Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 09/07/2012, covering the week from the 02nd July to the 08th July 2012

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

General weather patterns

During the week of the 02nd July to 08th July 2012, five weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 03rd July and 06th July bulletins are presented in the figures below:

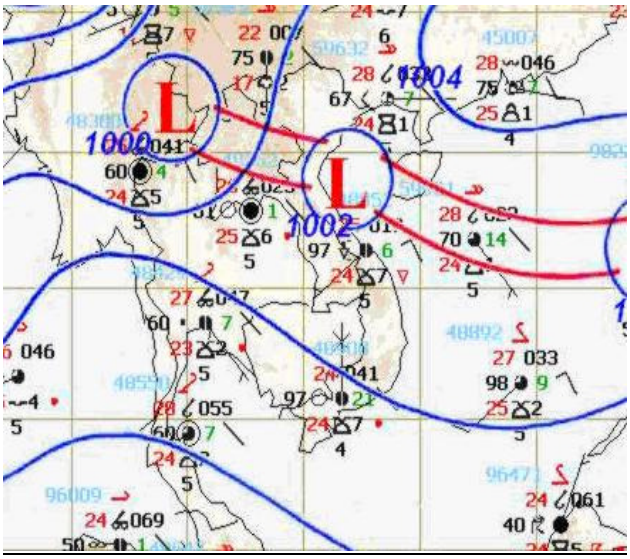


Figure 1: Weather map for 03rd July 2012

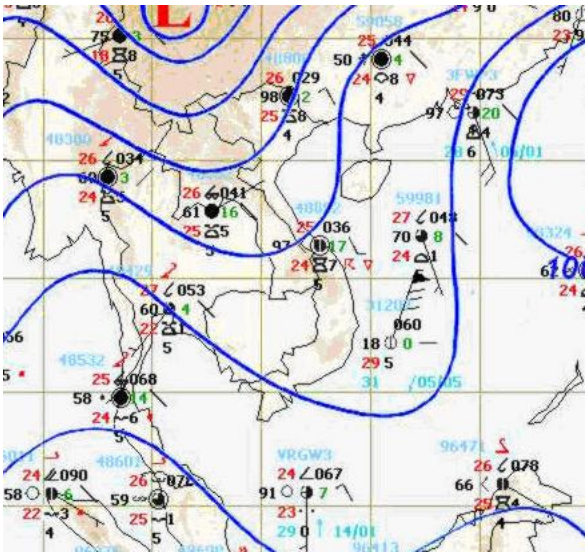


Figure 2: Weather map for 06th July 2012

South-West (SW) Monsoon

Moderate to strong SW monsoon prevailed over Amanda Sea and the Gulf of Thailand in the whole last week (Figure 1and 2).

Inter Tropical Convergence Zone (ITCZ)

Inter Tropical Convergence Zone (ITCZ) laid across the Northeast of Thailand, the South of Lao PDR and the Central of Viet Nam during the mid of the week (Figure 1).

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

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

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Over weather situation

A severe weather situation was occurred during the 5th and the 6th July in the LMB. As a result of strong SW monsoon activity as well as ITCZ appearance, heavy rain occurred in the North, Northeast and the Central of Thailand, the North and the South and the Central of Lao PDR and Vietnam, in the North, the East, the Northeast, the Southwest and the Central of Cambodia.

General behaviour of the Mekong River

There was some variation of water levels along the Mekong river during reporting period. Water levels at most stations in the upper and middle reaches recording levels that are below the long-term average while water levels at lower reach's stations were somewhat around the long-term average during this time of the year.

Regarding to 2 stations in downstream at Tan Chau and Chau Doc, water levels at those 2 stations were below the long term average with falling and rising trend in last week.

For stations from Chiang Saen to Vientiane/ Nong Khai

Water levels at Chieng Saen and Luang Prabang showed a rising trend during the monitoring period (Figure 3). Water levels at Chiang Khan, Vientiane/ Nakon Phanom were more-or-less stable from the beginning to the mid of week, then increasing sharply to the end of the week. These stations were recording levels that are below the long-term average for this time of the year and lower than that of 1992, the lowest of water levels at those stations during current 20 year historical record (Annex C).

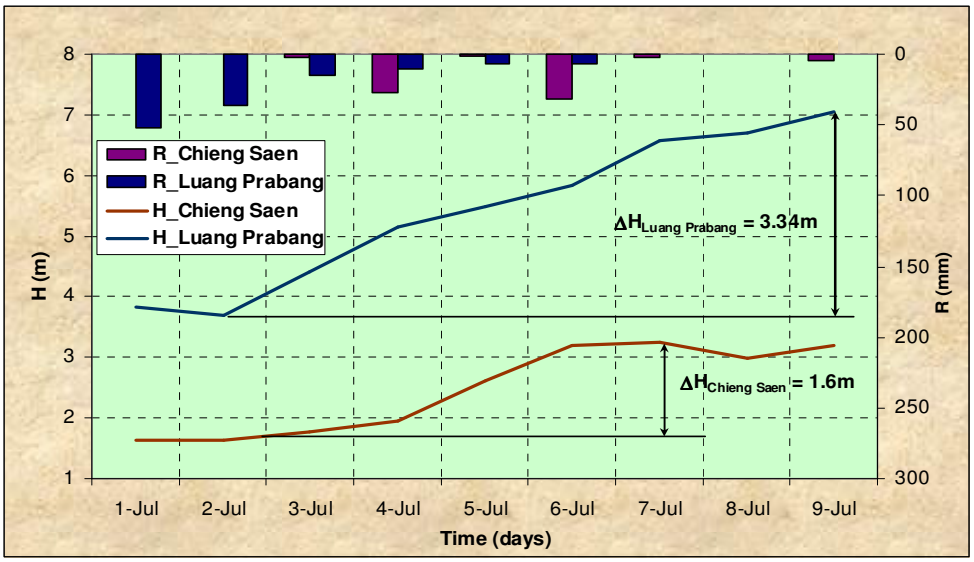


Figure 3: Water level rising at stations: Chieng Saen and Luang Prabang

For stations from Paksane to Pakse

Water levels were sharply increasing in the first half of the week, then slightly rising toward the end of the week except Paksane where water level was more-or-less stable in most of the time of the week and sudden rising at the end of the week. Figure 4 illustrates the sharply rising of water levels at stations Nakon Phanom/Thankek, Mukdahan/Savannakhet and Khong Chiam in the first half of last week.

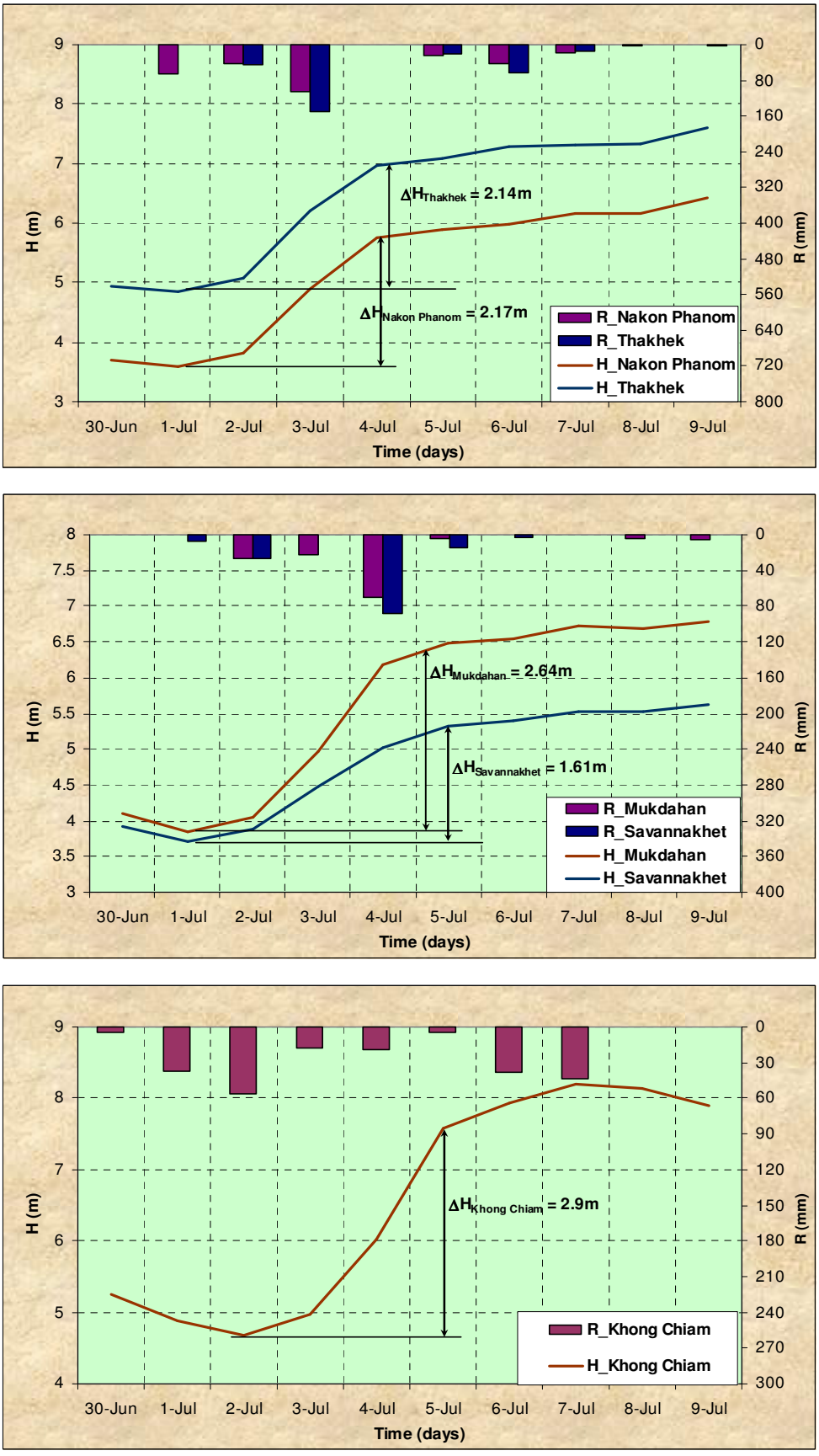


Figure 4: Quick rising of water levels at stations: Nakon Phanom/ Thakhek ; Mukdahan/Savannakhet and Khong Chiam

Water levels at stations on the left bank tributaries of Lao PDR such as at Muong Mai of Nam Nhiep River, at Ban Phone Si of Nam Ca Dinh, at Mahaxai of Se Bang Fai, Khong Sedon of Sedon river and right bank tributaries of Thailand at Ban Tha Kok Daeng of Nam Sokhram were increasing sharply in the first half of the week (Figure 5).

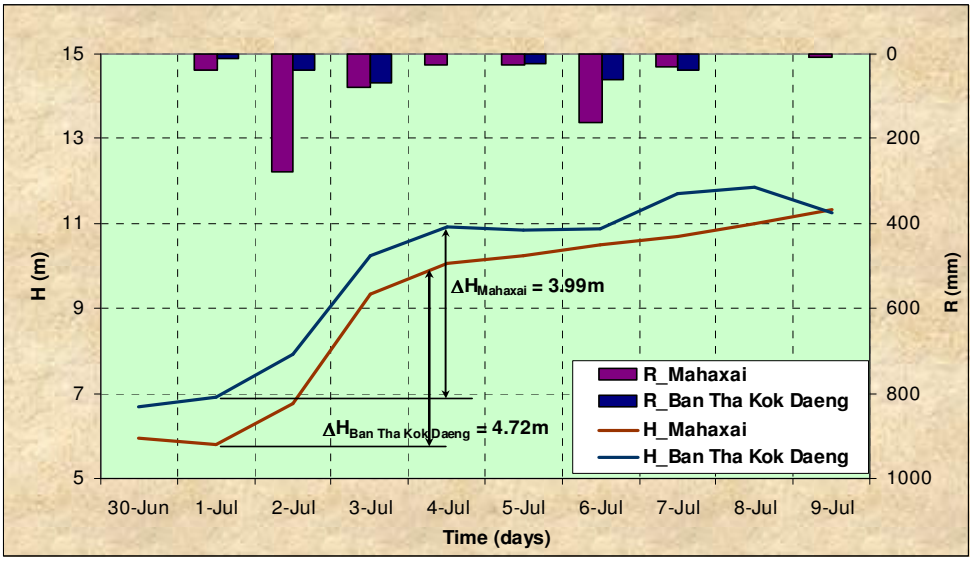


Figure 5: Rapid increasing of water levels at stations on tributaries: Nam Songkram at Ban Tha Kok Daeng, Se Bang Fai at Mahaxai

These stations were recording levels that are somewhat below or around the long-term average for this time of the year.

