Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 19/07/2010, covering the week from the 12th to the 18th July 2010

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

General weather patterns

During the week of the 12th to the 18th July 2010, seven weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia and made available to the MRC-RFMMC. The weather patterns of the 12th July and the 18th July bulletins are shown below:

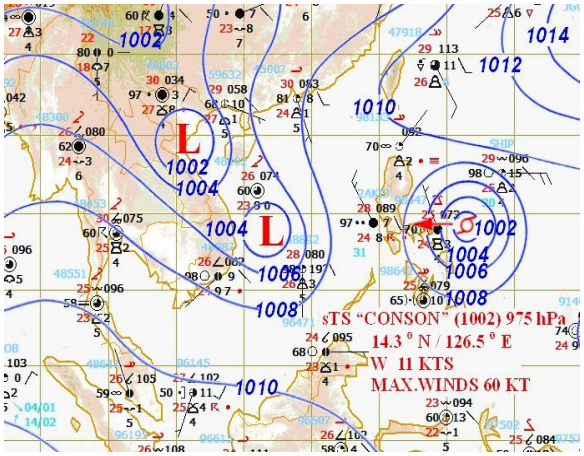


Figure 1: Weather map for 12th July 2010

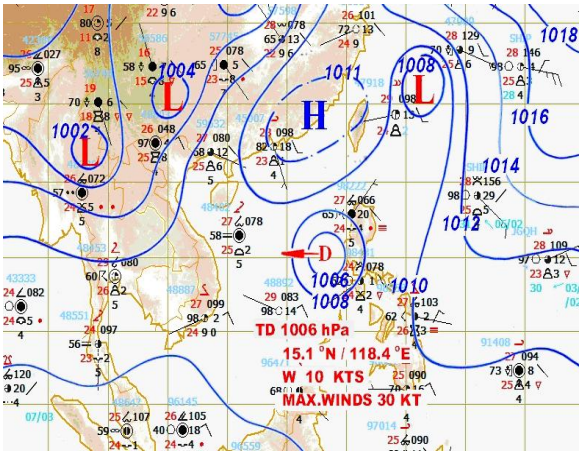


Figure 2: Weather map for 18th July 2010

Weak to strong South-West (SW) Monsoon

Weak SW monsoon prevailed over Andaman Sea, the Gulf of Thailand during the beginning of the week. From 15th July to the end of the week, moderate to strong SW monsoon occurred over Andaman Sea, the Gulf of Thailland, Cambodia, Lao PDR and Viet Nam.

Inter Tropical Convergence Zone (ITCZ)

No ITCZ was observed during this week.

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

The severe Tropical Storm (sTS) ***"CONSON"*** (1002) with a central pressure of 975 hPa and a central maximum wind speed of 111.12 km/h (figure 1), which was formed in East of the Philippines on 12th July, caused damages in Liuzong Island of the Philippines and then upgraded into Typhoon (TY) when travelling through South China Sea and landed over Northern Viet Nam on 18th July. It downgraded into low pressure on 19th July when moving deep into China territory (figure 2).

On 19th July, the Tropical Depression (TD) with a central pressure of 1006 hPa moving to westward at a speed of 18.52 km/h, and with a near central maximum sustained wind speed of 55.56 km/h was located at latitude 15.1^{0}N, longtitude 118.4^{0}E, which was over the west of the Philippines.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Overall weather situation

During the middle to the end of the week, from moderate to strong Southwest monsoon prevailed over the Andaman Sea, the Gulf of Thailand, Cambodia, Lao PDR and Viet Nam. The trough of low pressure laid across the Lower Mekong Basin (LMB), Myanmar, Thailand, Lao PDR, Cambodia and Viet Nam at the surface. The active stream line trough of low pressure laid across the LMB, Myanmar, Thailand, Lao PDR and Viet Nam at the height of 850 hPa (1.5 km). The southwesterly wind prevailed over Myanmar, Thailand and Indochina Peninsula. As the result of these phenomena, moderate thundershowers to heavy shower occurred in Myanmar, Thailand, Lao PDR, Cambodia, and Viet Nam.

General behaviour of the Mekong River

Water levels along the Lower Mekong River were generally low and all of stations were recording levels that are somewhat below long-term average and show a falling and rising trend in upper and middle reaches of the LMB during this week. Meanwhile, water levels at stations in lower reach of the LMB from Phnom Penh to Koh Khel are more or less stable in which water levels in downstream at Tan Chau and Chau Doc monitoring stations were fluctuated by tidal effect.

Water levels at all of the forecast stations in the mainstream were below long-term average from 1.5m to 3m during this time of the year.

For stations from Chiang Saen to Chiang Khan

Water levels were more or less stable from the beginning to the middle of the week and then rising toward the end of the week. The stations were recording levels that were below long-term average for this time of the year.

For stations Vientiane and Nongkhai

Water levels were rising from the beginning to the mid of the week end then more or less stable to the end of the week. The stations were recording levels that were below long-term average for this time of the year.

For stations from Paksane to to Savanakhet/Mukdahan

Water levels were more or less stable from the beginning to the middle of the week and then rapidly rising toward the end of the week as the result of heavy rain caused by CONSON Typhoon. The water levels at stations on the left bank tributaries of Lao PDR such as at Muong Kao of Nam Sane River, at Muong Mai of Nam Nhiep, at Ban Phone Si of Nam Ca Dinh, at Mahaxai of Se Bang Fai River, were increasing sharply with intensities from 1.5m to 2.5m per day.

The stations were recording levels that were below long-term average for this time of the year.

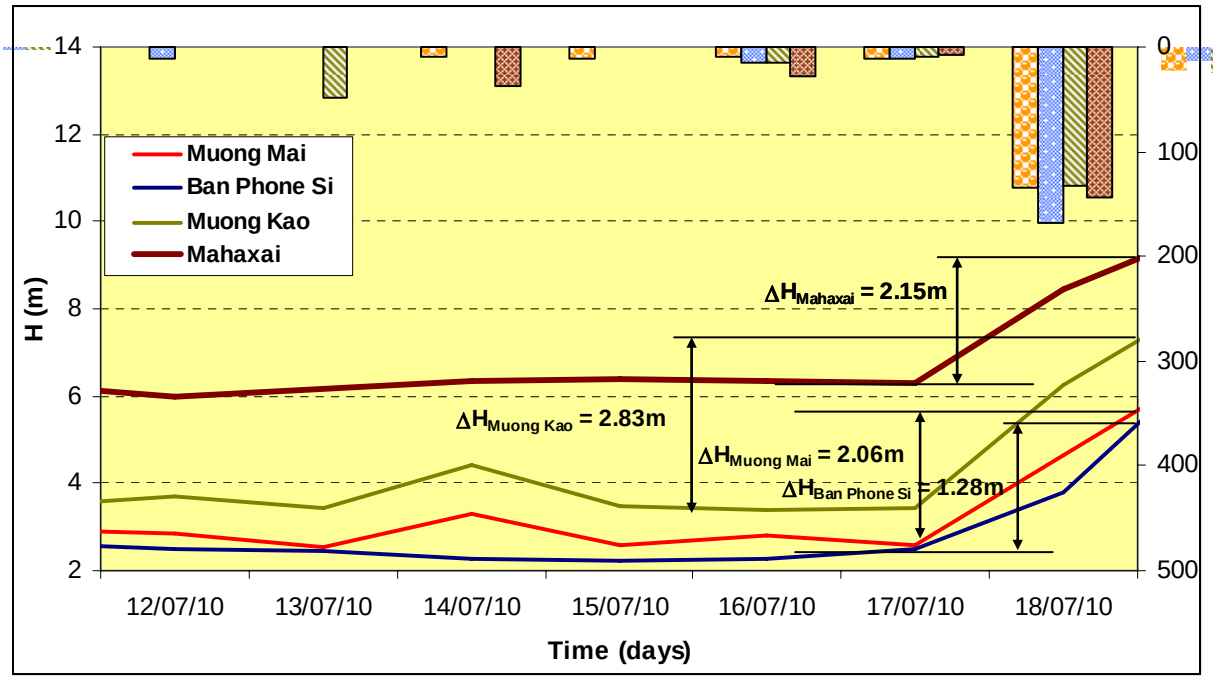


Figure 3: Rapidly rising of water levels on tributaries: Nam Sane at Muong Kao, Nam Nhiep at Muong Mai, Nam Ca Dinh at Ban Phone Si, Se Bang Fai at Mahaxai

For stations from Stung Treng to Koh Khel

Water levels were more-or-less stable, slightly rising at the end of the week. All of the stations were recording levels that are below the long-term average level for this time of the year.

Stations Neak Luong, Tan Chau and Chau Doc

Water levels at these stations have been significantly affected by tidal effect with rising trend towards the end of the week. The stations were recording levels that are below the long-term average for this time of the year.

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 significanlyt 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

2010	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
12/07	536.44	3.59	6.34	6.07	2.68	3.67	5.28	3.35	4.56	3.49	2.39	3.75	2.44	3.55	9.31	4.61	2.64	1.75	2.58	1.62	1.79	0.60	0.64
13/07	536.48	3.58	6.15	6.49	2.80	3.57	5.01	3.25	4.47	3.40	2.30	3.69	2.65	3.50	9.27	4.62	2.68	1.69	2.64	1.67	1.84	0.37	0.30
14/07	536.76	3.58	5.94	6.63	3.25	3.96	5.25	3.16	4.39	3.31	2.25	3.68	2.66	3.43	9.20	4.61	2.75	1.76	2.69	1.82	1.89	0.26	0.11
15/07	536.68	3.70	6.00	6.70	3.45	4.28	5.32	3.13	4.36	3.25	2.25	3.54	2.55	3.40	9.10	4.54	2.71	1.79	2.73	1.84	1.91	0.32	0.14
16/07	537.17	3.89	6.02	6.53	3.70	4.56	5.56	3.29	4.53	3.30	2.20	3.48	2.49	3.41	9.03	4.47	2.74	1.76	2.72	1.86	1.88	0.35	0.24
17/07	536.74	3.97	6.26	6.34	3.55	4.51	5.70	3.42	4.65	3.46	2.16	3.48	2.45	3.48	9.04	4.42	2.71	1.82	2.68	1.88	1.84	0.41	0.28
18/07	536.35	4.18	6.62	6.38	3.40	4.38	6.05	4.00	5.29	3.91	2.12	3.65	2.56	3.43	9.15	4.44	2.71	1.82	2.64	1.90	1.84	0.45	0.32
19/07	536.31	3.94	7.90	6.74	3.33	4.26	7.74	4.59	6.79	4.90	2.77	4.07	2.86	3.42	9.11	4.47	2.69	1.79	2.57	1.88	1.79	0.50	0.38
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

