Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared at: 29/07/2013, covering the week from the 22nd July to the 29th July 2013

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

General weather patterns

During the week of 22nd July to 29th July 2013 four weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 23rd July and 27th July are presented in the figures below:

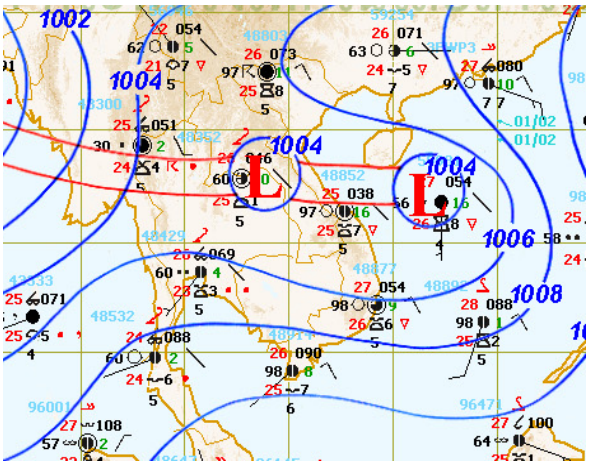


Figure 1: Weather map for 23rd July2013

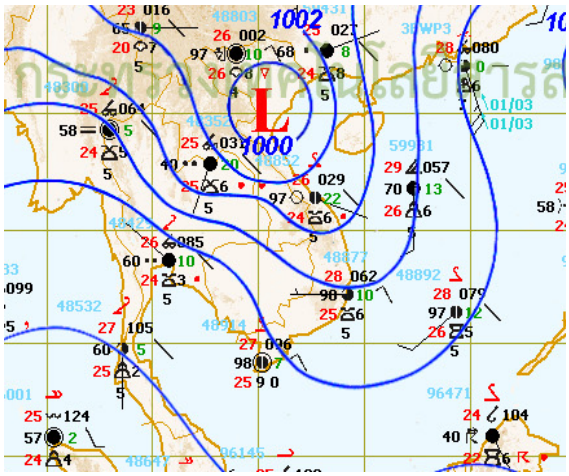


Figure 2: Weather map for 27th July 2013

Moderate South-West (SW) Monsoon

Weak and moderate SW monsoon prevailed over Myanmar, Thailand, Lao PDR, Cambodia and Viet Nam during second half of last week (Figure 1 and 2).

Inter Tropical Convergence Zone (ITCZ)

ITCZ was laid across the northern part of Thailand middle part of Lao PDR and Viet Nam in the first half week of monitoring period.

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

No TD, TS or TY have significant influenced the LMB during the last week.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Over weather situation

ITCZ was active during the first half of last week and followed by SW monsoon which prevailing over Myanmar, Thailand, Lao PDR, Cambodia and Viet Nam for the rest of last week. As a result, scattered isolated heavy rainfall occurred in many areas in LMB. The amount of rainfall from 22nd July to 28th July were recorded at Chiang Saen (153.8 mm), Paksane (245.8 mm), Nakhon Phanom (195.4 mm), Thakhek (201.9 mm), Khong Chiam (182.2 mm), Stung Treng (168.5 mm) and Kratie (98.8 mm). See Figure 3 for Weekly Rainfall distribution (MAP) of LMB, covering the week 22nd July – 29th July, 2013.