For stations from Stung Treng to Kampong Cham

Water levels at these stations were rising during the week and somewhat above the long-term average for this time of the year (Figure 6).

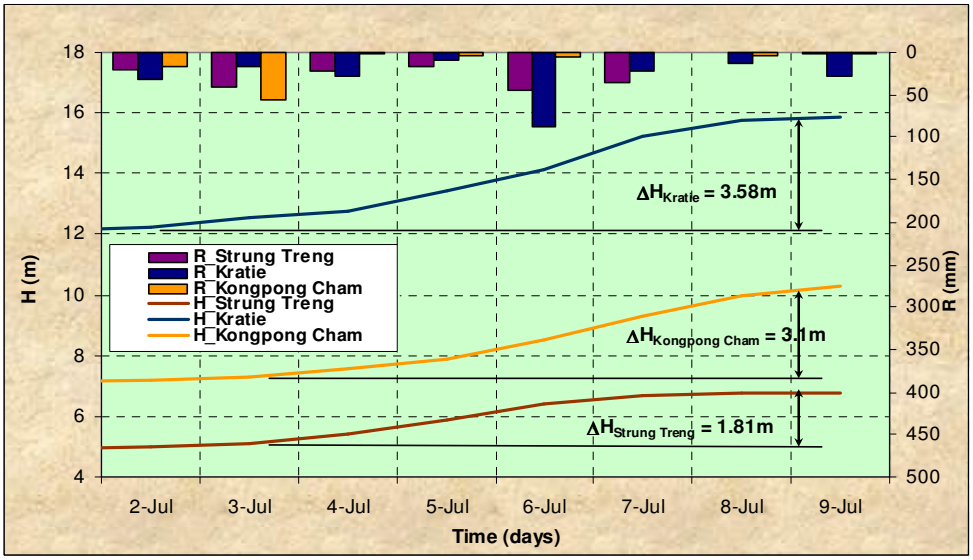


Figure 6: Quick rising of water levels at stations: Strung Treng, Kratie and Kongpong Cham

For stations from Phnom Penh to Koh Khel/Neak Luong

Water levels showed a rising trend toward the end of the week. Most stations were recording levels that are somewhat below the long-term average for this time of the year.

Tan Chau and Chau Doc

Water levels were decreasing during the first half of the week the increasing toward the end of the week. Both stations were recording levels that are below the long-term average for this time of the year and significantly affected by tidal.

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

Flood Situation

- Flood stage or alarm stage:

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

2012	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
02/07	534.72	1.64	3.70	4.48	1.82	2.38	4.70	3.81	5.08	4.04	2.88	4.68	3.86	4.99	12.25	7.18	4.01	3.14	3.67	2.62	3.08	1.34	1.35
03/07	536.14	1.77	4.41	4.14	1.74	2.34	5.26	4.90	6.21	4.96	3.90	4.97	4.01	5.10	12.54	7.32	4.08	3.22	3.71	2.64	3.15	1.30	1.30
04/07	535.79	1.95	5.15	3.80	1.60	2.22	5.28	5.75	6.98	6.18	5.02	6.03	4.85	5.42	12.74	7.56	4.24	3.40	3.85	2.78	3.28	1.12	1.08
05/07	535.94	2.60	5.49	3.84	1.49	2.11	5.30	5.89	7.09	6.48	5.32	7.58	6.19	5.87	13.42	7.87	4.39	3.58	3.97	2.97	3.41	0.99	0.65
06/07	535.67	3.19	5.84	4.62	1.44	2.02	5.46	5.98	7.28	6.54	5.40	7.93	6.42	6.40	14.14	8.49	4.68	3.85	4.22	3.17	3.67	0.97	0.64
07/07	536.00	3.24	6.58	5.74	1.75	2.22	5.30	6.15	7.30	6.72	5.52	8.20	6.72	6.67	15.24	9.30	5.10	4.00	4.58	3.45	4.02	1.14	0.76
08/07	536.05	2.99	6.71	6.17	2.40	2.82	5.44	6.15	7.33	6.69	5.52	8.13	6.74	6.78	15.74	9.98	5.58	4.13	4.92	3.84	4.43	1.37	0.94
09/07	535.69	3.20	7.04	6.75	2.98	3.50	6.20	6.42	7.60	6.78	5.62	7.89	6.58	6.80	15.83	10.28	5.81	4.58	5.20	4.04	4.68	1.50	1.06
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

2012	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
02/07	nr	nr	36.40	2.00	16.00	13.00	27.90	43.30	46.20	27.40	26.30	56.70	23.50	20.00	32.40	16.50	nr		nr	nr	nr	nr	
03/07	7.0	1.8	14.6	8.6	1.6	0.5	4.3	104.7	149.2	22.2	nr	17.6	36.6	42.0	16.4	55.6	nr		9.1	nr	nr	1.3	0.0
04/07	nr	26.9	10.0	nr	7.0	10.7	nr	0.2	0.6	70.7	87.7	19.2	nr	23.0	28.0	1.7	20.3		18.5	3.2	14.3	7.6	
05/07	nr	1.3	7.2	8.3	72.2	44.9	25.8	24.0	20.2	4.8	15.2	5.0	36.5	16.0	nr	3.6	nr		nr	nr	nr	0.0	0.0
06/07	11.0	31.5	6.4	22.6	nr	1.7	3.9	40.8	63.0	0.5	2.8	38.5	45.0	45.5	88.4	5.7	nr		nr	nr	7.2	0.0	
07/07	1.0	1.8	nr	12.4	nr	0.0	27.0	18.2	15.3	0.0	nr	43.5		36.0	21.8	0.3	nr		nr	nr	5.3	0.0	
08/07	nr	nr	nr	0.7	1.4	2.2	45.0	2.7	nr	3.8	nr	0.0	nr	nr	13.0	3.3	nr		12.8	nr	8.4	14.5	
09/07	2.00	5.00	nr	1.20	33.60	16.90	26.50	0.60	1.90	5.50	nr	nr	4.00	1.00	28.00	1.40	nr		nr	nr	nr	nr	2.00

