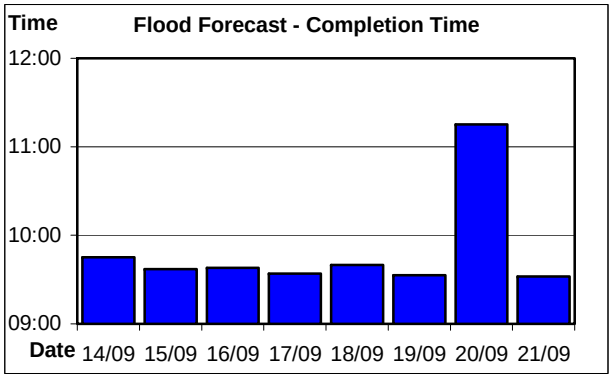


Figure B4: Flood forecast completion time

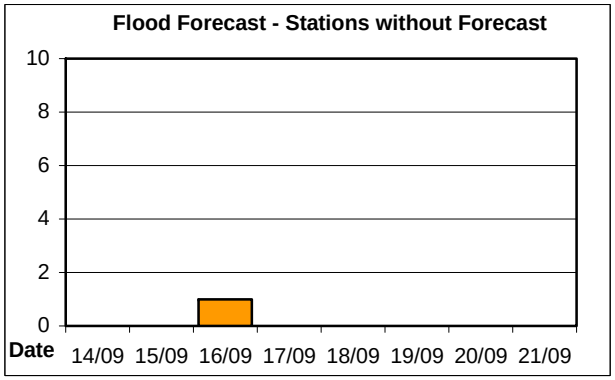


Figure B5: Flood forecast stations without forecast

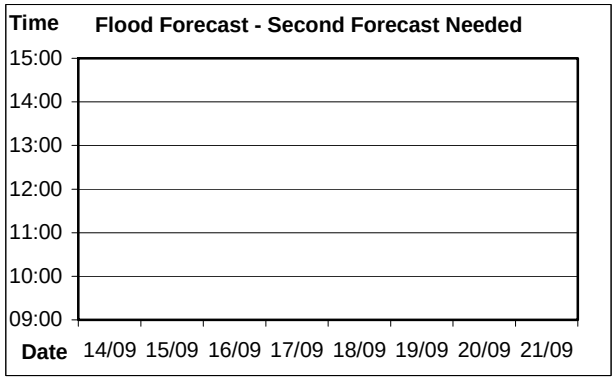


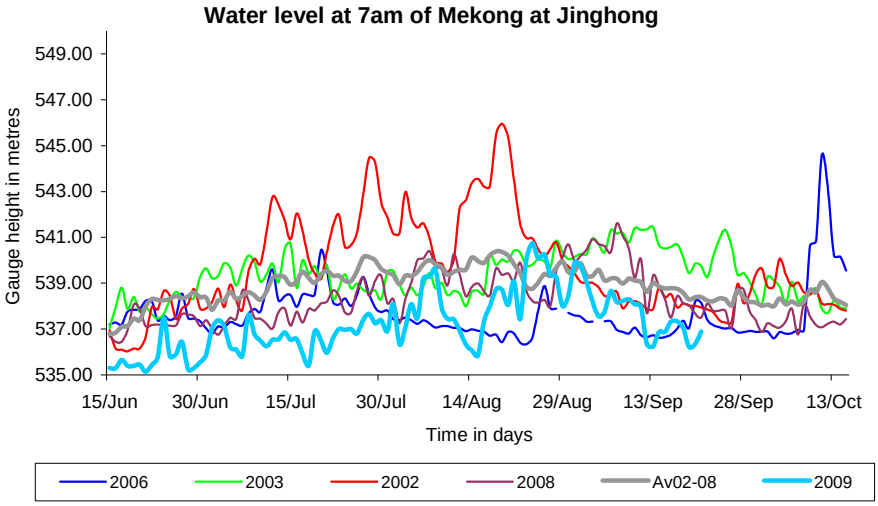
Figure B6: Second forecast needed