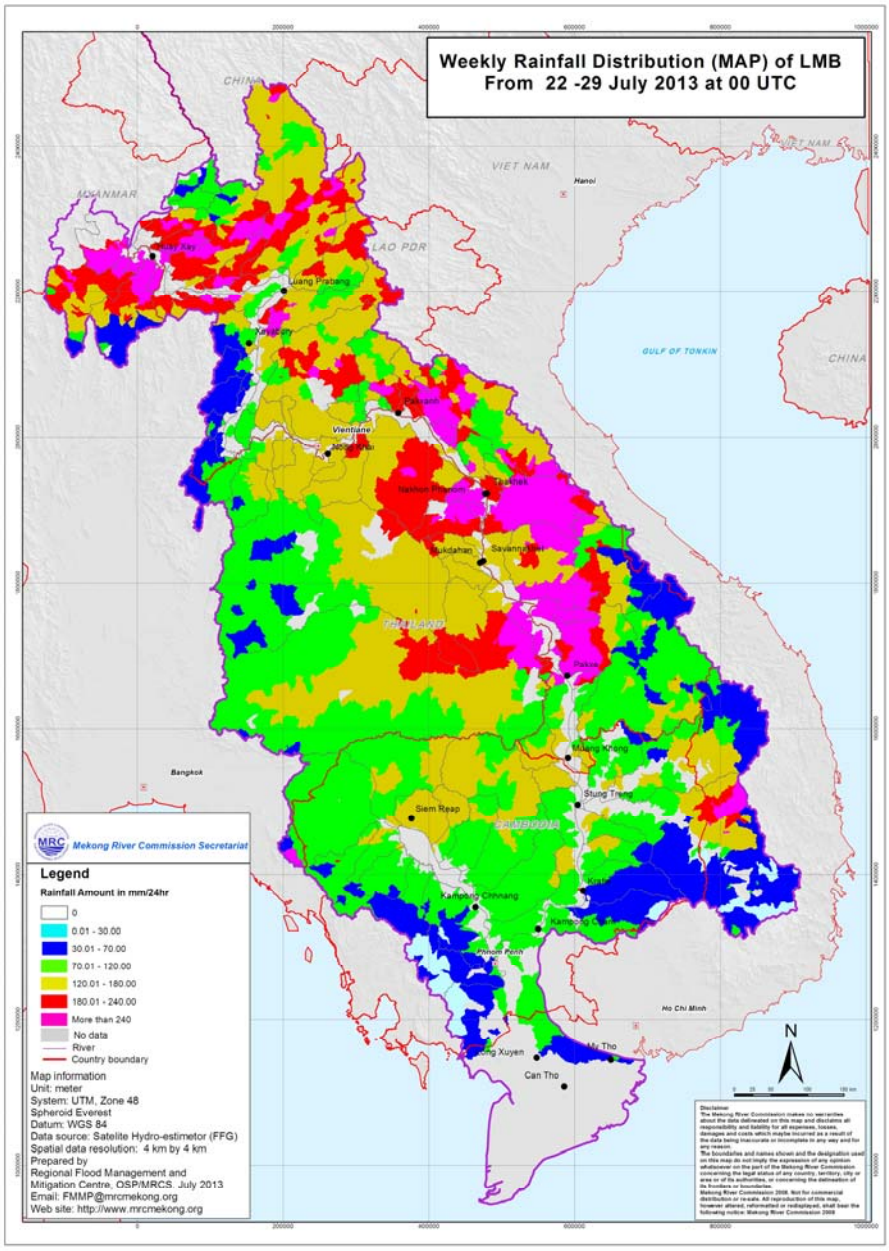


Figure 3: Weekly Rainfall distribution (MAP) of LMB, covering the week 22nd July – 29th July, 2013

General behaviour of the Mekong River

During last week, water levels at most stations in upper and middle reaches of LMB rose up below the long-term average water level (LTA) except those of middle reach were above LTA for this time of the year; those water levels of lower reach of LMB were rising during last week above or about LTA for this time of the year. However, water levels of two stations in downstream at Tan Chau and Chau Doc were influenced by tidal and rose up below LTA during this period of the year.

For stations from Chiang Saen and Luang Prabang

In general, the water levels at Chiang Saen and Luang Prabang rose up during last week below LTA.

For stations from Chiang Khan, Vientiane and Nong Khai and Paksane

Water levels of all stations rose up below the long-term average during last week except Paksane that above LTA for this time of the year. Water levels of these stations were influenced by ITCZ.

For stations from Thakhet/Nakon Phanom to Pakse

Water levels at Thakhet/Nakhon Phanom, Mukdahan, Khong Chiam and Pakse rose up above the long-term average during last week for this time of the year. Water levels of these stations were also influenced by ITCZ.