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

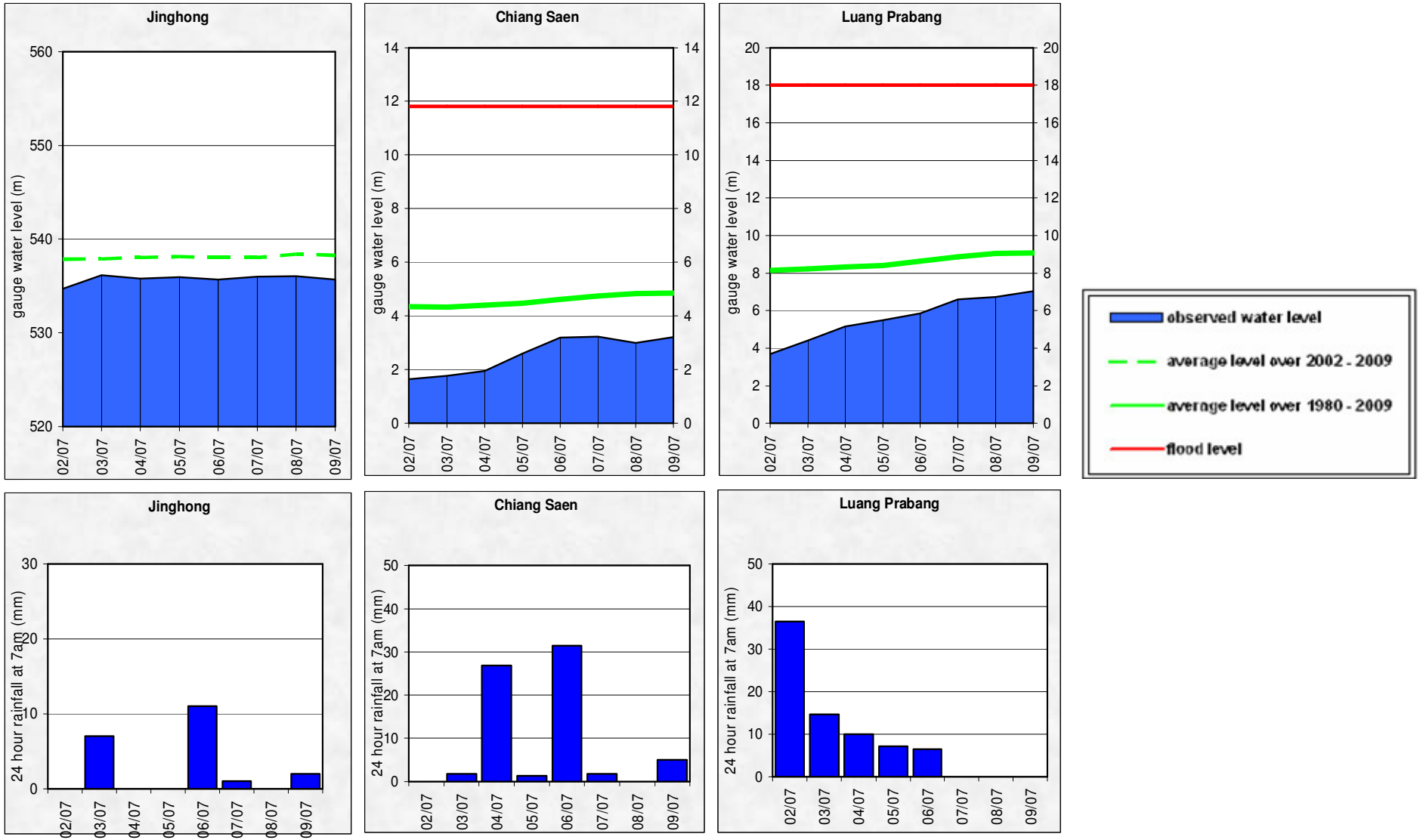


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

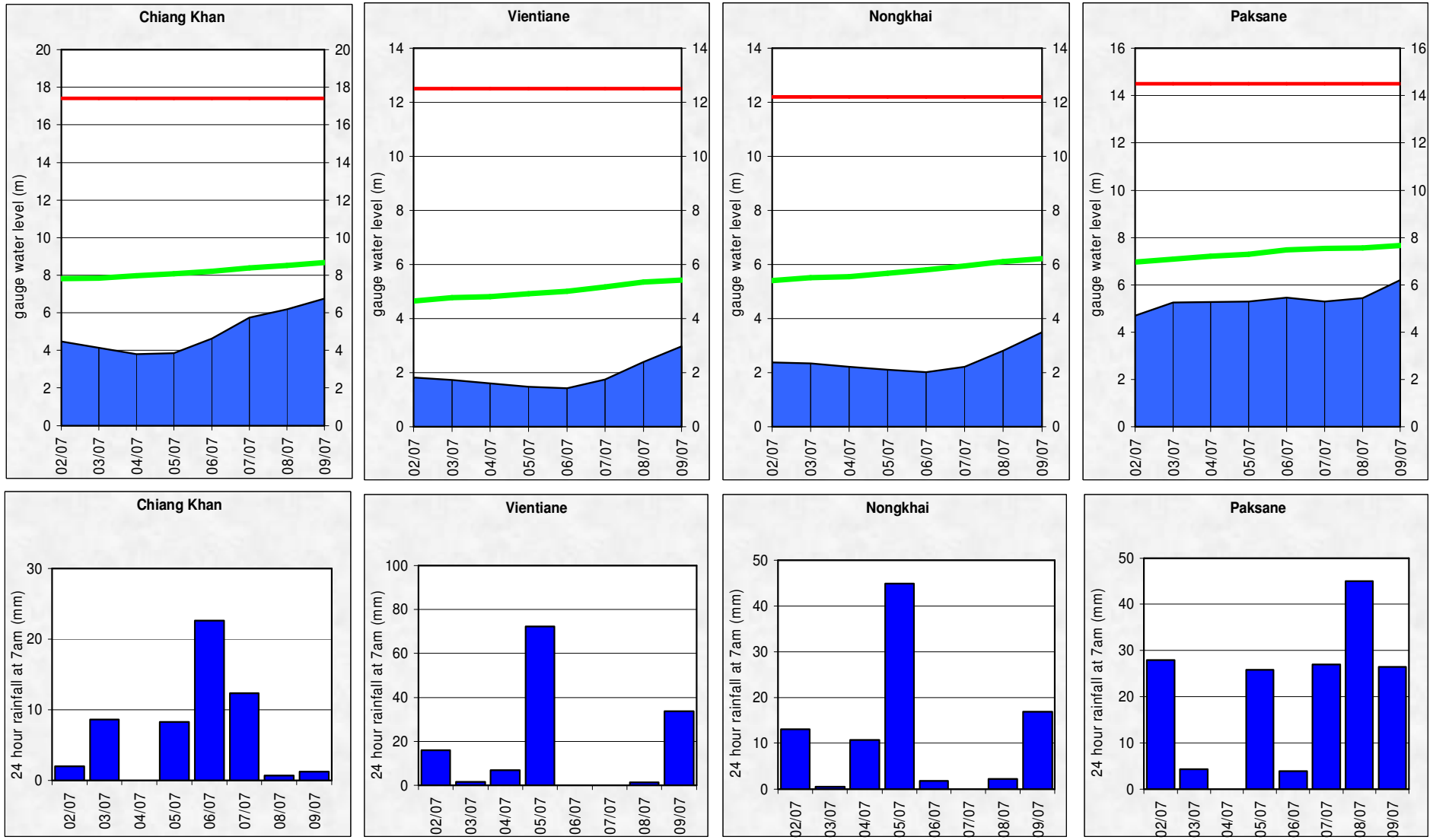


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

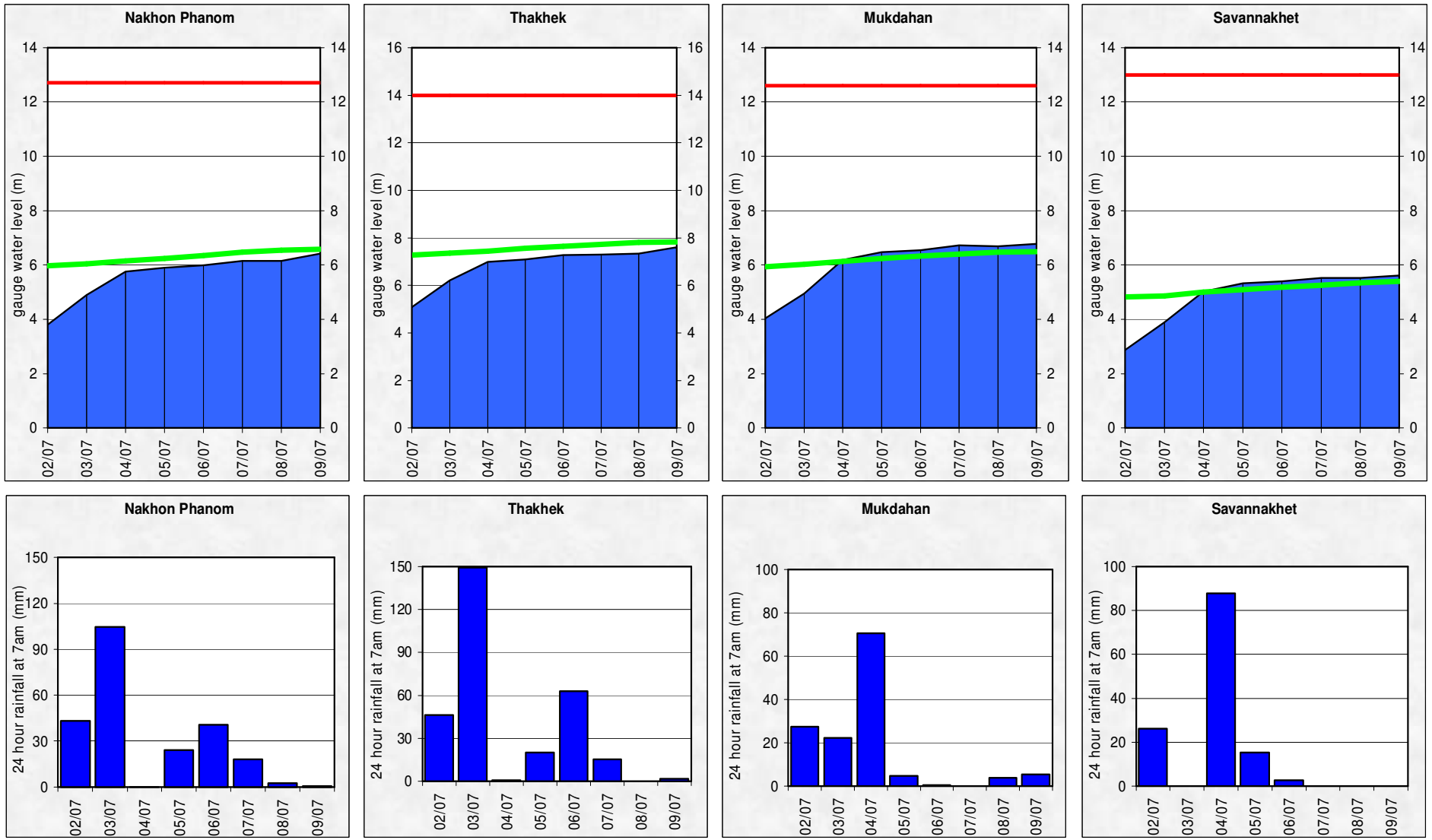


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

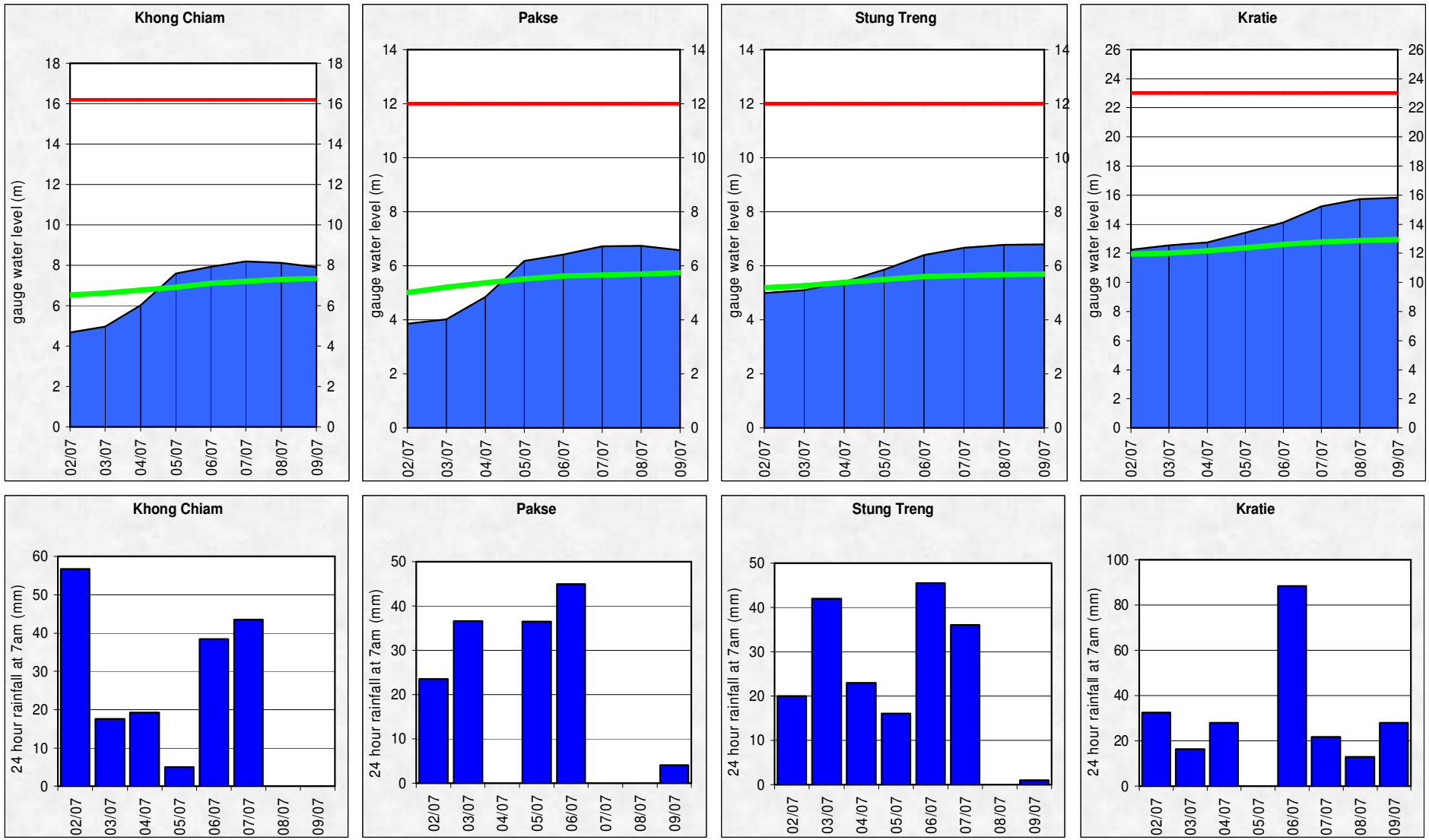


Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

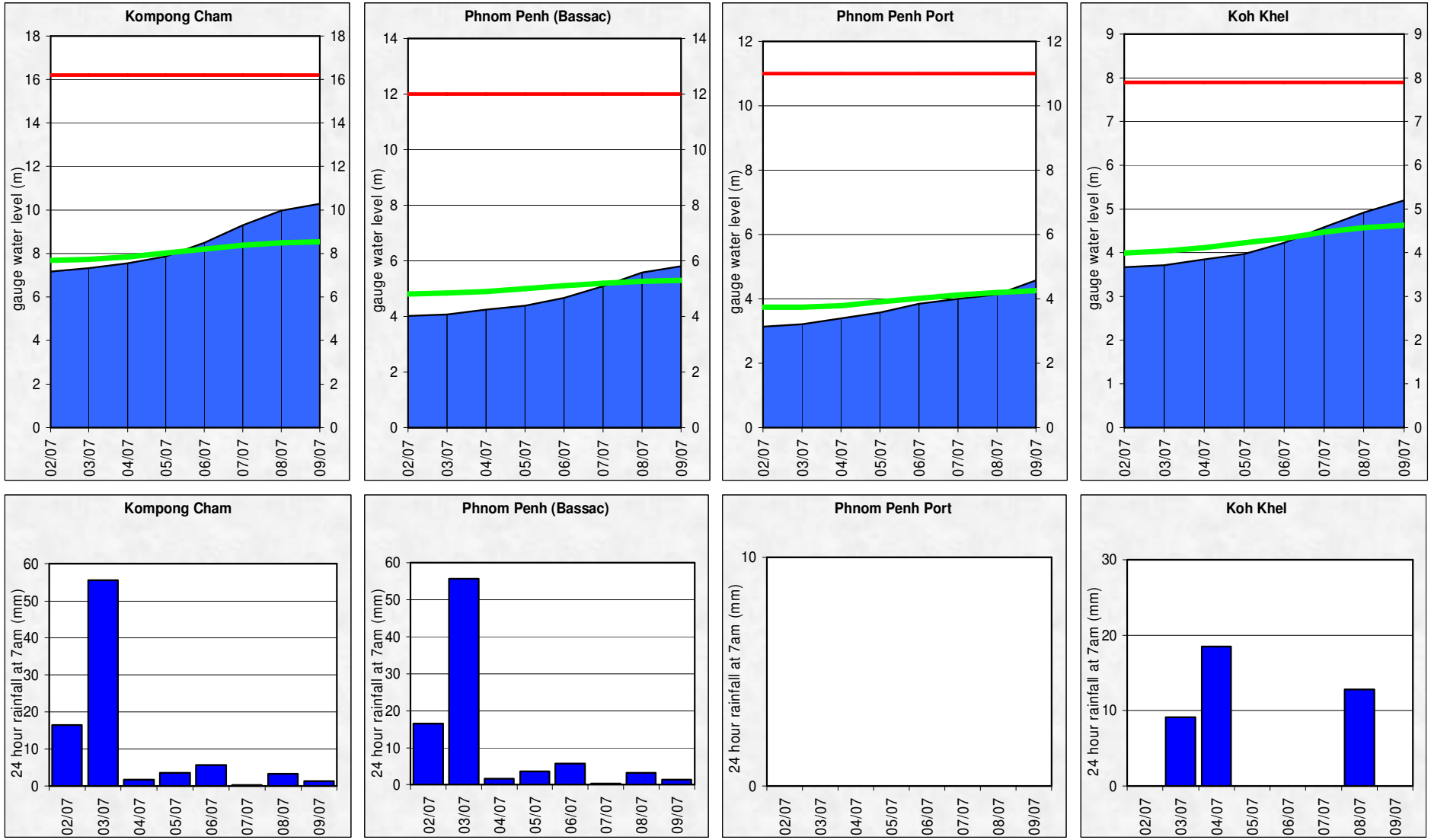
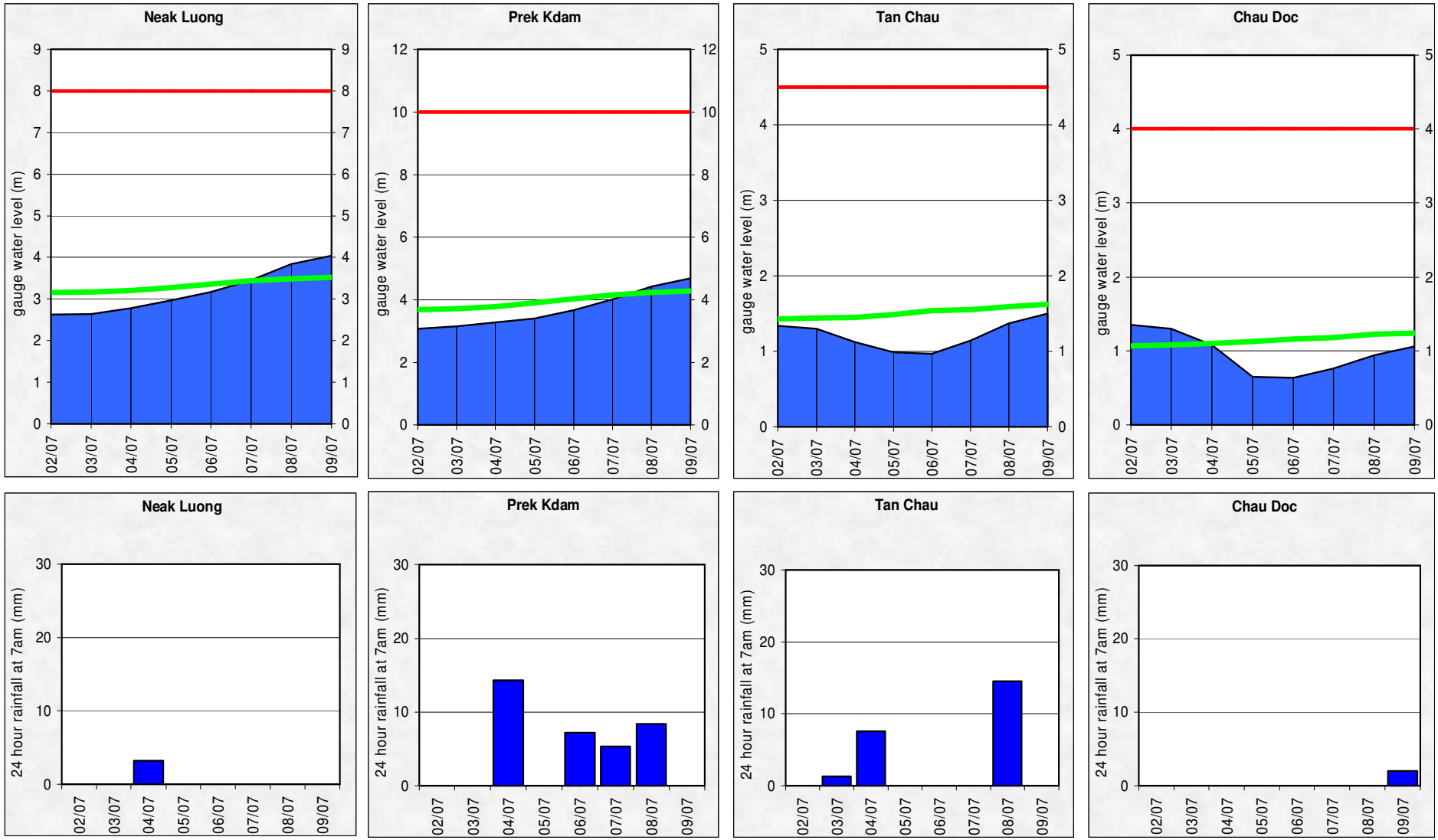


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

Accuracy

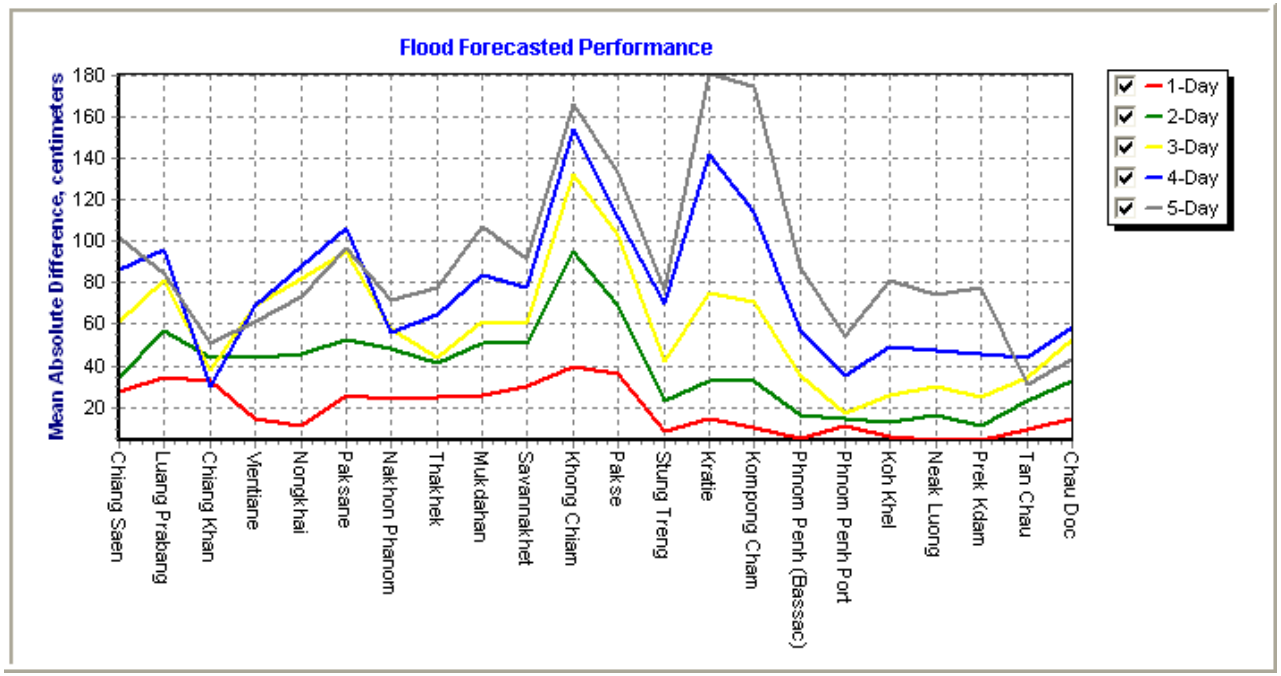
"Accuracy" describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster in Charge taking into consideration known biases in input data and his/her knowledge of the response of the model 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 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, accuracies for 4-day and 5-day forecast lead time at stations Khong Chiam, Pakse in the middle reach, Kratie, Kampong Cham in the lower reach and Tan Chau, Chau Doc in the Mekong delta were less than expected.

The differences due to 3 main factors: (1) high variability of rainfall forecast from NWP; (2) internal model functionality in forecasting especially at those stations; for which the parameter adjustment in the model is not possible; (3) the adjustment by utilizing the practical knowledge and experiences of forecaster-in-charge.