2010	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
12/07	6.0	2.2	0.0	0.0	0.0	0.0	0.2	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	0.4		0.0	0.0	0.0	0.0	1.0
13/07	4.0	0.0	0.0	0.0	0.0	0.3	0.0	1.8	0.0	0.0	2.4	28.0	5.3	0.0	0.8	0.9	33.6		26.0	5.9	0.0	0.0	0.0
14/07	0.0	0.0	40.4	69.0	23.4	47.5	0.0	39.7	37.7	6.8	13.6	19.3	10.7	0.0	34.2	33.1	51.5		9.5	1.8	5.3	3.1	0.0
15/07	26.0	19.7	33.4	74.2	6.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.3	0.0		4.2	4.4	0.0	8.0	0.0
16/07	0.0	0.0	0.0	0.0	2.5	20.4	1.5	11.5	14.5	3.0	2.8	0.0	4.1	48.5	0.0	0.0	0.0		0.0	0.0	0.0	7.0	44.0
17/07	0.0	0.0	37.0	0.0	0.0	0.0	3.1	70.1	44.7	15.4	9.7	0.0	0.0	29.2	7.4	13.4	0.3		4.5	2.6	33.2	3.0	0.0
18/07	18.0	0.0	18.6	9.0	0.0	31.6	145.4	64.7	79.0	11.2	9.0	0.0	0.0	7.8	13.2	11.2	1.7		12.9	2.4	5.3	11.0	0.0
19/07	0.0	27.4	20.0	4.6	20.8	4.6	4.8	12.5	29.4	0.9	0.0	0.0	0.0	0.0	0.0	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