For stations from Stung Treng to Kampong Cham

Water levels at these stations rose up during last week above the long-term average for this time of the year. All stations were recording water levels that were below the LTA for this time of the year.

For stations from Phnom Penh to Koh Khel/Neak Luong

Water levels at these stations rose up during last week about the long-term average for this time of the year. All stations were recording water levels that were slightly below the LTA for this time of the year.

Tan Chau and Chau Doc

Water levels showed a rising trend during last week below the long-term average. Both stations recorded water levels that were somewhat below the long-term average for this time of the year, and that were significantly affected by the tide.

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 were 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

2013	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
22/07	535.41	3.62	9.10	8.34	5.08	5.94	8.80	6.93	8.09	6.82	5.78	7.66	6.32	6.97	15.62	9.49	5.12	4.19	4.54	3.32	4.07	1.59	1.53
23/07	535.36	3.68	9.08	8.68	5.10	5.96	9.02	7.22	8.32	7.13	6.08	8.08	6.61	6.88	16.05	10.28	5.73	4.79	5.11	3.84	4.59	1.64	1.43
24/07	535.38	3.82	9.02	9.14	5.55	6.28	9.05	7.27	8.37	7.25	6.19	8.51	7.09	6.89	16.18	10.46	5.95	5.15	5.33	4.10	4.85	1.62	1.19
25/07	535.38	3.78	9.02	9.24	5.95	6.82	8.82	7.14	8.30	7.25	6.21	8.64	7.44	7.46	16.40	10.63	6.09	5.25	5.44	4.22	4.98	1.55	1.12
26/07	535.35	3.81	9.12	9.22	6.08	7.01	8.90	7.28	8.44	7.25	6.21	8.84	7.52	7.58	16.98	11.06	6.35	5.41	5.61	4.38	5.18	1.64	1.17
27/07	535.34	3.72	9.08	9.22	6.10	7.01	9.32	7.67	8.70	7.57	6.52	8.63	7.30	7.46	16.94	11.27	6.54	5.62	5.79	4.56	5.35	1.75	1.25
28/07	535.33	3.89	9.44	9.17	5.97	7.01	9.62	8.17	9.33	7.99	6.77	8.92	7.55	7.27	16.68	11.12	6.54	5.62	5.79	4.58	5.37	1.78	1.29
29/07	535.28	4.04	10.12	9.10	6.02	6.98	10.70	9.38	10.50	8.87	7.81	9.73	8.18	7.63	16.70	11.01	6.50	5.51	5.75	4.54	5.35	1.79	1.32

Table A2: observed rainfall

Unit in mm

2013	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
22/07	41.0	25.5	5.0	1.3	2.8	7.6	75.5	10.7	6.7	5.5	nr	28.5	nr	87.5	15.0	26.9	0.2	-	nr	nr	nr	0.0	-
23/07	24.0	9.2	60.0	1.4	nr	35.2	19.3	6.1	1.9	1.4	12.0	47.0	nr	18.0	61.2	13.4	4.8	-	1.6	1.8	4.3	2.0	0.2
24/07	12.5	18.9	5.4	7.4	nr	5.4	nr	0.3	nr	8.0	8.0	48.8	26.7	6.0	15.8	3.3	0.3	-	5.0	2.2	nr	2.0	2.2
25/07	28.0	0.5	5.2	1.0	4.7	22.4	70.1	15.4	20.3	38.0	nr	10.6	25.2	37.5	6.8	27.2	0.7	-	1.5	0.8	nr	2.3	13.0
26/07	0.5	55.0	nr	0.0	6.2	4.3	18.2	22.7	23.0	1.9	0.8	0.0	0.3	5.5	nr	1.5	0.2	-	nr	16.8	0.0	nr	0.0
27/07	11.0	5.5	14.6	2.6	1.6	2.3	13.9	46.5	55.5	0.4	nr	7.3	14.3	5.5	nr	nr	nr	-	nr	nr	nr	7.3	31.0
28/07	26.00	39.2	1.4	2.0	nr	6.3	48.8	93.7	94.5	22.7	21.1	40.0	38.2	8.5	nr	nr	nr	-	nr	nr	nr	nr	-
29/07	10.50	40.9	32.6	3.7	31.5	33.4	73.8	115.5	111.6	23.0	35.1	1.3	nr	27.0	3.0	33.2	0.7	-	7.5	1.6	0.0	14.1	26.0