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	71.4	28.6	14.3	28.6	57.1	42.9	42.9	0.0	28.6	42.9	14.3	0.0	71.4	57.1	57.1	100.0	57.1	85.7	85.7	100.0	57.1	42.9	***49.4***
2-day	83.3	50.0	66.7	33.3	33.3	16.7	16.7	33.3	50.0	50.0	0.0	16.7	33.3	33.3	50.0	33.3	33.3	50.0	16.7	83.3	16.7	16.7	***37.1***
3-day	40.0	60.0	80.0	20.0	0.0	0.0	0.0	40.0	40.0	40.0	20.0	20.0	40.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	20.0	0.0	***20.9***
4-day	50.0	50.0	75.0	25.0	25.0	0.0	75.0	50.0	25.0	50.0	25.0	25.0	25.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	***23.9***
5-day	33.3	66.7	66.7	33.3	33.3	0.0	33.3	33.3	33.3	33.3	33.3	33.3	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	33.3	***24.2***

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)						
2012	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	*10:42*	*0*	*-*	*6*	*07:12*	*07:46*	*07:17*	*05:57*	*09:00*	*07:02*	*07:02*	*0*	*0*	*1*	*24*	*182*	*2*	*77*
month	*10:41*	*1*	*-*	*16*	*07:12*	*08:03*	*07:22*	*06:05*	*08:51*	*07:22*	*07:12*	*1*	*0*	*17*	*233*	*659*	*4*	*382*
season	*10:42*	*1*	*-*	*25*	*07:12*	*08:03*	*07:29*	*06:10*	*08:56*	*07:27*	*07:15*	*1*	*0*	*70*	*525*	*799*	*5*	*506*

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.