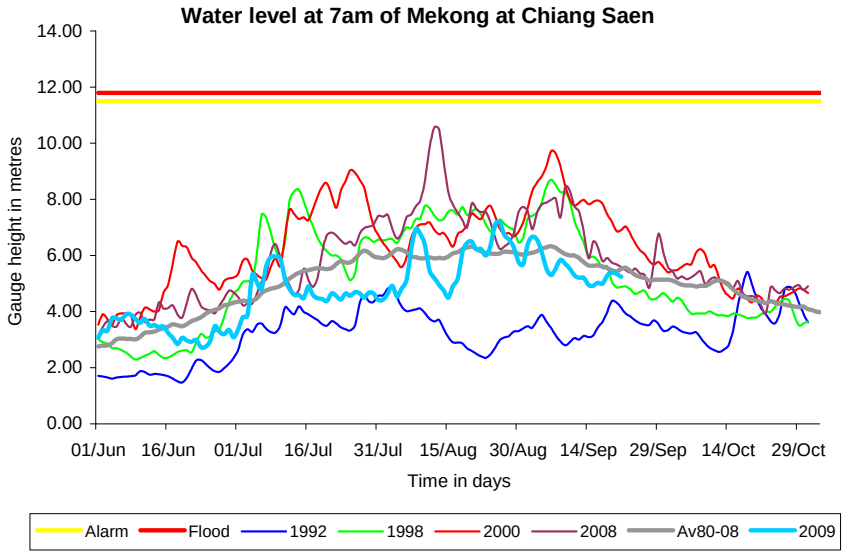
Annex C: Season Water Level Graphs

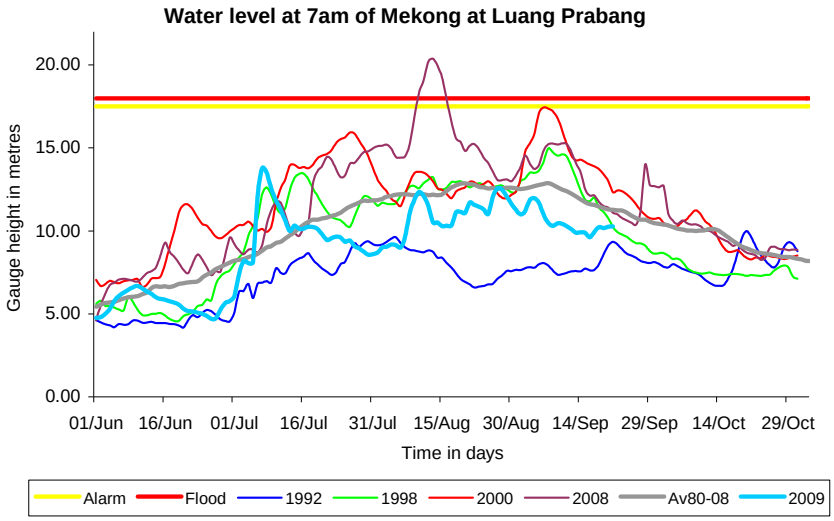
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

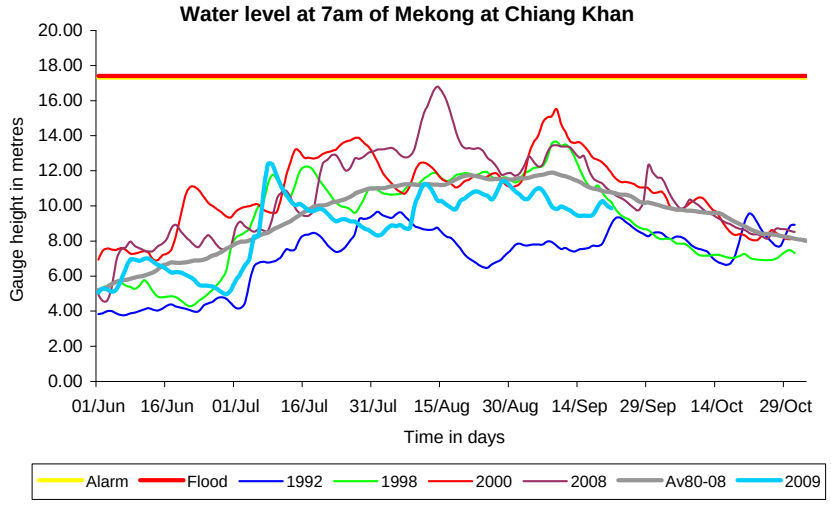
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