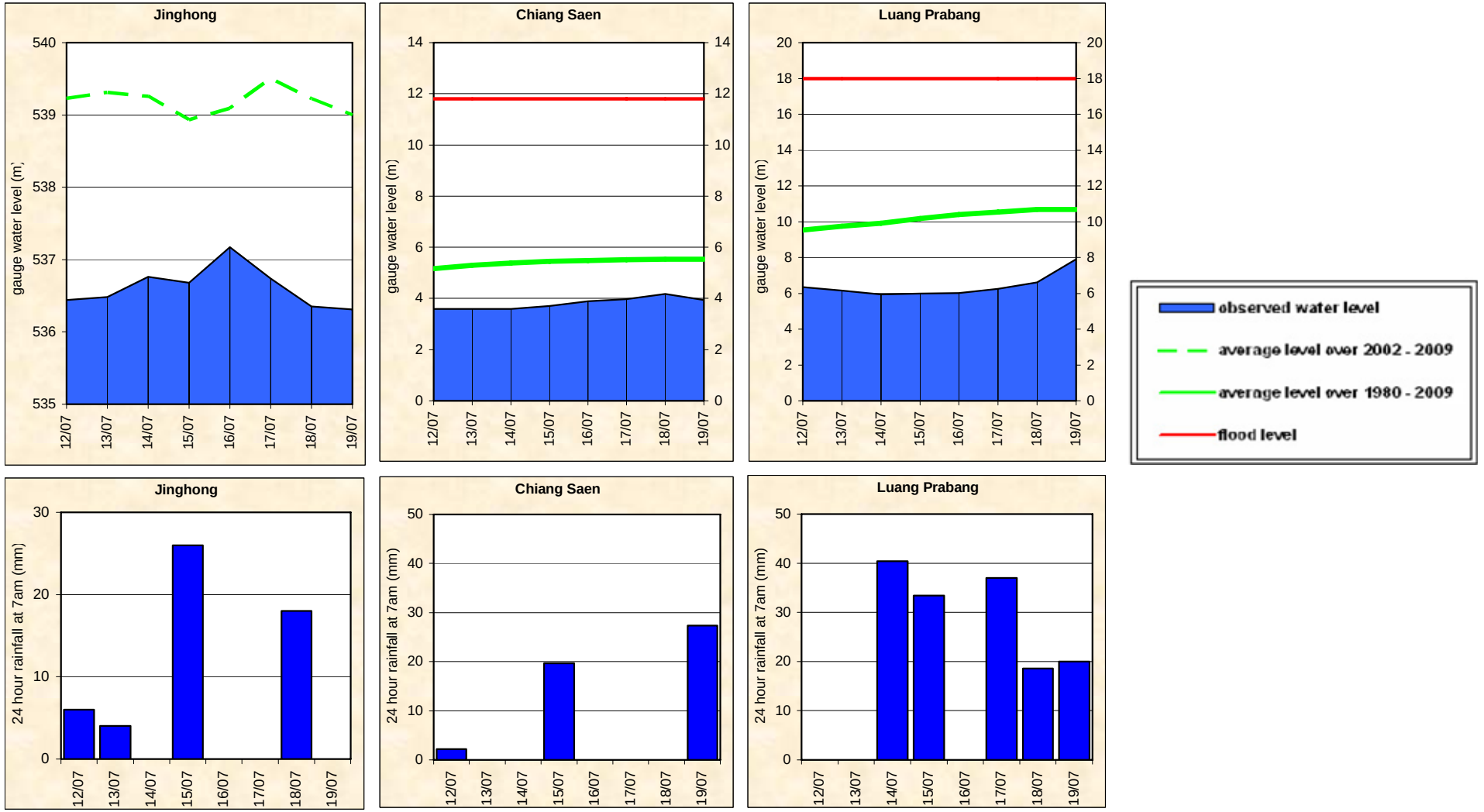


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

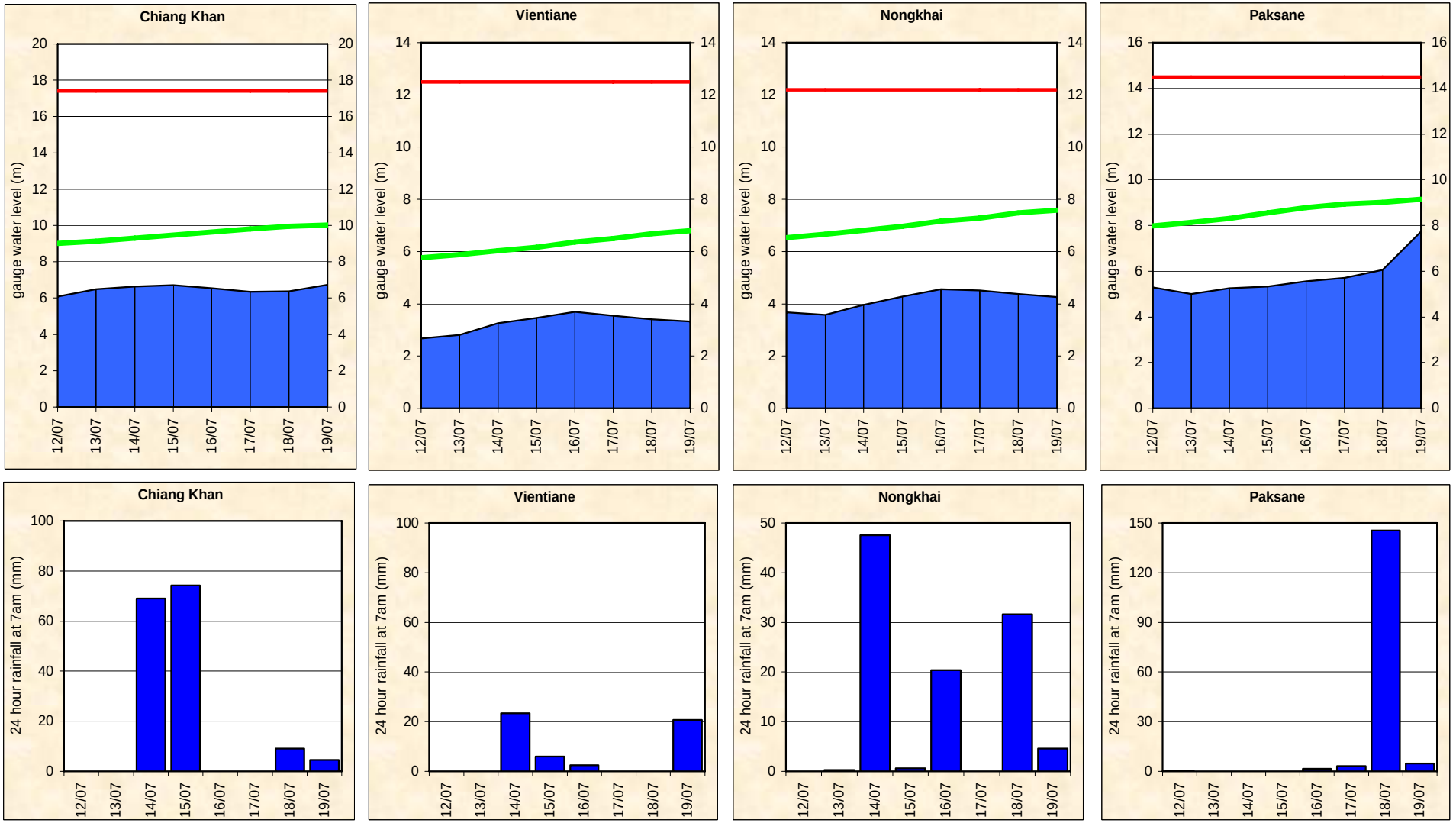


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

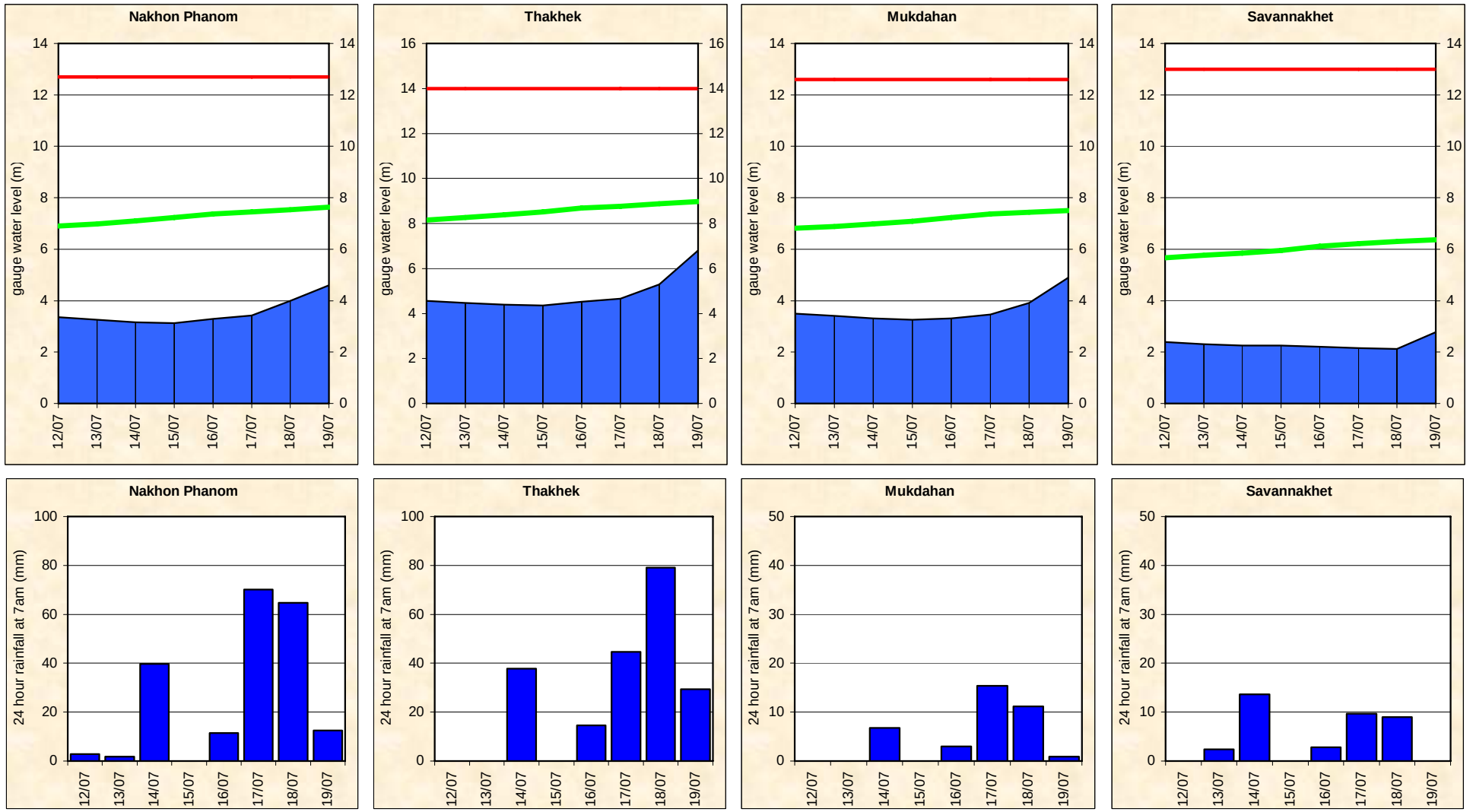


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

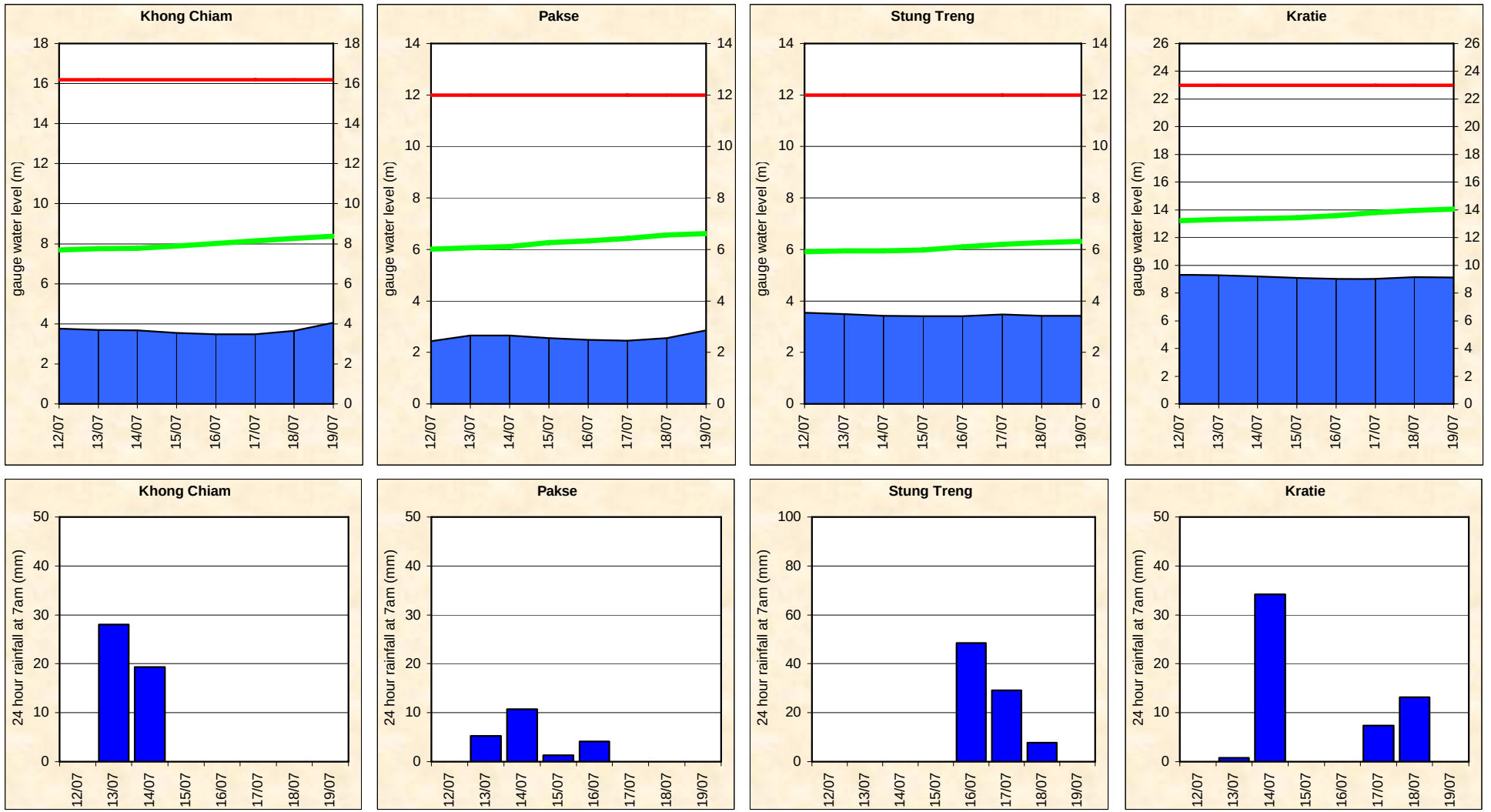


Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

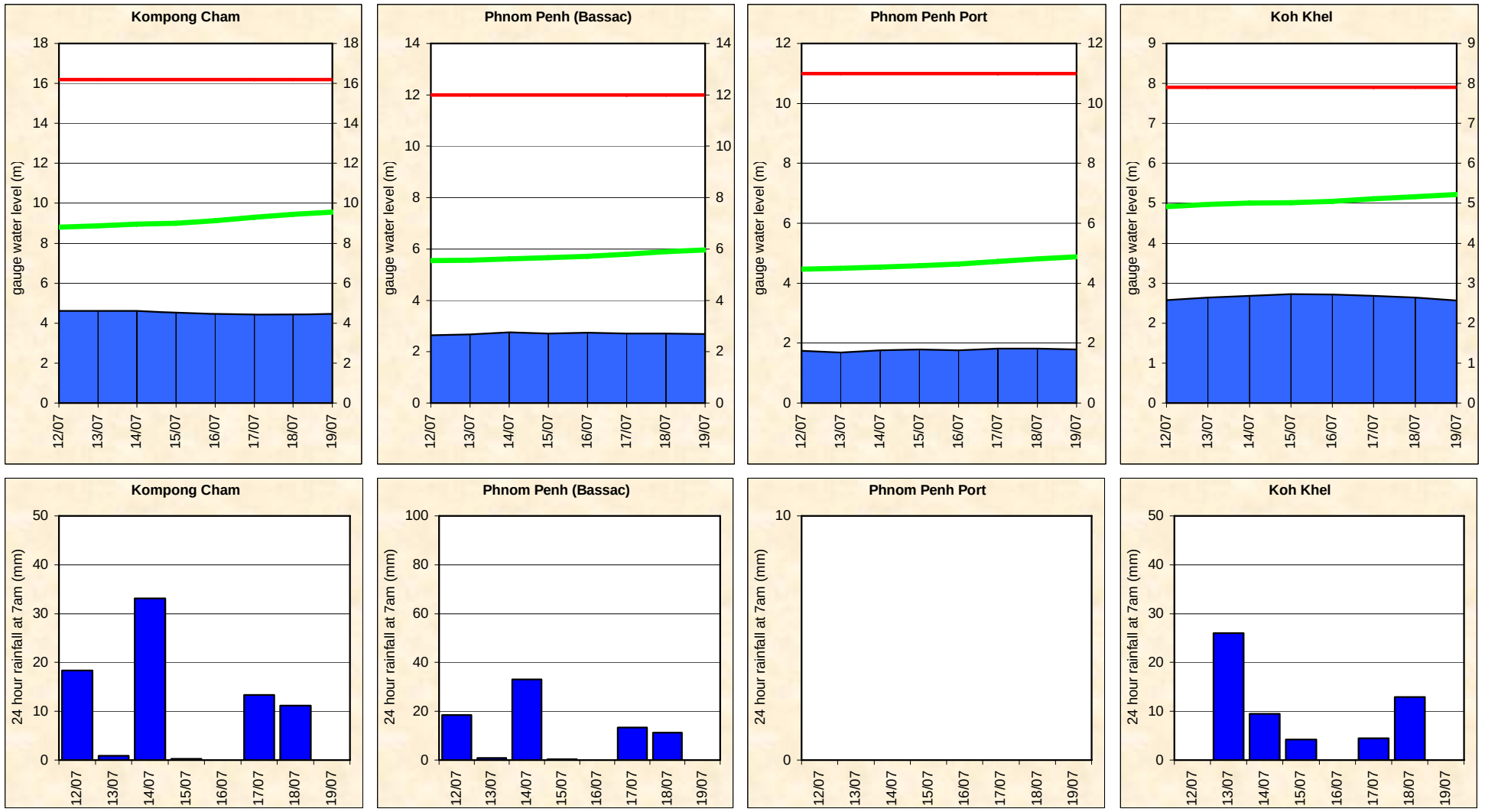
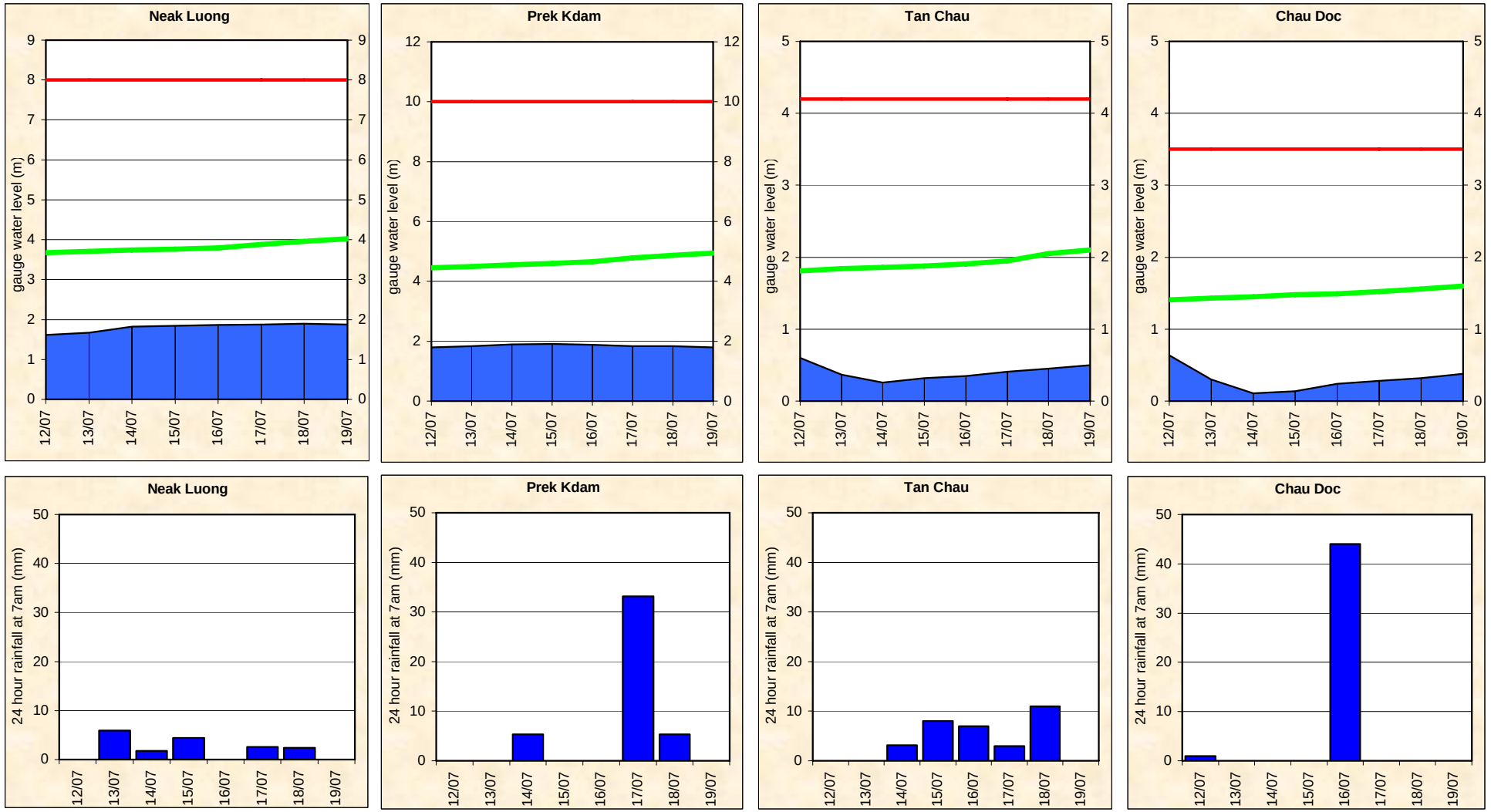