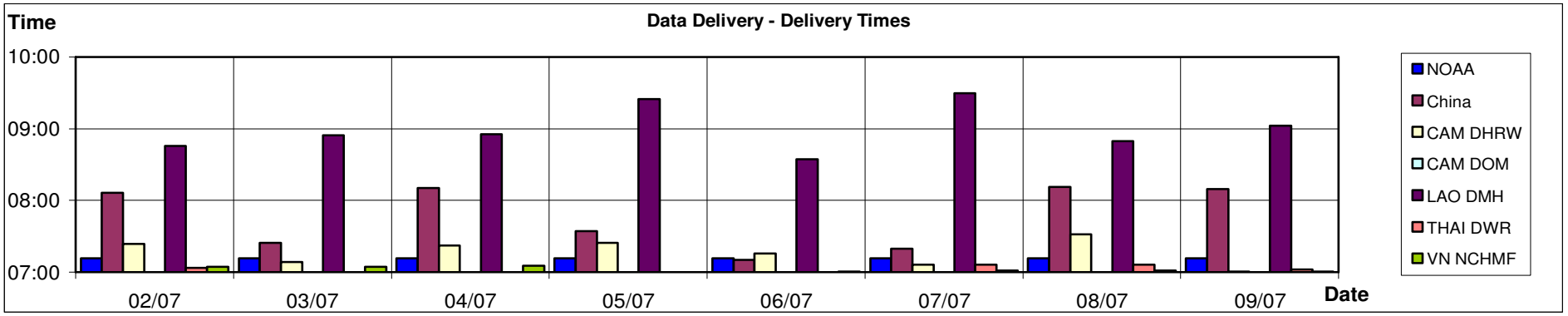


Figure B2: Data delivery times for the past 8 days including the current report date

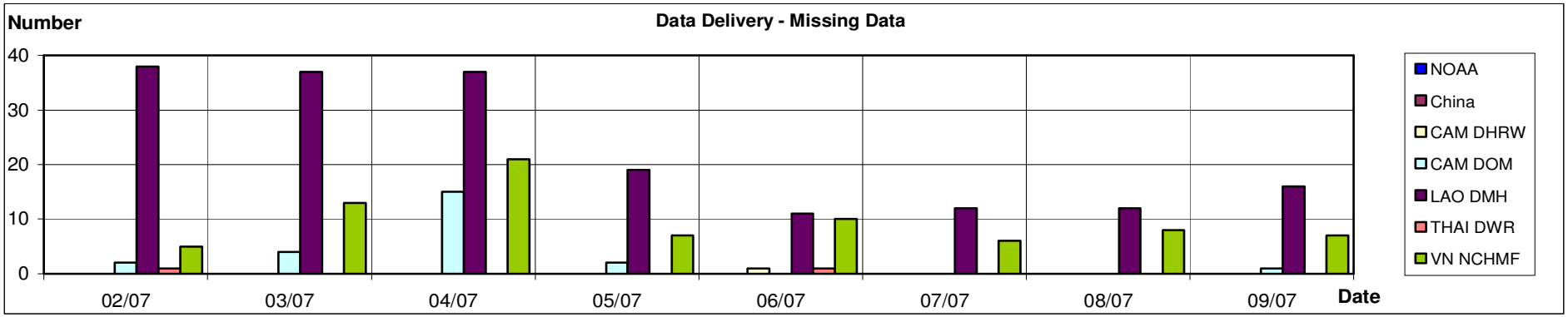


Figure B3: Missing data for the past 8 days including the current report date

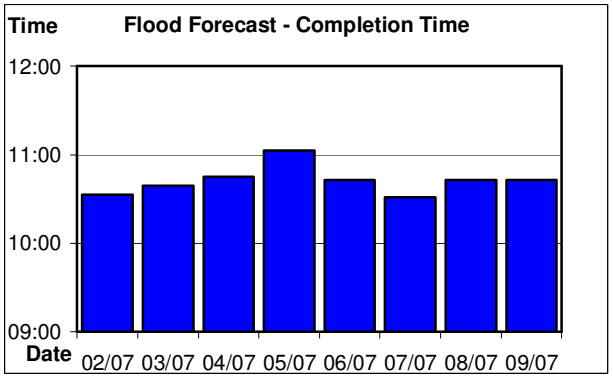


Figure B4: Flood forecast completion time

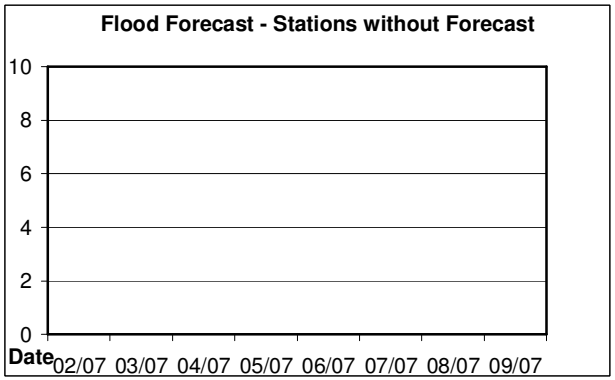


Figure B5: Flood forecast stations without forecast

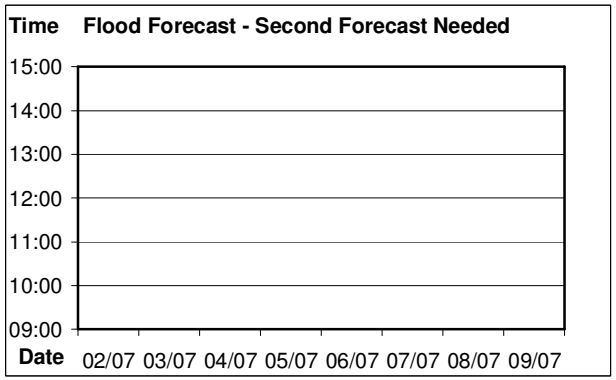


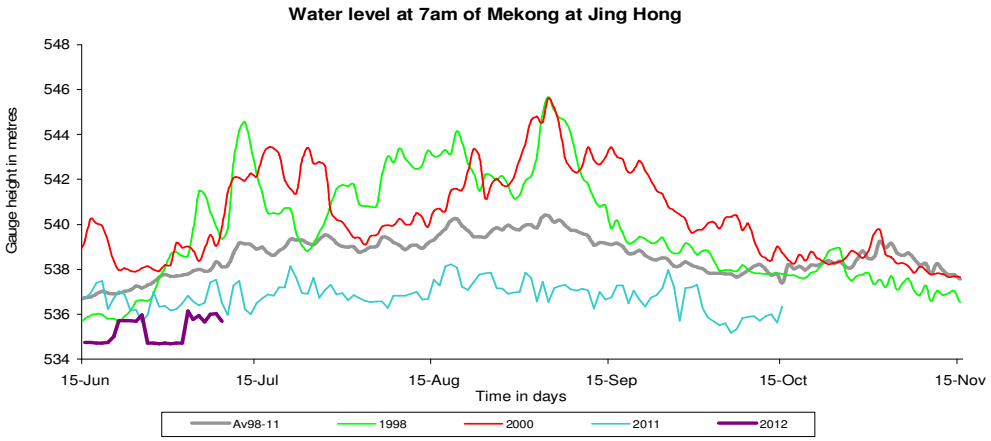
Figure B6: Second forecast needed

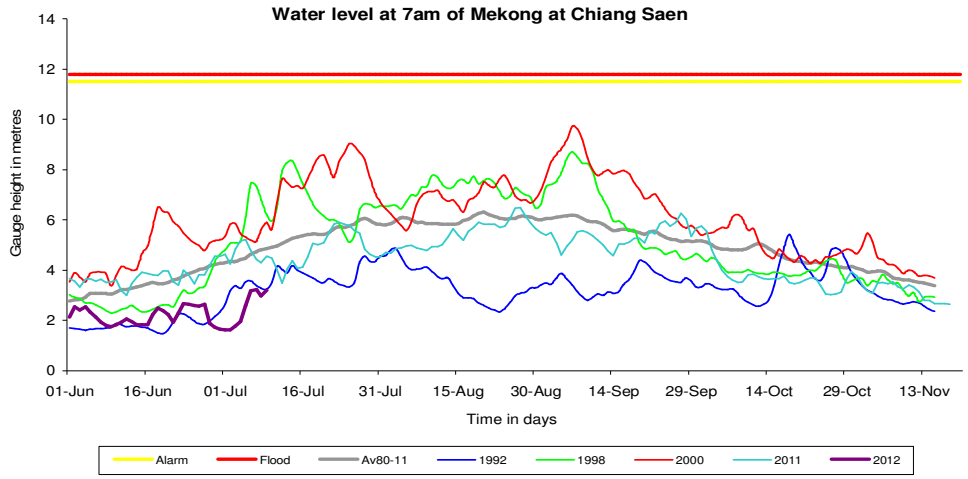
Annex C: Season Water Level Graphs

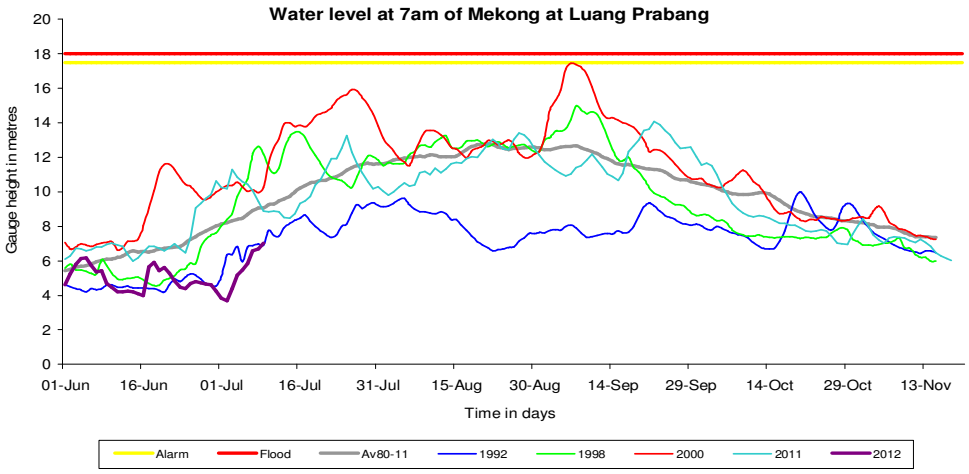
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

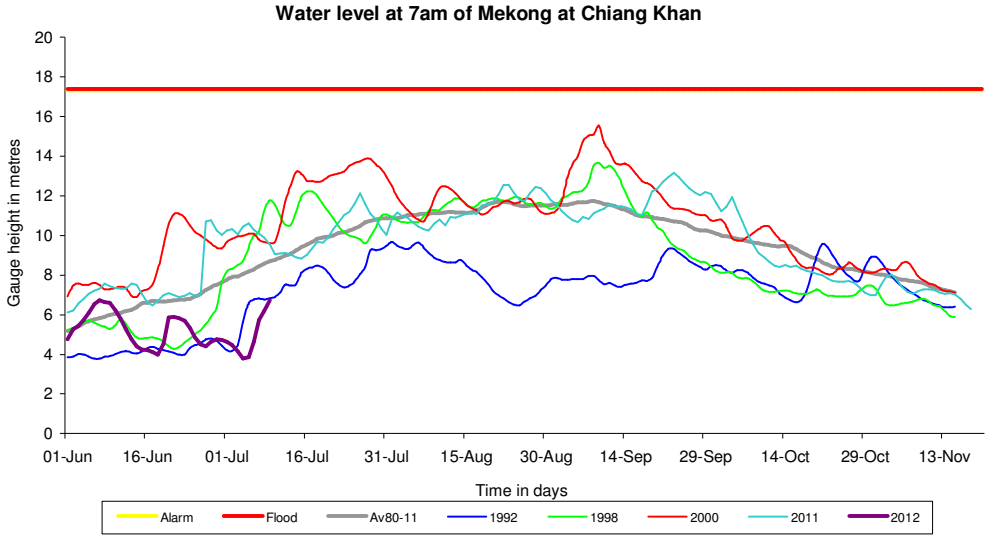
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