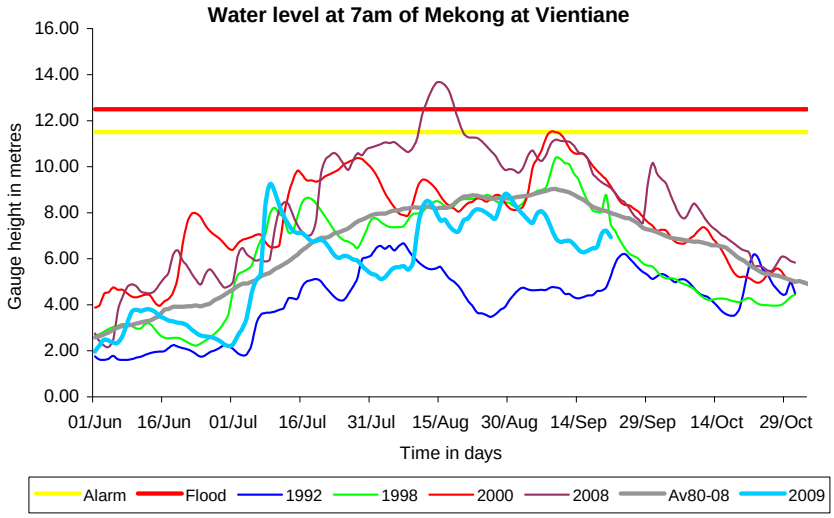
IN WET SEASON FROM 1 JUNE TO 31 OCTOBER

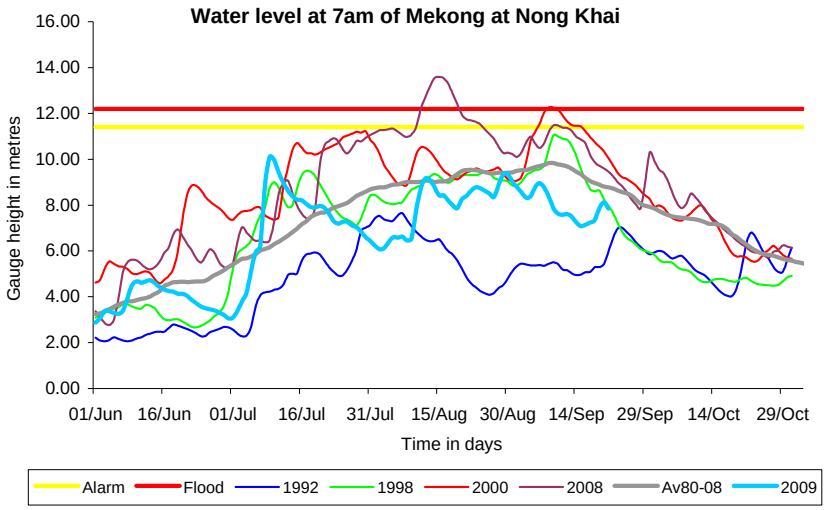


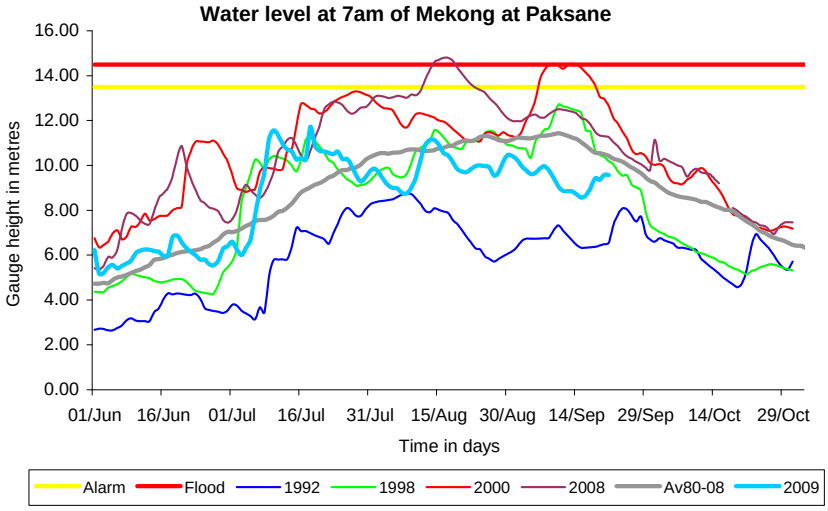


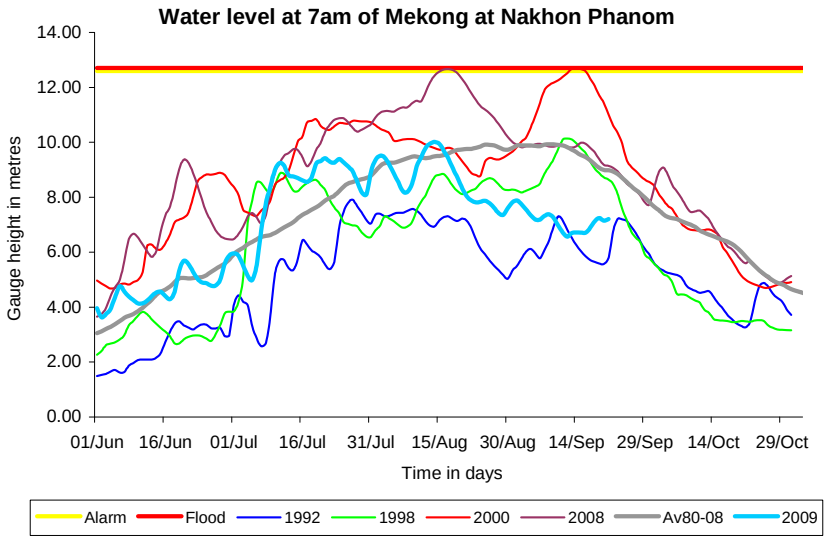

Water level at 7am of Mekong at Luang Prabang
Gauge height in metres
20.00
15.00
10.00