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



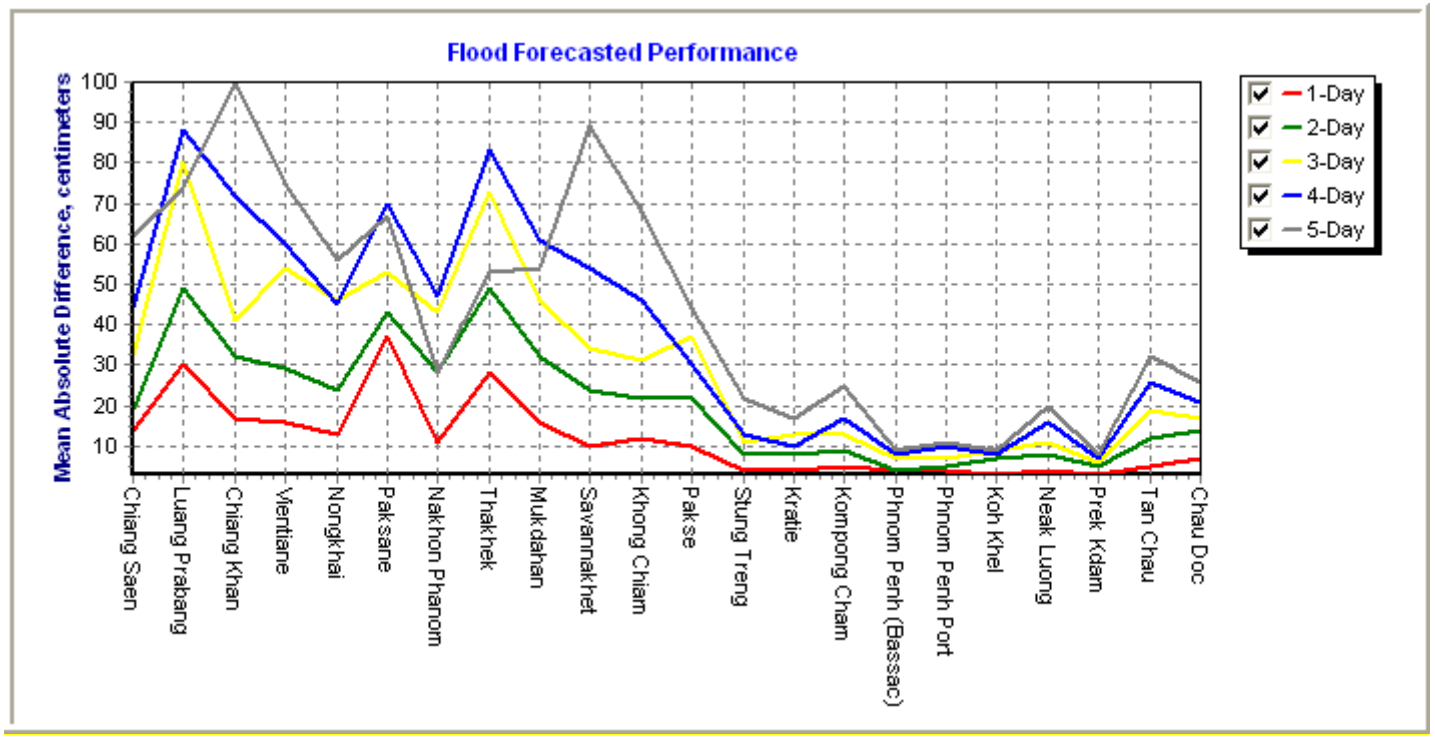
Annex B: Accuracy and performance

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 the known biases in input data, the knowledge of model response and the experience with hydrometeorological conditions of the Mekong River Basin. The information presented as a graph below shows 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 normal pattern in which the accuracy for 1-day to 3-day forecasts at all stations were better than 4-day and 5-day forecast. In general, the over all accuracy is quite good for 1-3 day forecast lead time at stations from Chiang Sean to Koh Khel. The peaks at Chiang Khan and Savannakhet for 5 day forecast lead time were less than expected and this perhaps caused by internal model functionality due to limited parameters for model calibration.

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	100.0	100.0	50.0	33.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	66.7	100.0	100.0	100.0	100.0	83.3	100.0	83.3	83.3	*90.9*
2-day	100.0	100.0	60.0	60.0	60.0	20.0	80.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.0	80.0	100.0	60.0	60.0	*84.5*
3-day	75.0	100.0	100.0	100.0	75.0	50.0	75.0	100.0	75.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0	0.0	*84.1*
4-day	66.7	100.0	100.0	66.7	33.3	66.7	33.3	66.7	66.7	66.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0	0.0	*75.8*
5-day	100.0	100.0	100.0	100.0	100.0	100.0	50.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0	0.0	*88.6*

Table B2: Benchmarks of success (Indicator of accuracy in mean absolute error) Unit in cm

	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
1-day	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

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)						
2010	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	*10:58*	*1*	*-*	*8*	*08:12*	*-*	*08:18*	*07:12*	*08:27*	*08:33*	*07:25*	*0*	*2*	*9*	*167*	*140*	*4*	*60*
month	*10:43*	*2*	*-*	*7*	*01:27*	*-*	*08:00*	*07:32*	*08:25*	*08:28*	*07:35*	*0*	*6*	*12*	*426*	*329*	*13*	*162*
season	*10:43*	*2*	*-*	*47*	*21:46*	*-*	*08:07*	*07:46*	*08:35*	*08:27*	*07:34*	*0*	*6*	*35*	*1328*	*945*	*29*	*414*

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.

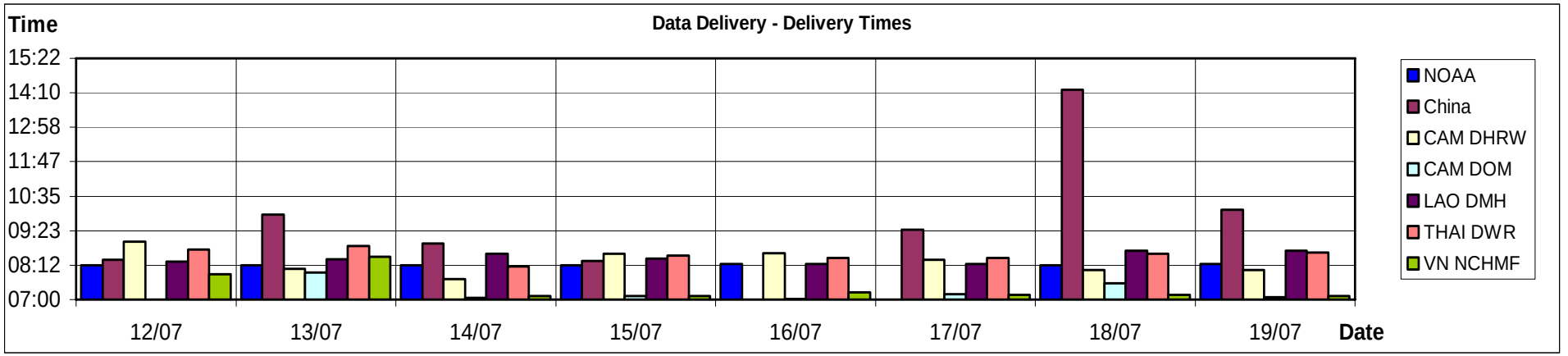


Figure B2: Data delivery times for the past 8 days including the current report date