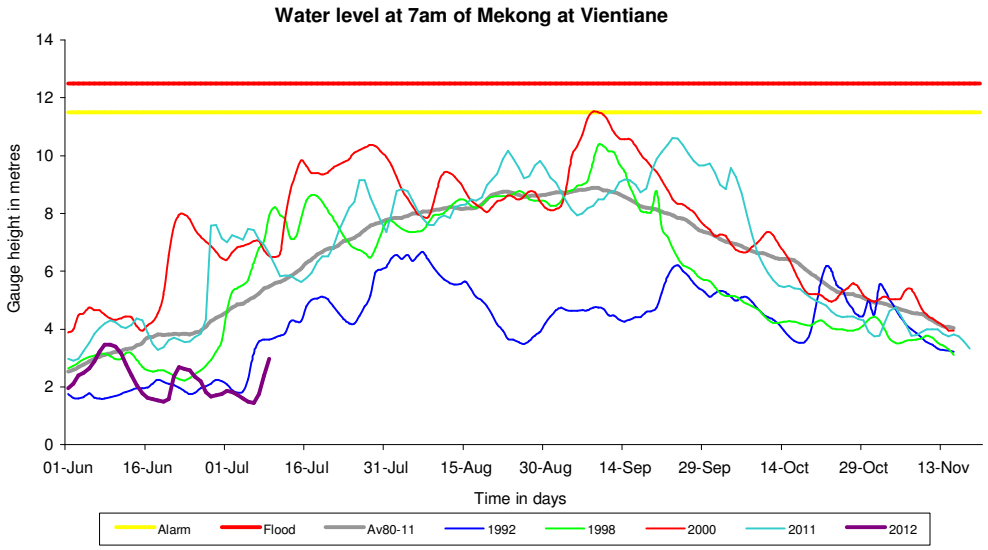
IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

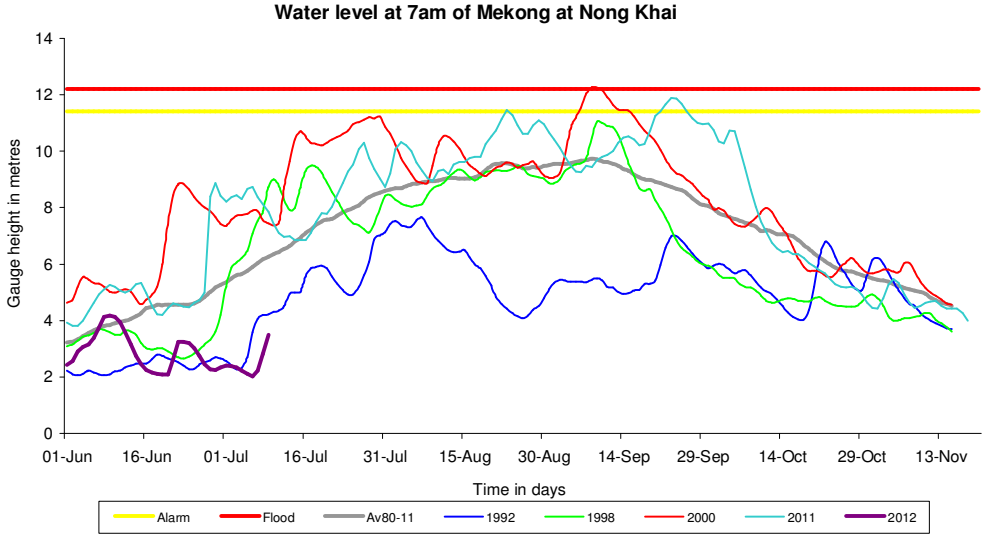




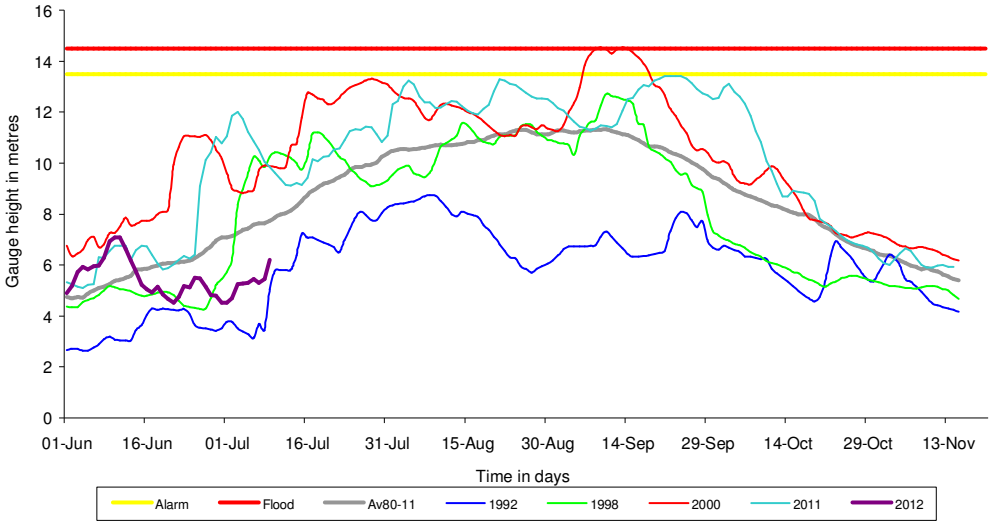



Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
20
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

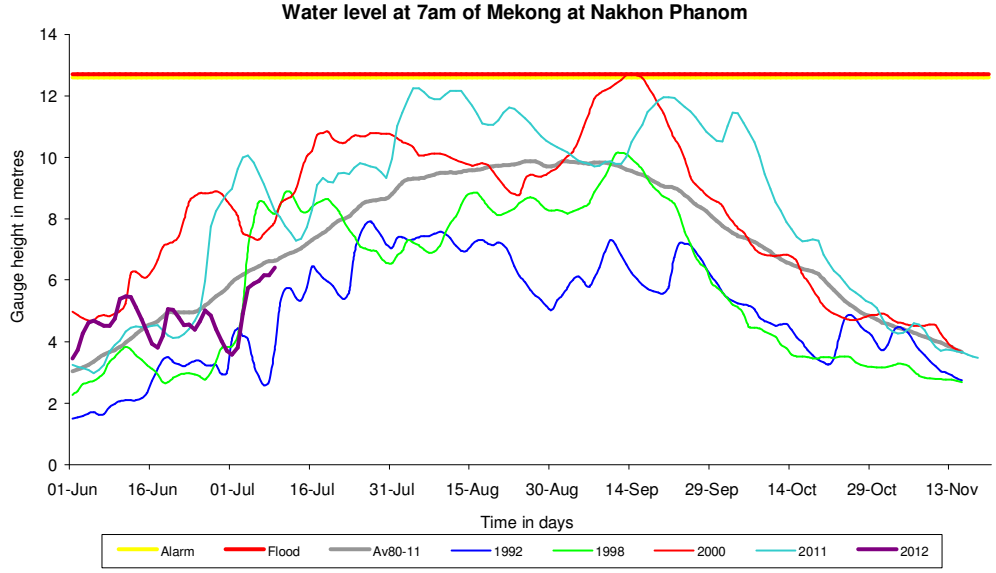

Water level at 7am of Mekong at Vientiane
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012


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
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

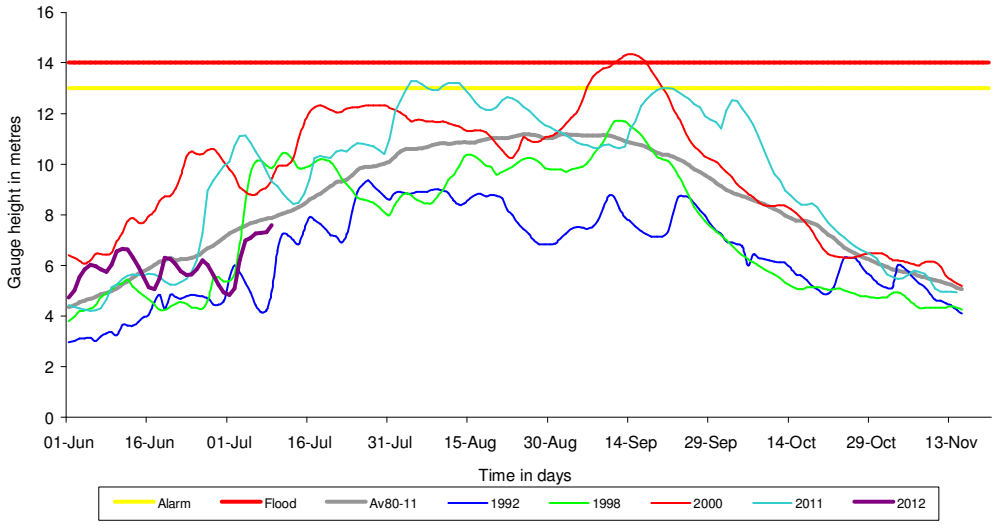
Water level at 7am of Mekong at Paksane

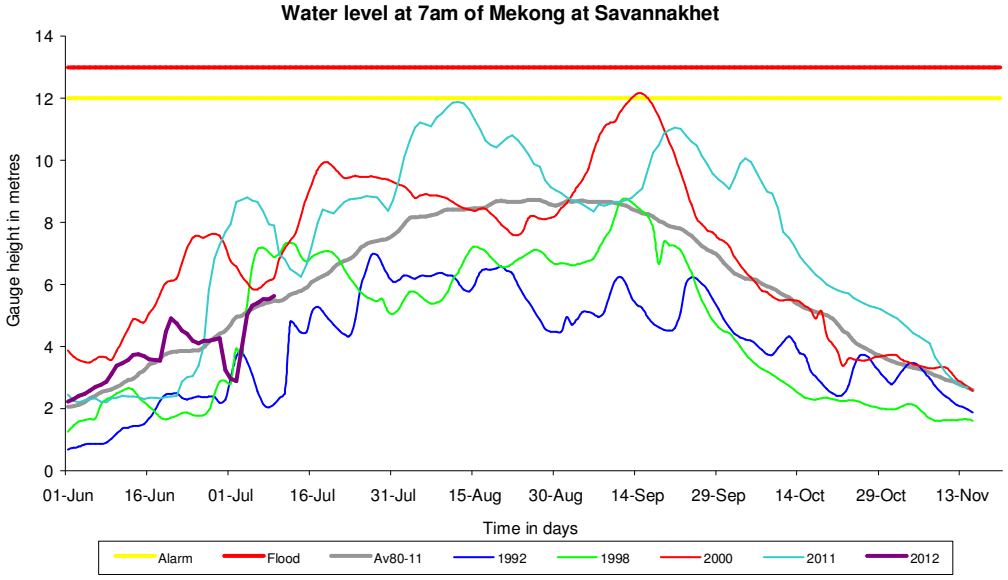


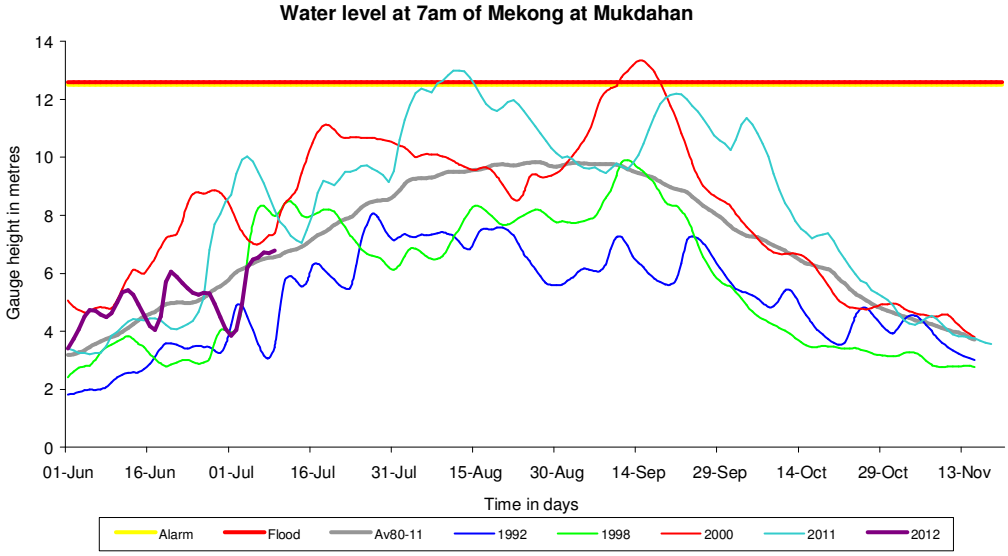
Water level at 7am of Mekong at Nakhon Phanom