5.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

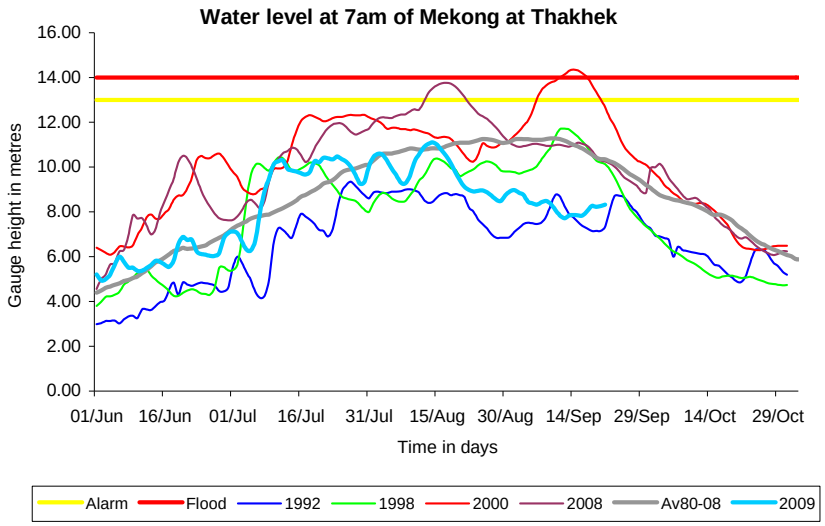

Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

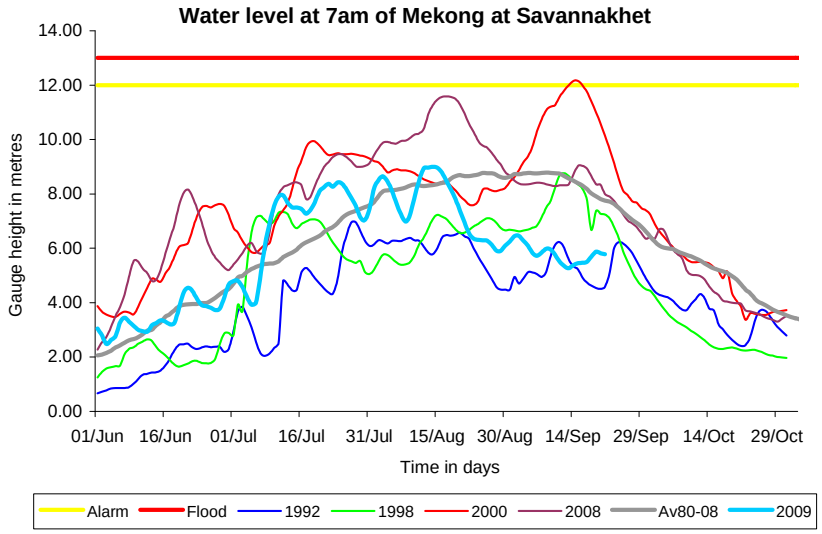

Water level at 7am of Mekong at Vientiane
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