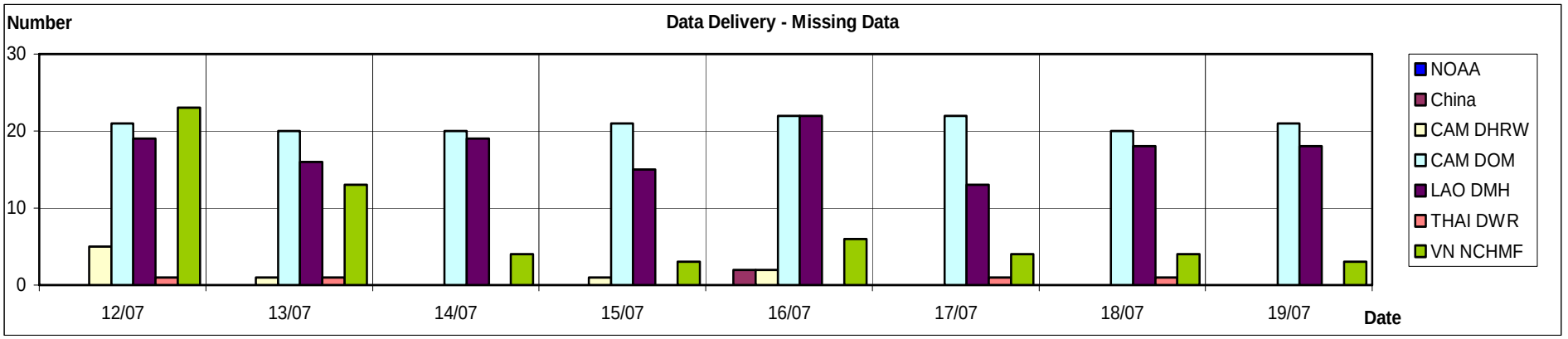


Figure B3: Missing data for the past 8 days including the current report date

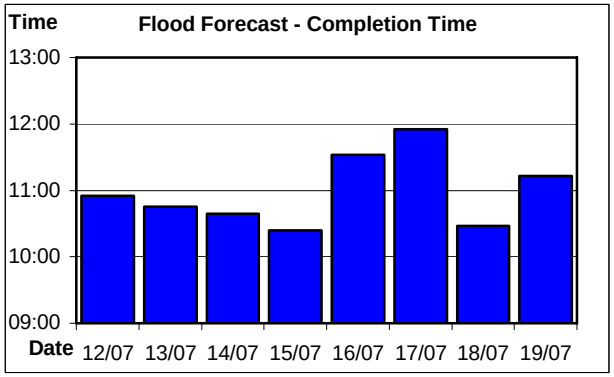


Figure B4: Flood forecast completion time

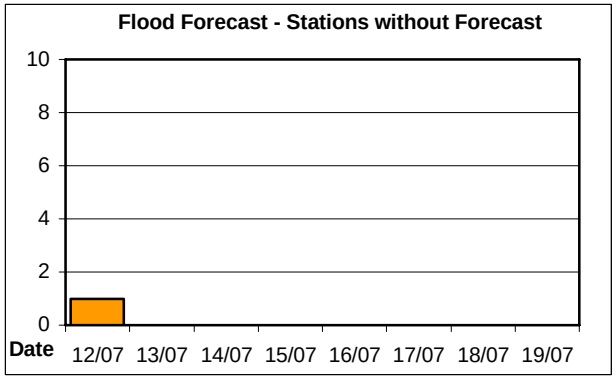


Figure B5: Flood forecast stations without forecast

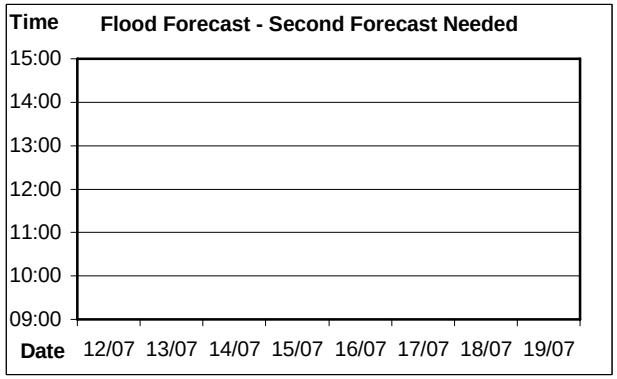


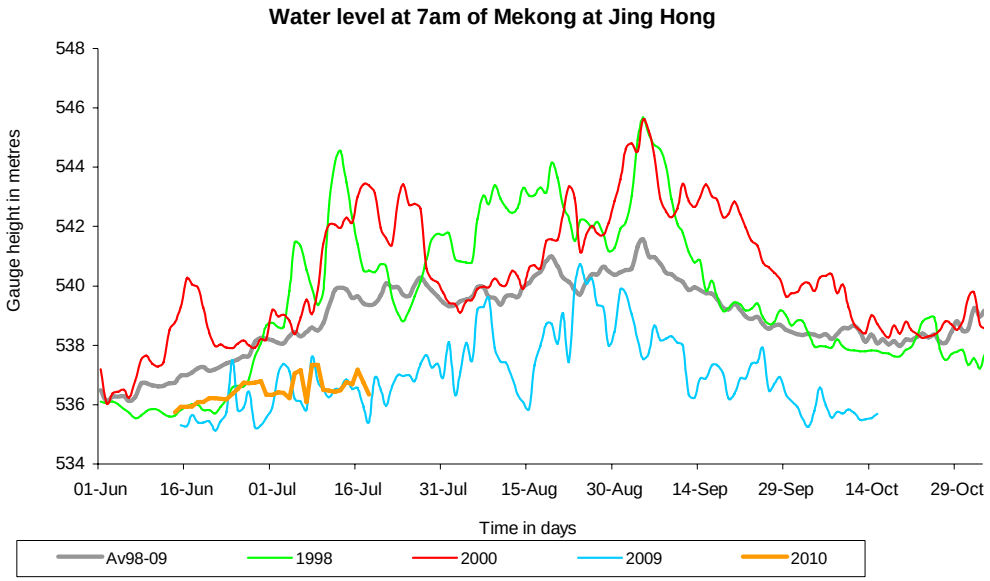
Figure B6: Second forecast needed

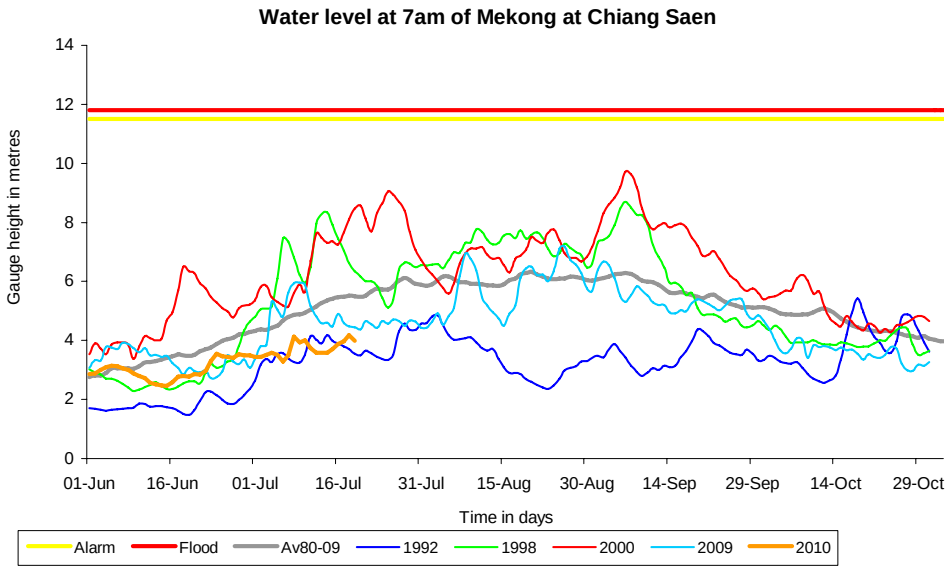
Annex C: Season Water Level Graphs

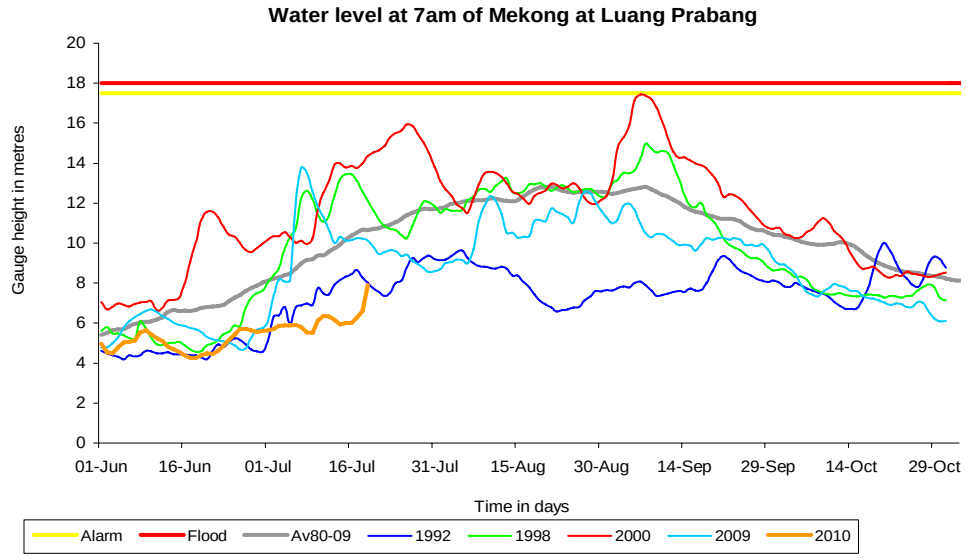
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

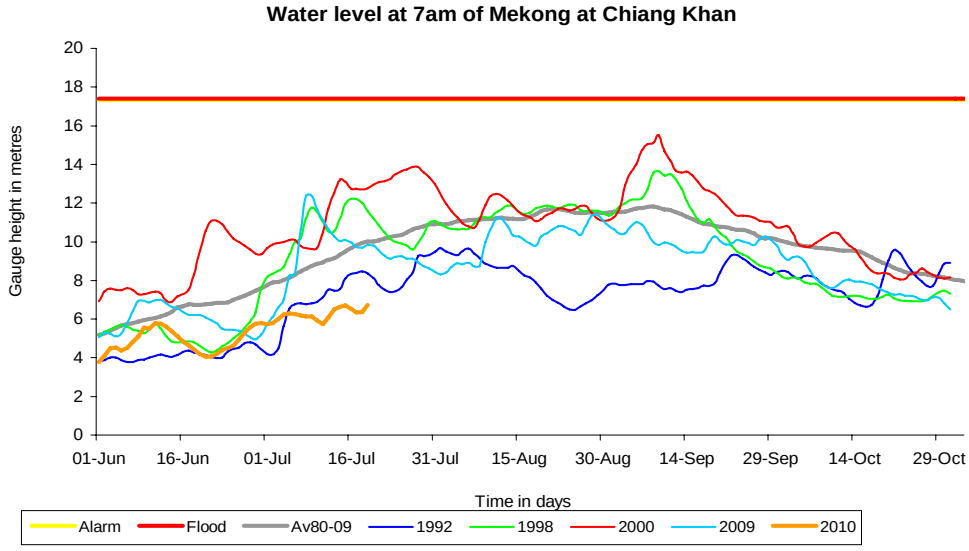
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