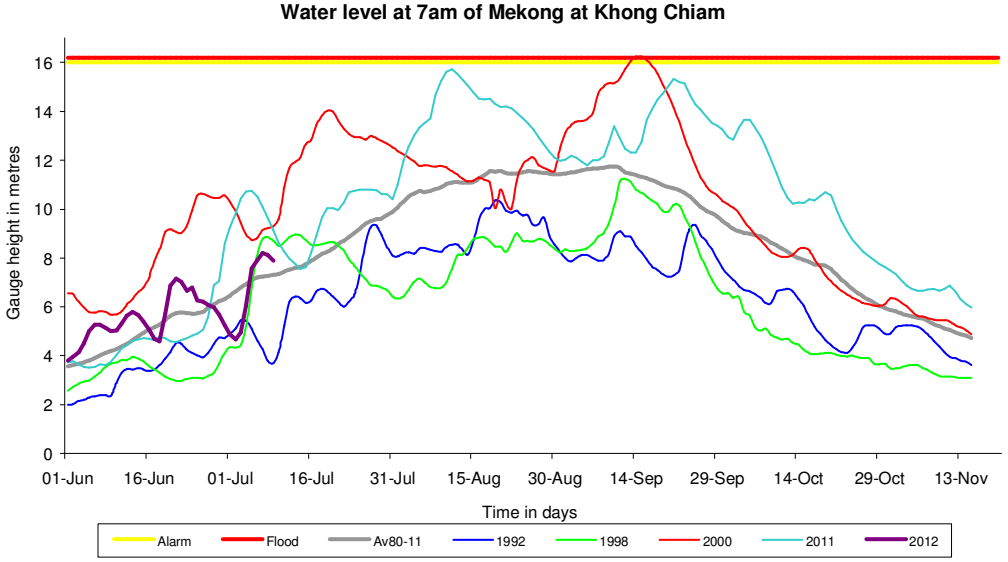


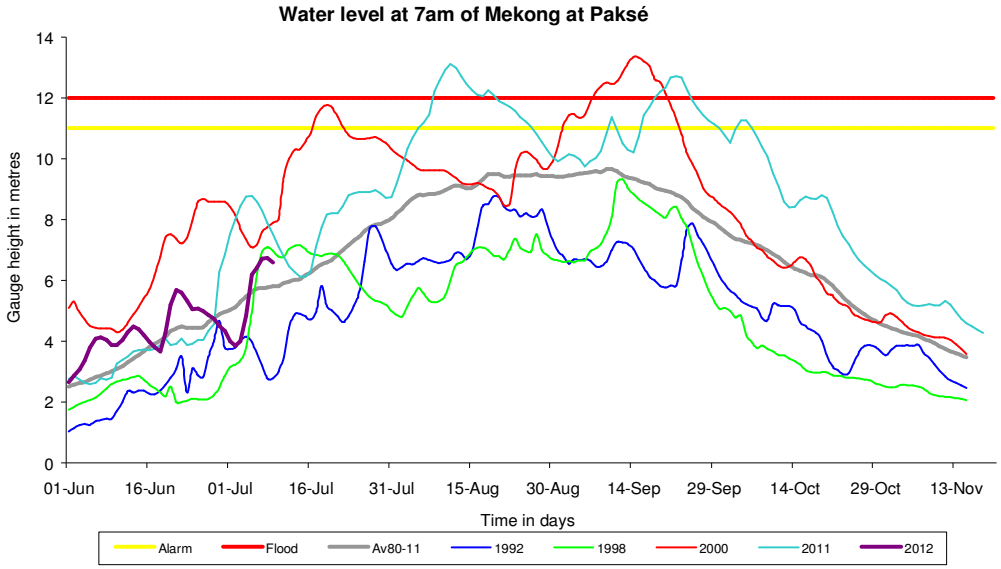
Water level at 7am of Mekong at Thakhek

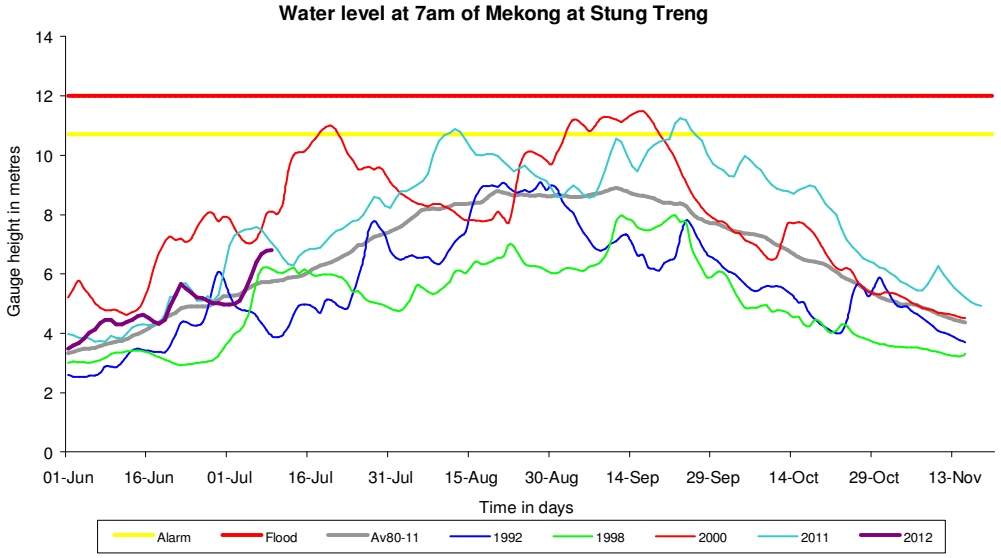


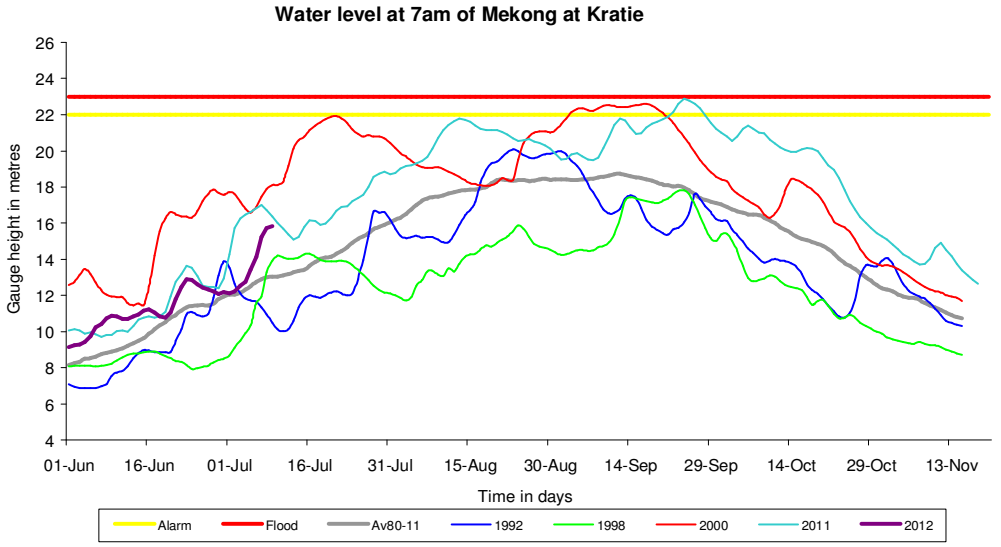

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

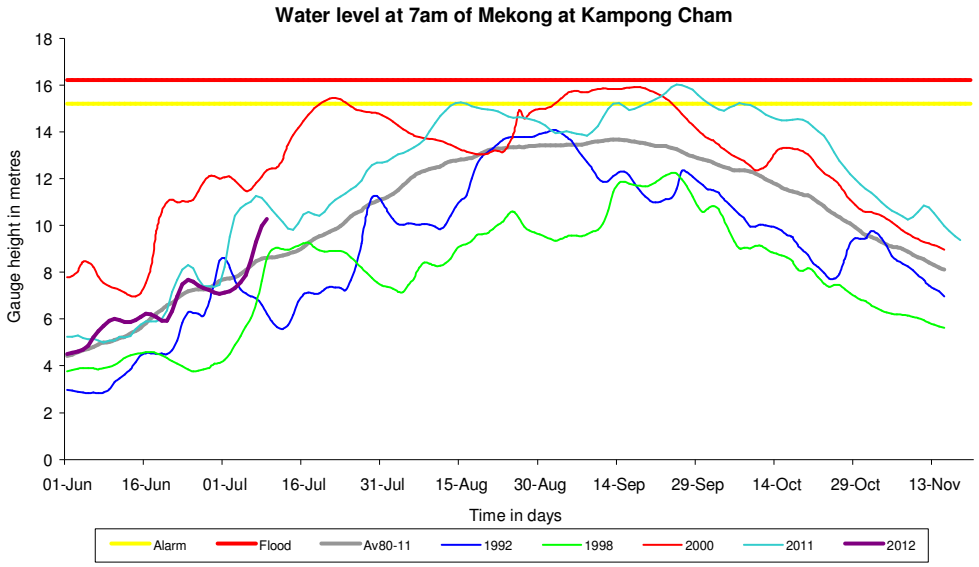

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

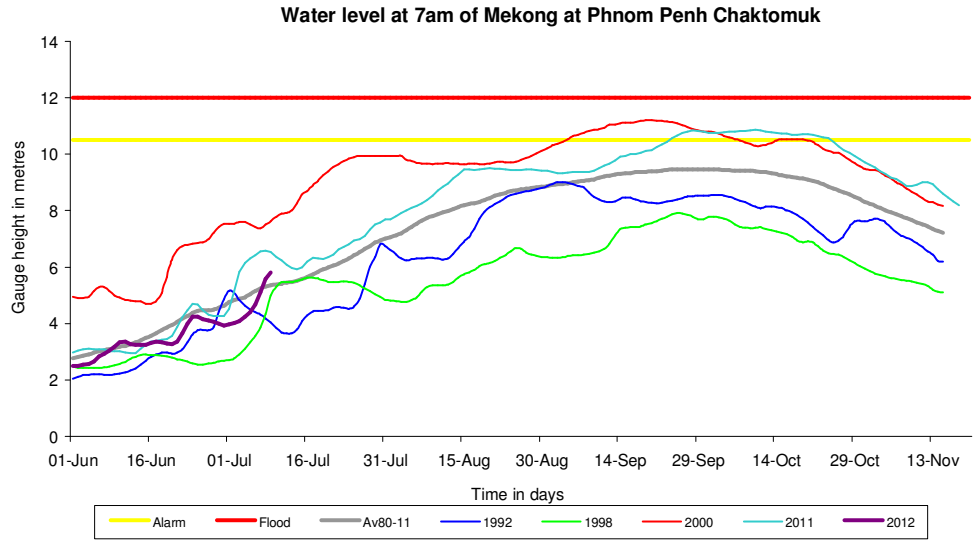

Water level at 7am of Mekong at Khong Chiam
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