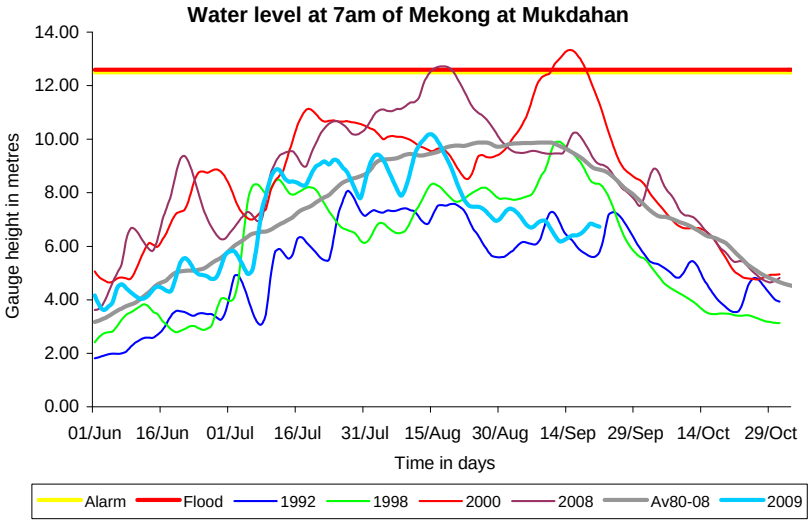

Water level at 7am of Mekong at Nong Khai
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

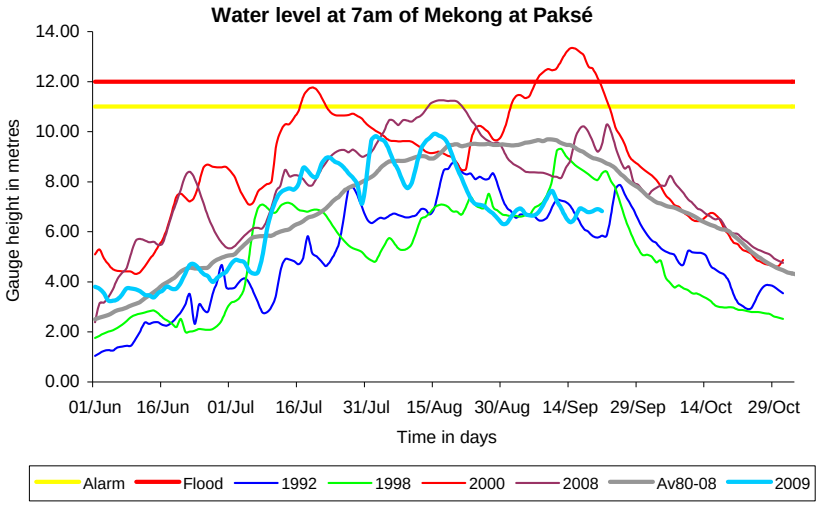

Water level at 7am of Mekong at Paksane
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