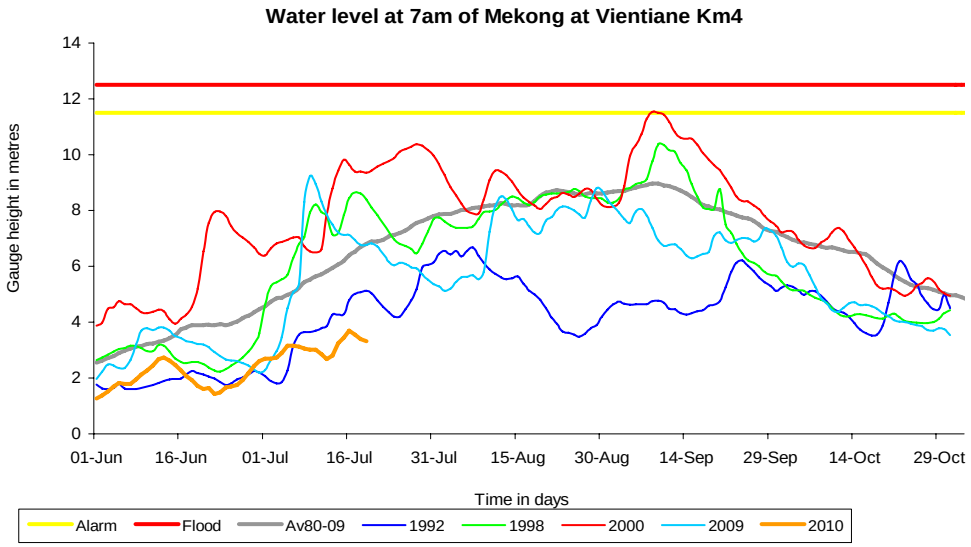
IN WET SEASON FROM 1 JUNE TO 31 OCTOBER



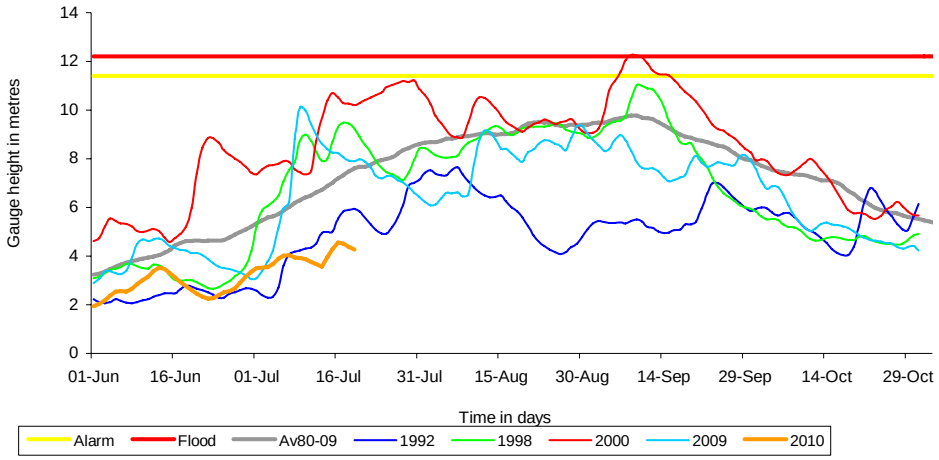



Water level at 7am of Mekong at Luang Prabang
Gauge height in metres
20
18
16
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

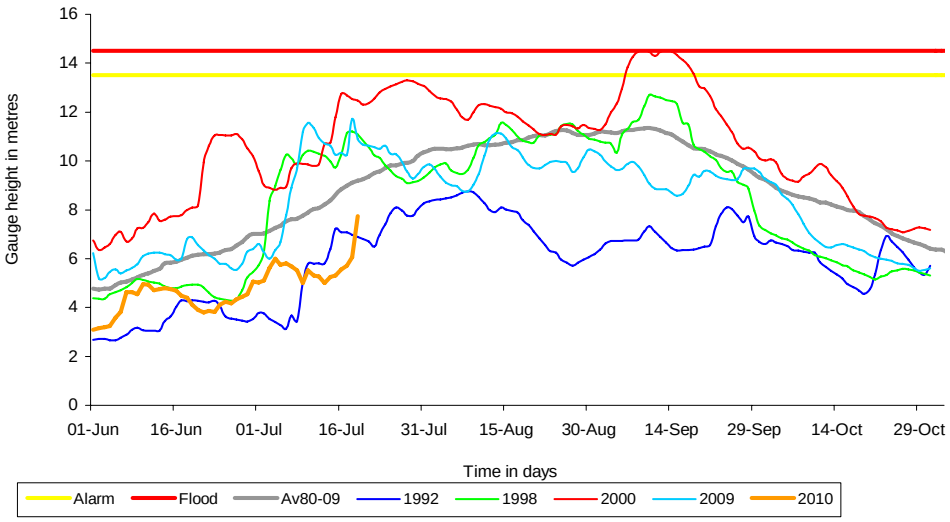

Water level at 7am of Mekong at Chiang Khan
Gauge height in metres
20
18
16
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010


Water level at 7am of Mekong at Vientiane Km4
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

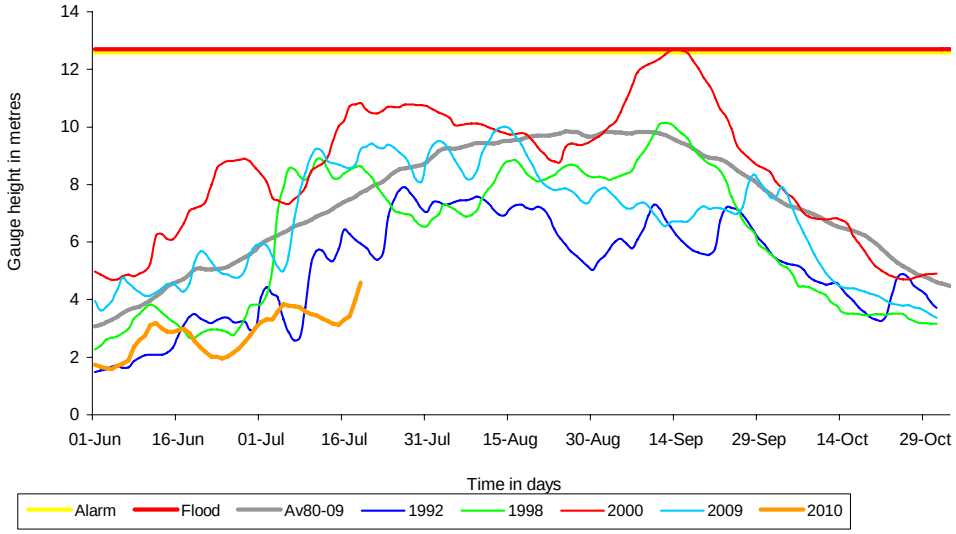
Water level at 7am of Mekong at Nong Khai