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

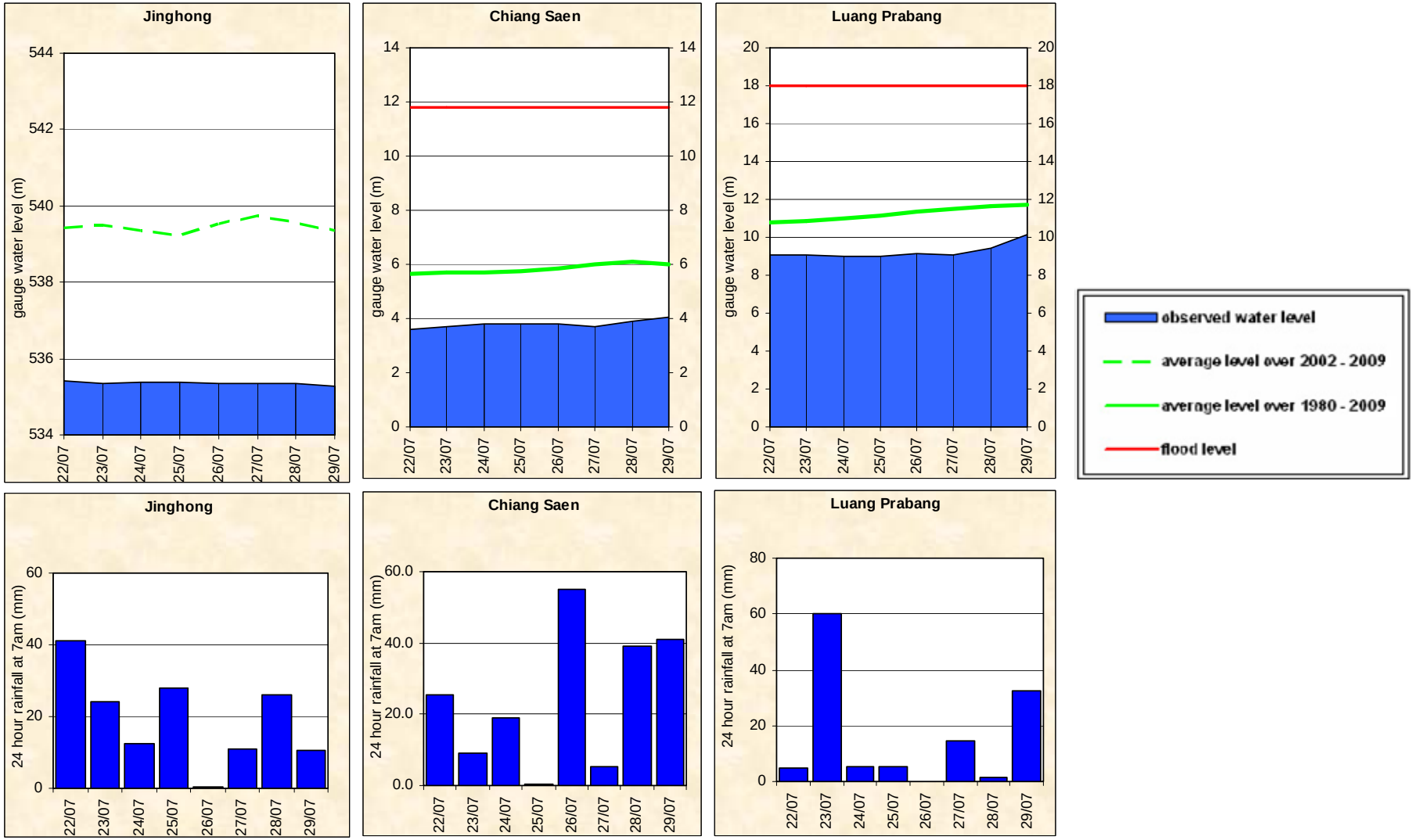


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