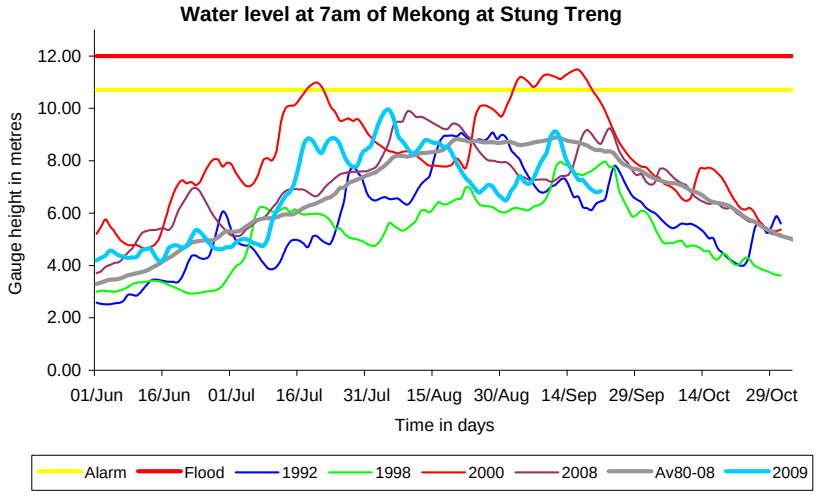

Water level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

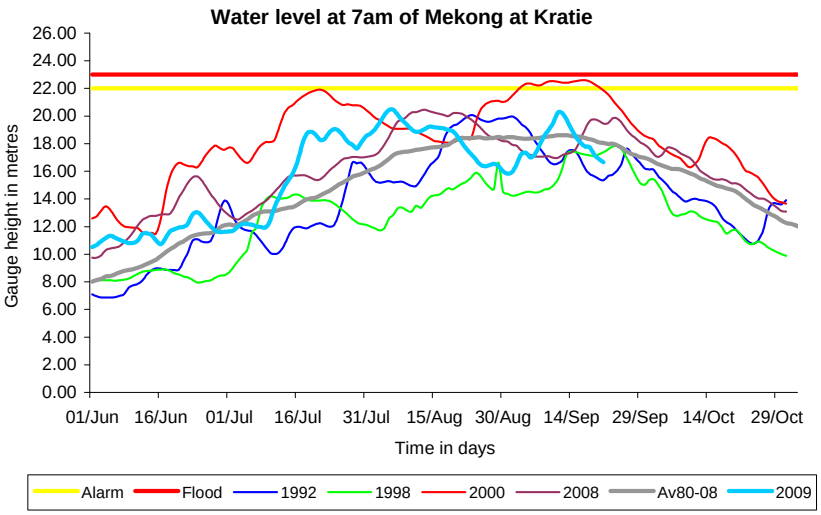

Water level at 7am of Mekong at Thakhek
Gauge height in metres
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