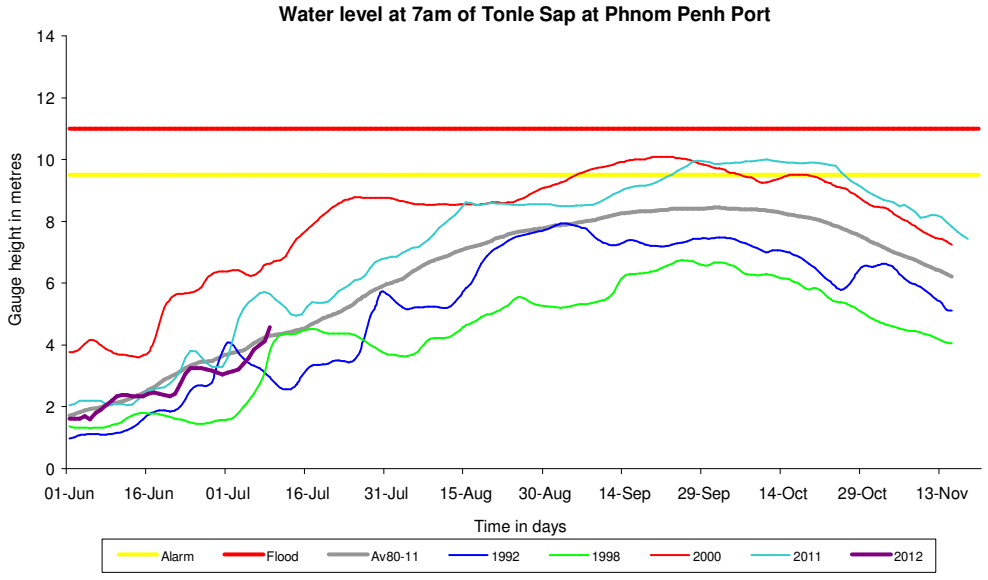

Water level at 7am of Mekong at Paksé
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

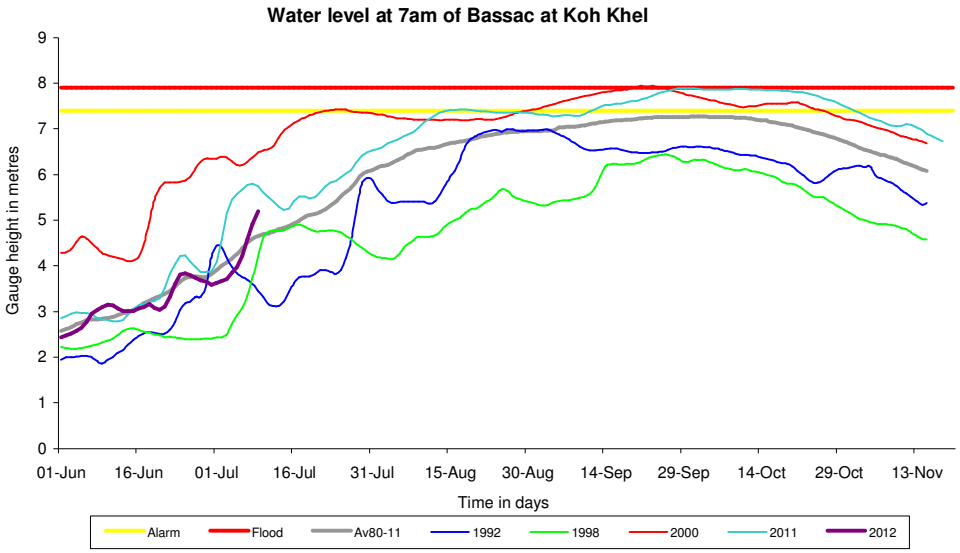

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

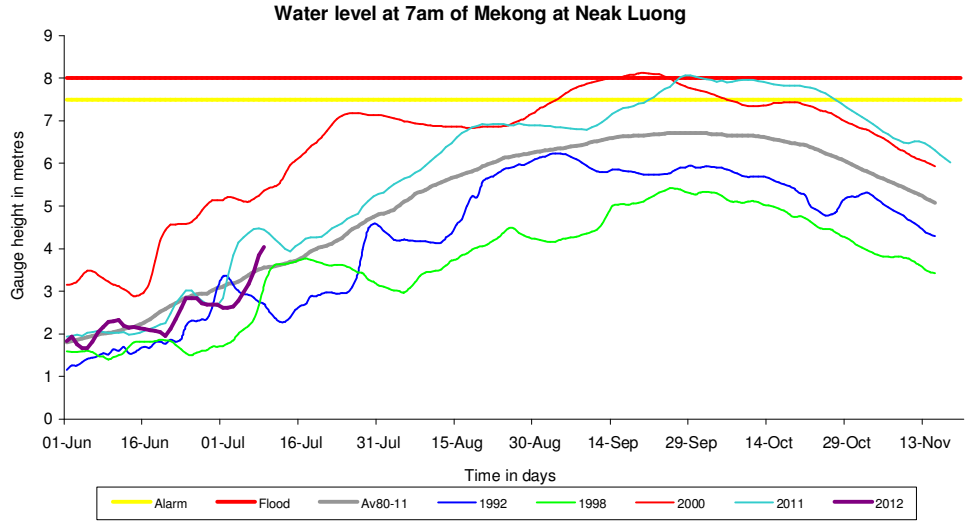

Water level at 7am of Mekong at Kratie
Gauge height in metres
4
6
8
10
12
14
16
18
20
22
24
26
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

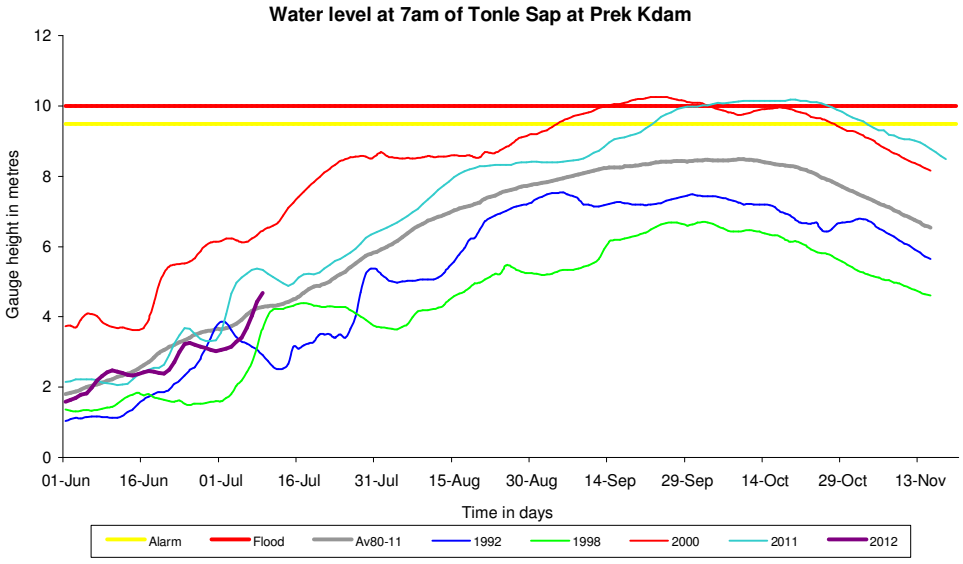

Water level at 7am of Mekong at Kampong Cham
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

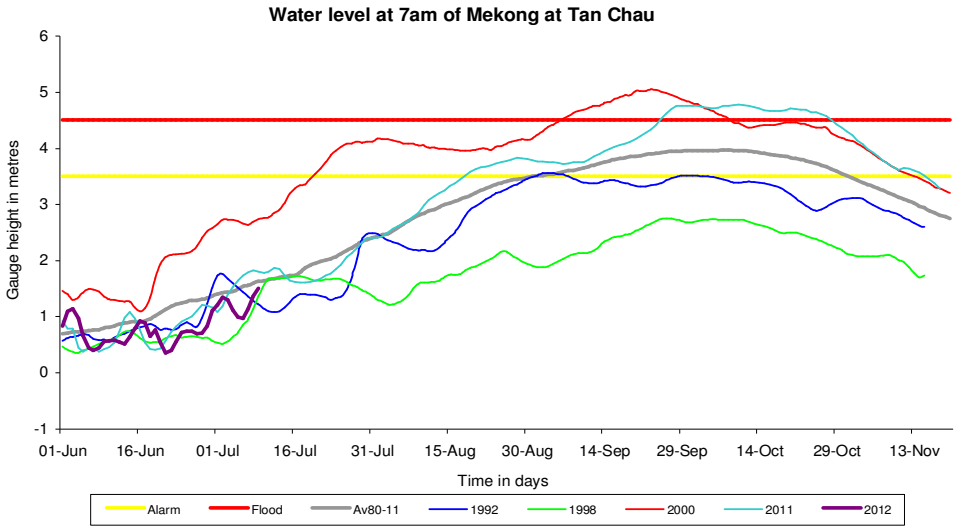

Water level at 7am of Mekong at Phnom Penh Chaktomuk
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012

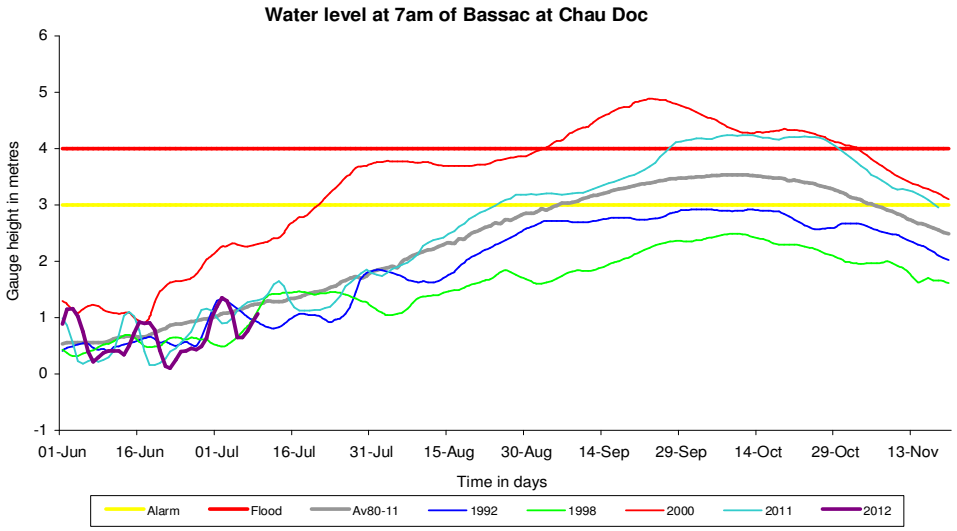

Water level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012


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
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012


Water level at 7am of Mekong at Neak Luong
Gauge height in metres
0
1
2
3
4
5
6
7
8
9
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012


Water level at 7am of Tonle Sap at Prek Kdam
Gauge height in metres
0
2
4
6
8
10
12
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012


Water level at 7am of Mekong at Tan Chau
Gauge height in metres
6
5
4
3
2
1
0
-1
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
2011
2012


Water level at 7am of Bassac at Chau Doc
Gauge height in metres
6
5
4
3
2
1
0
-1
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-11
1992
1998
2000
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2012