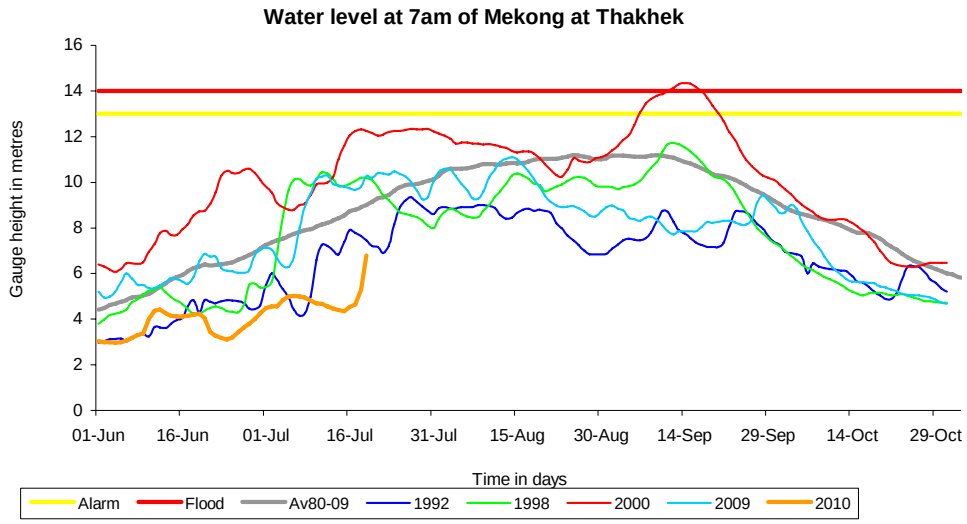


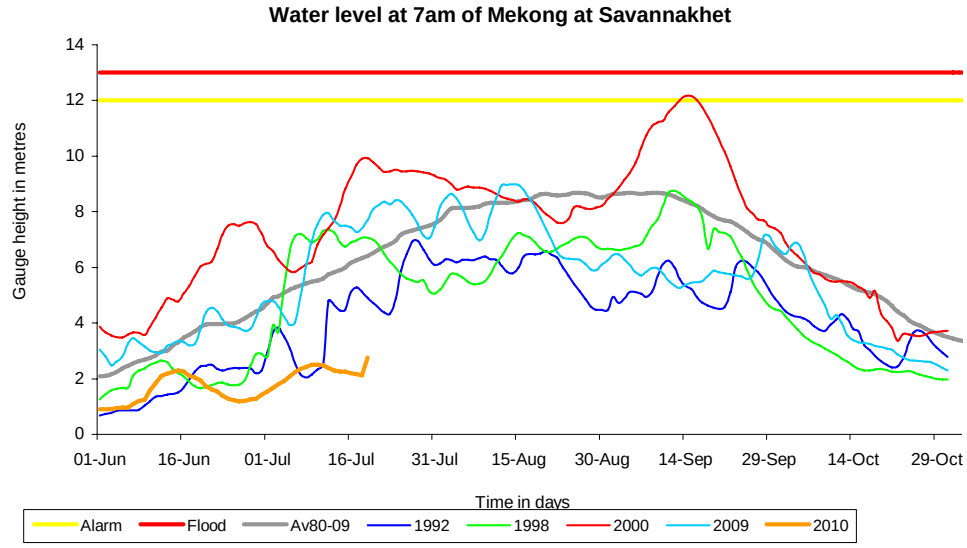
Water level at 7am of Mekong at Paksane

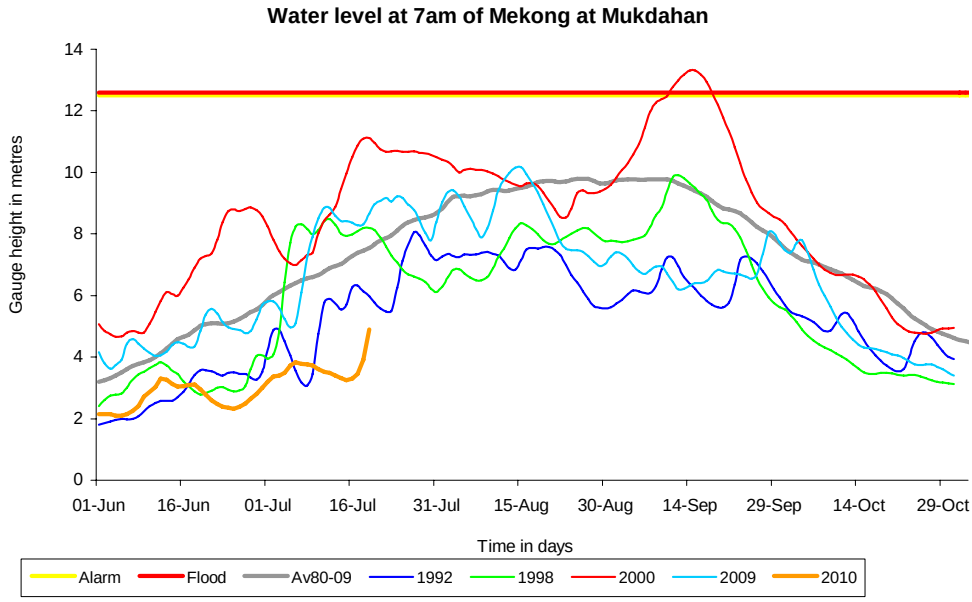


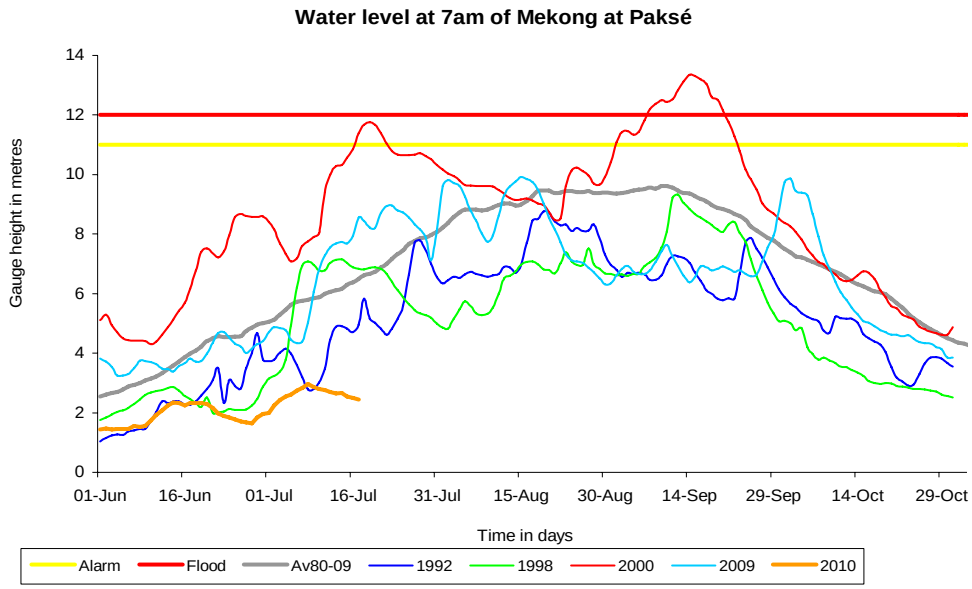
Water level at 7am of Mekong at Nakhon Phanom

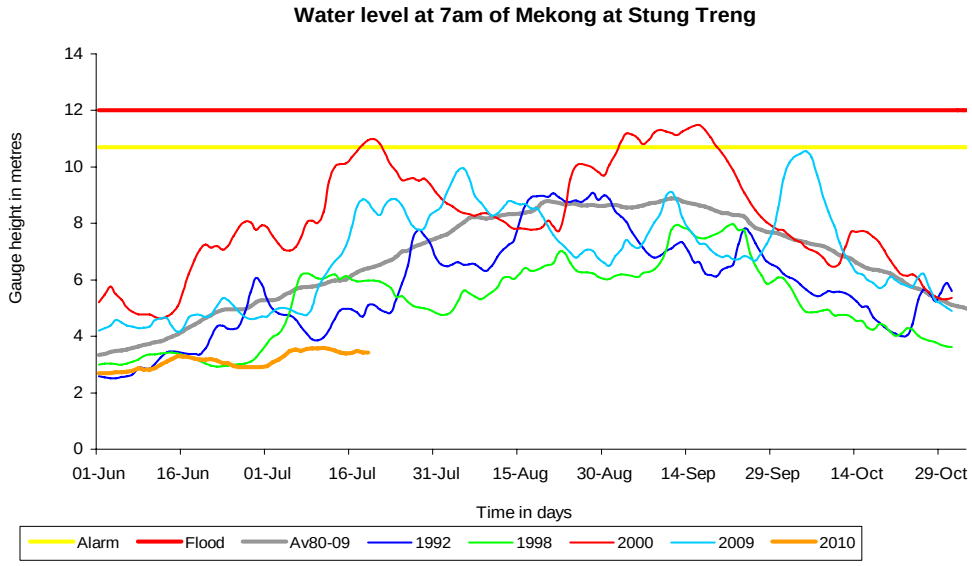


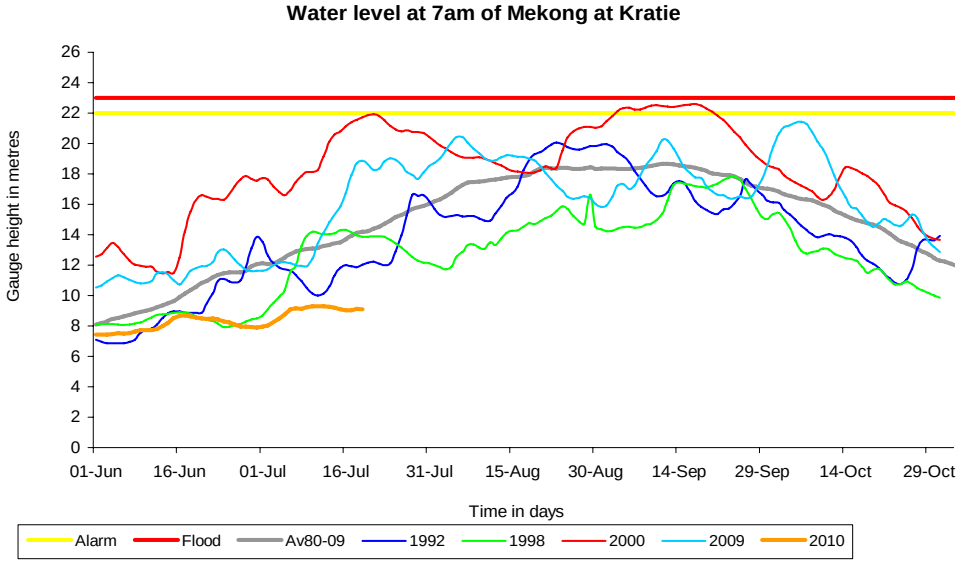

Water level at 7am of Mekong at Thakhek
Gauge height in metres
16
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

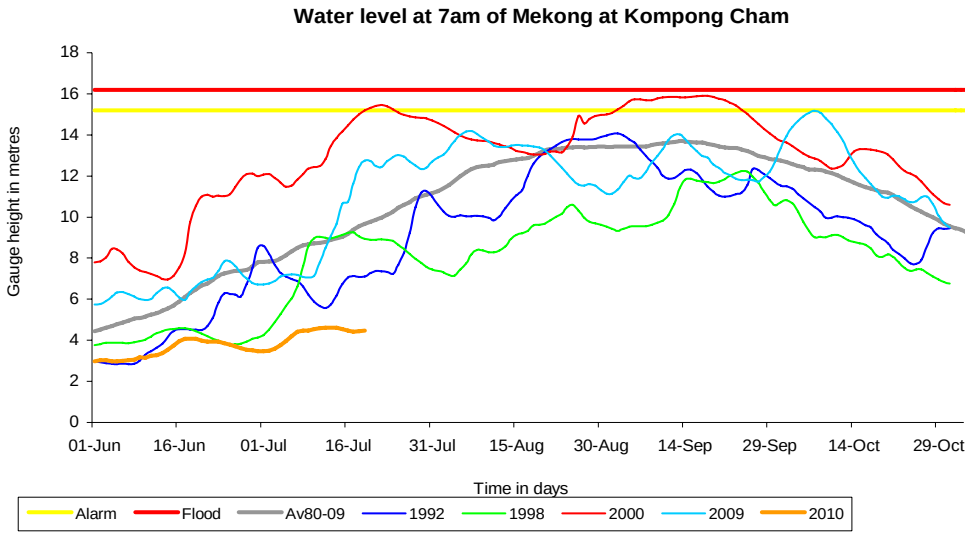

Water level at 7am of Mekong at Savannakhet
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

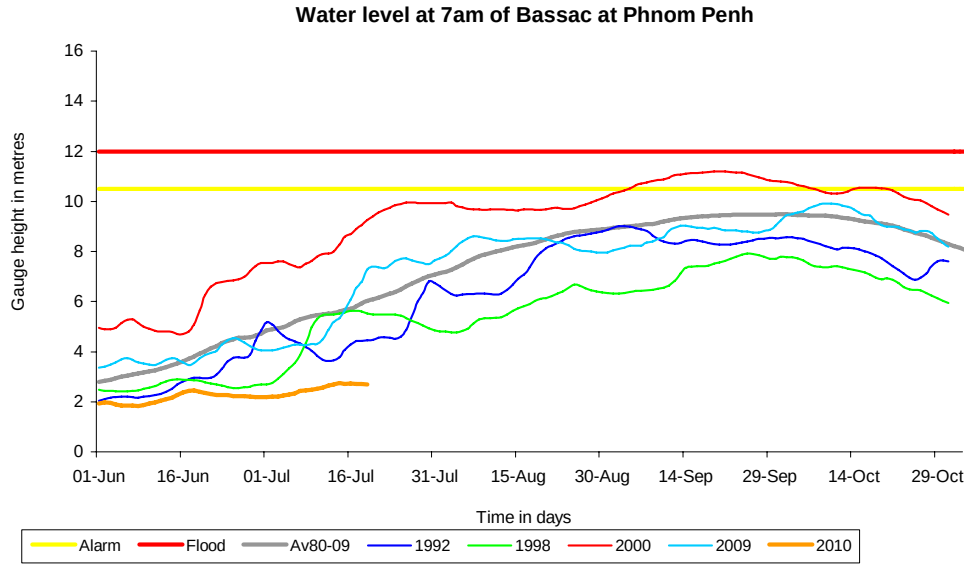

Water level at 7am of Mekong at Mukdahan
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