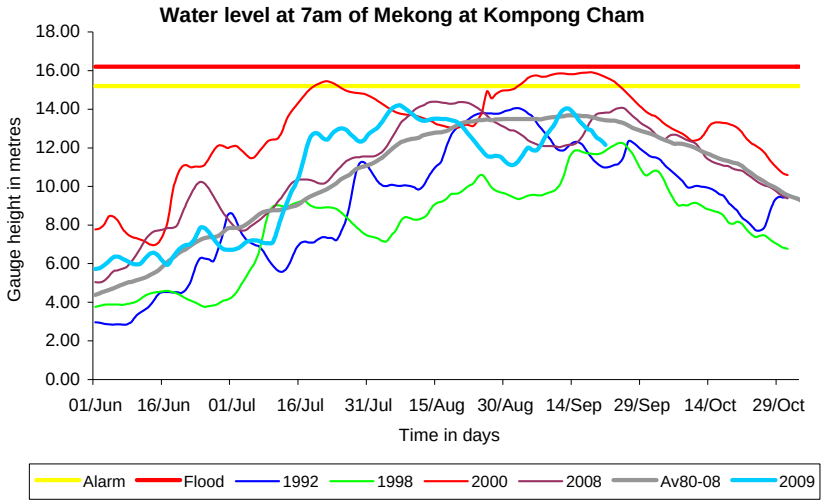

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

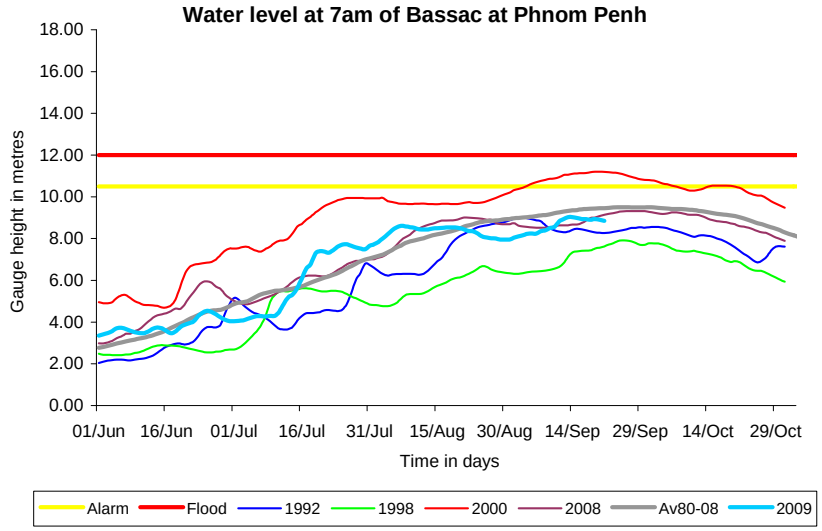

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

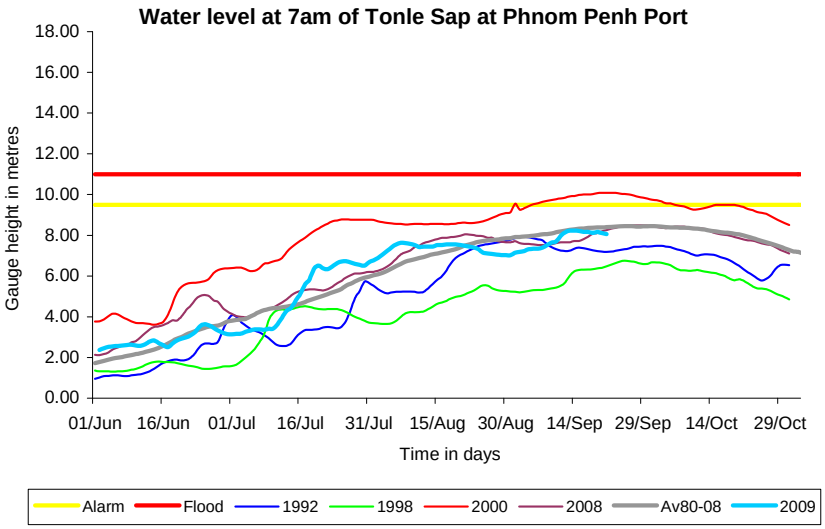

Water level at 7am of Mekong at Paksé
Gauge height in metres
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

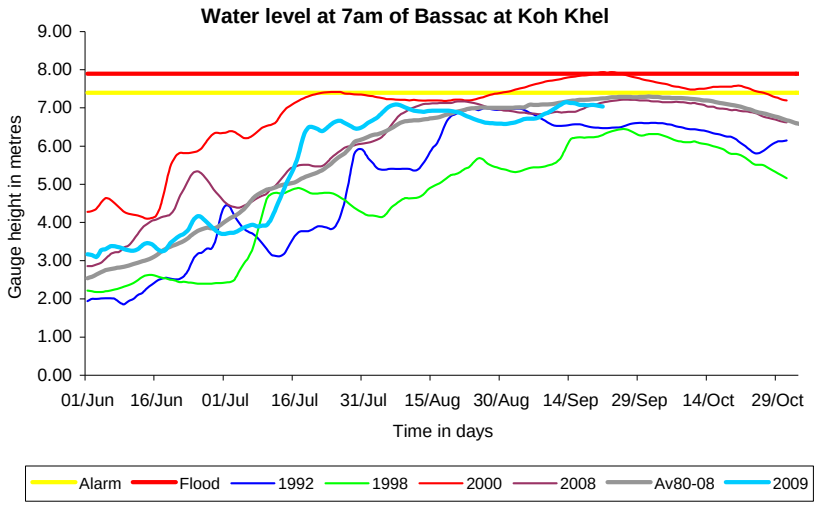

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

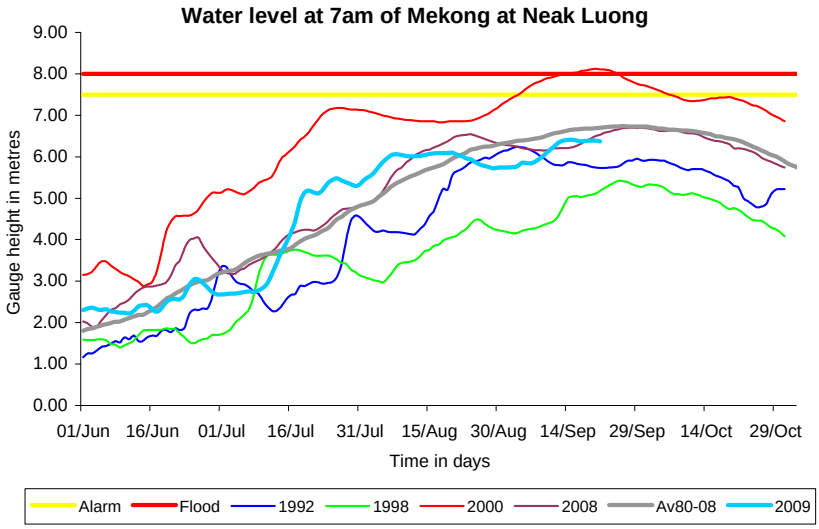

Water level at 7am of Mekong at Kratie
Gauge height in metres
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun
16/Jun
01/Jul
16/Jul
31/Jul
15/Aug
30/Aug
14/Sep
29/Sep
14/Oct
29/Oct
Time in days
Alarm
Flood
1992
1998
2000
2008
Av80-08
2009

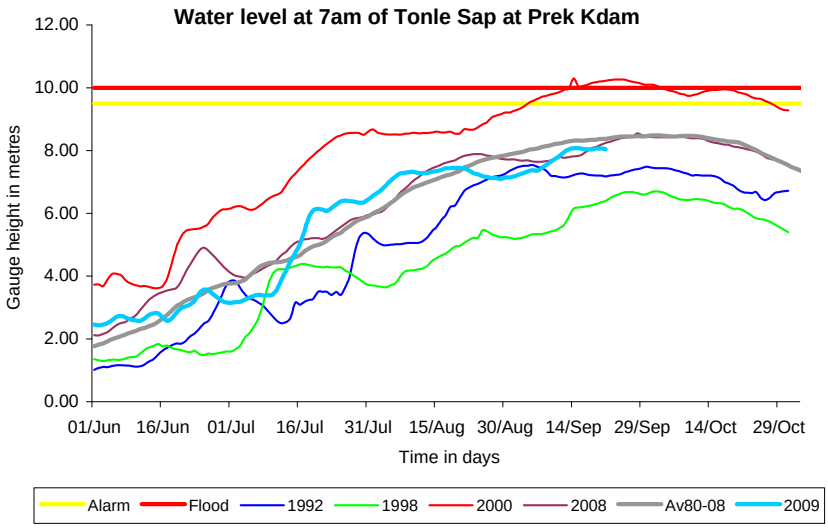

Water level at 7am of Mekong at Kompong Cham
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

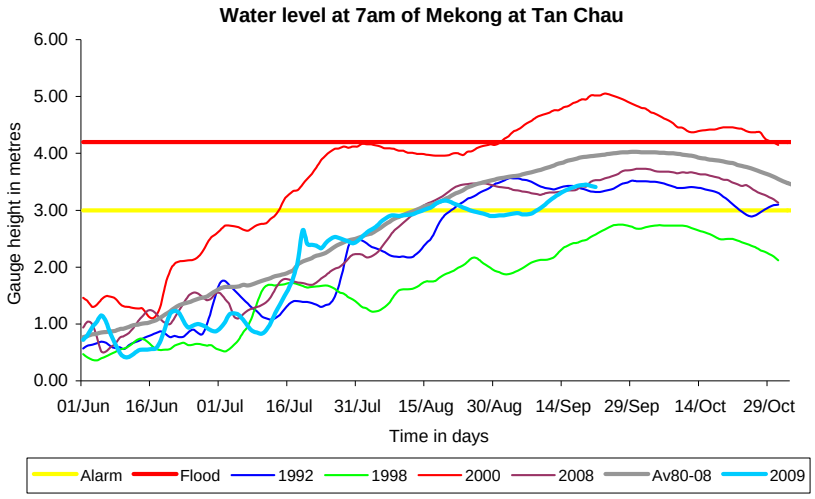

Water level at 7am of Bassac at Phnom Penh
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009

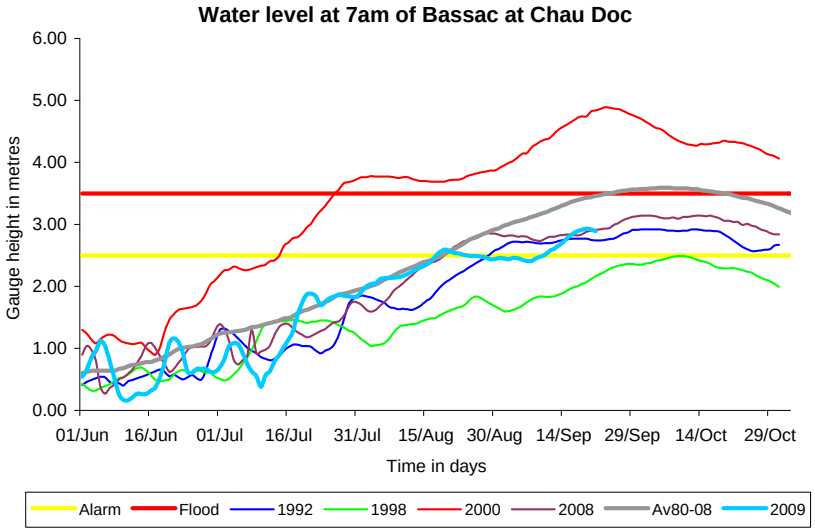

Water level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01/Jun 16/Jun 01/Jul 16/Jul 31/Jul 15/Aug 30/Aug 14/Sep 29/Sep 14/Oct 29/Oct
Time in days
Alarm Flood 1992 1998 2000 2008 Av80-08 2009


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