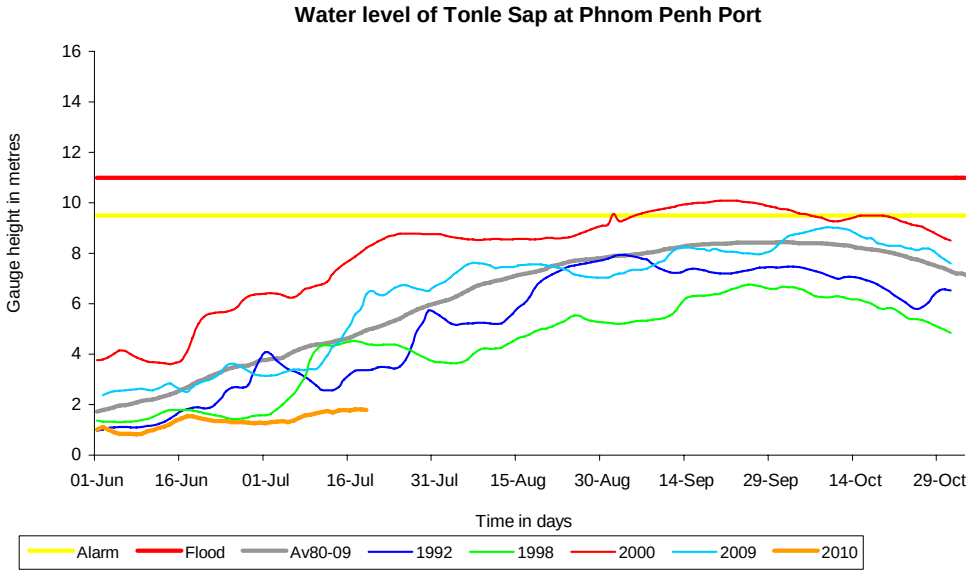

Water level at 7am of Mekong at Paksé
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

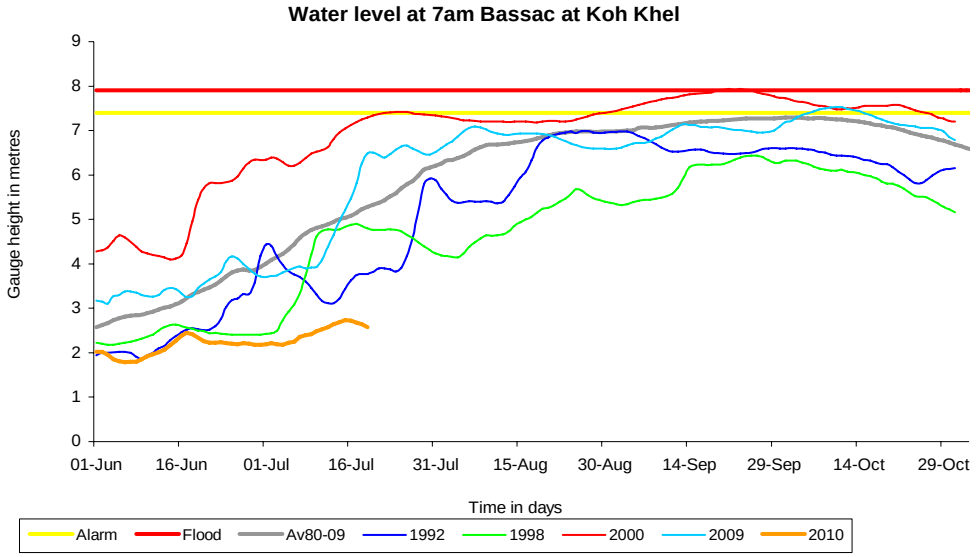

Water level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

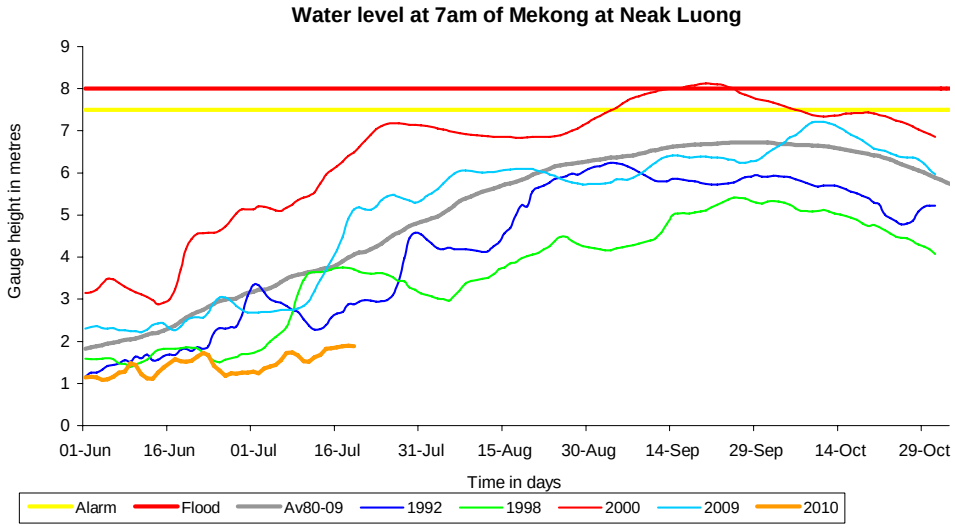

Water level at 7am of Mekong at Kratie
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
20
22
24
26
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

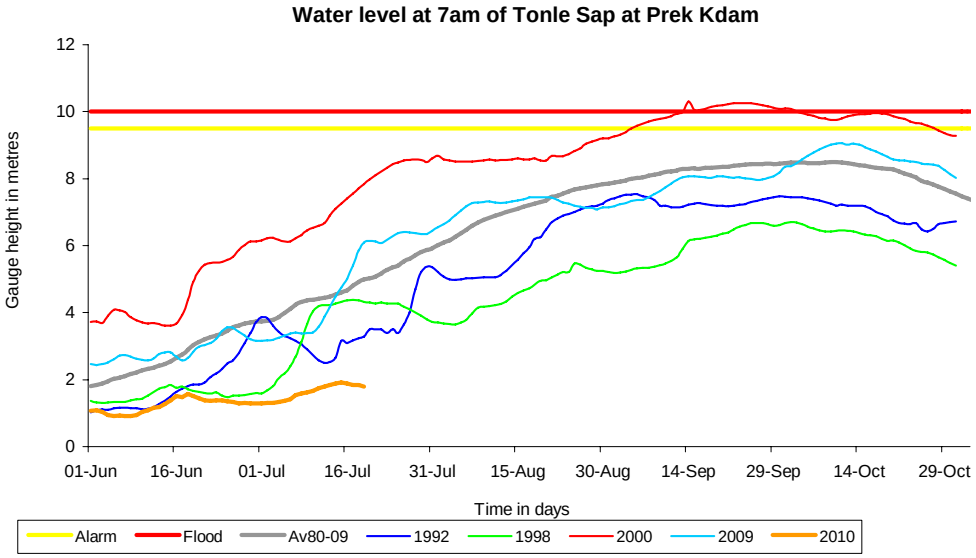

Water level at 7am of Mekong at Kompong Cham
Gauge height in metres
0
2
4
6
8
10
12
14
16
18
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

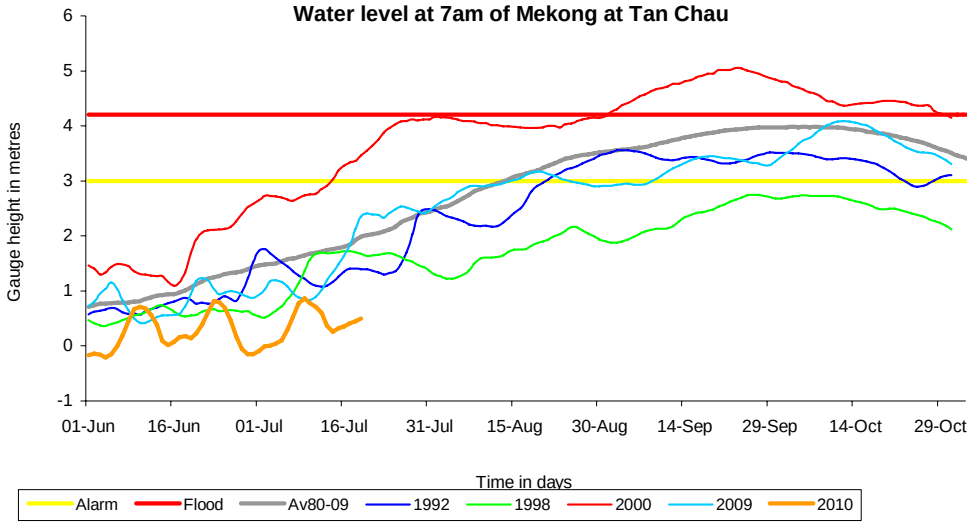

Water level at 7am of Bassac at Phnom Penh
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010

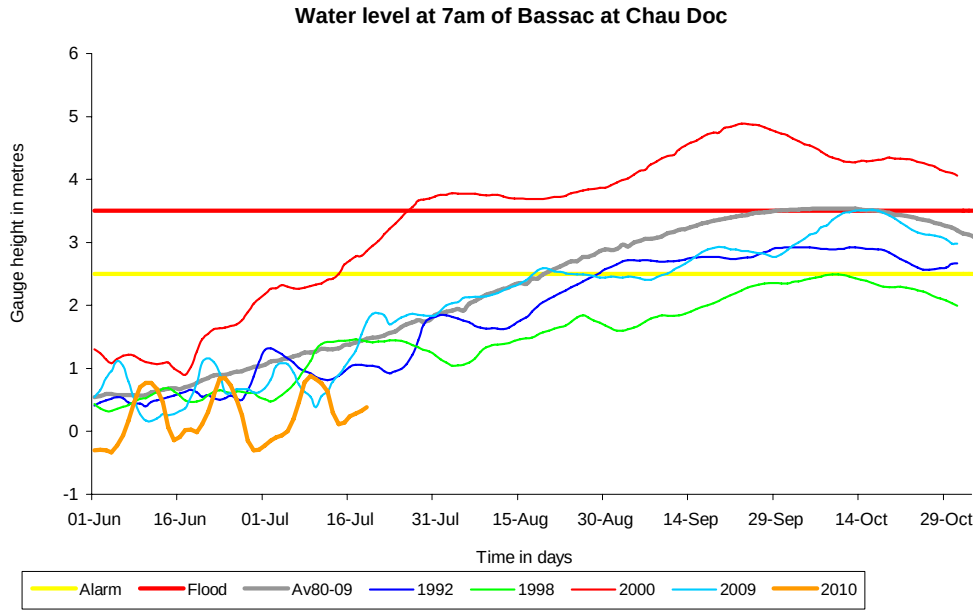

Water level of Tonle Sap at Phnom Penh Port
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010


Water level at 7am Bassac at Koh Khel
Gauge height in metres
0
1
2
3
4
5
6
7
8
9
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010


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
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010


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
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010


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
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010


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
Time in days
Alarm
Flood
Av80-09
1992
1998
2000
2009
2010