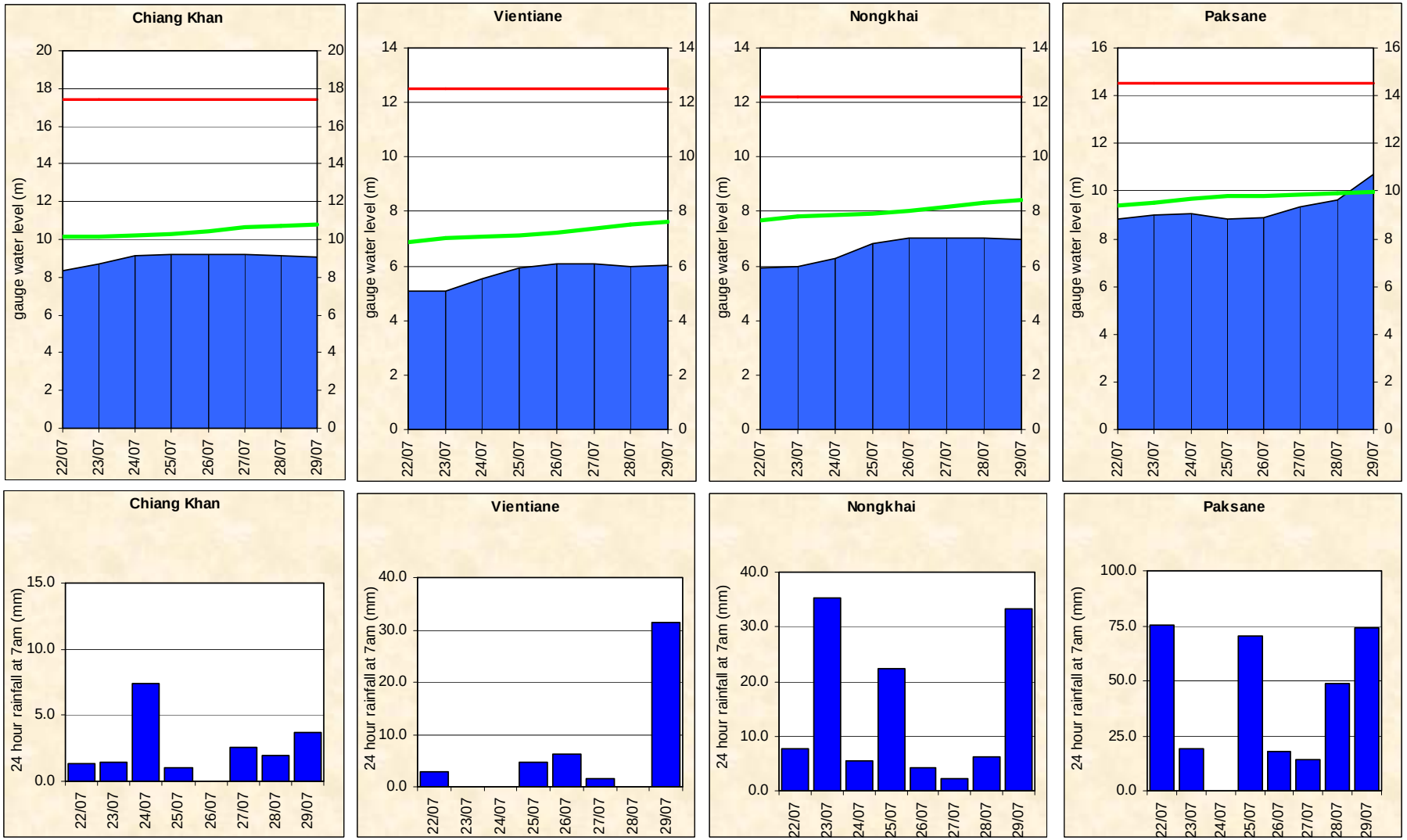


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

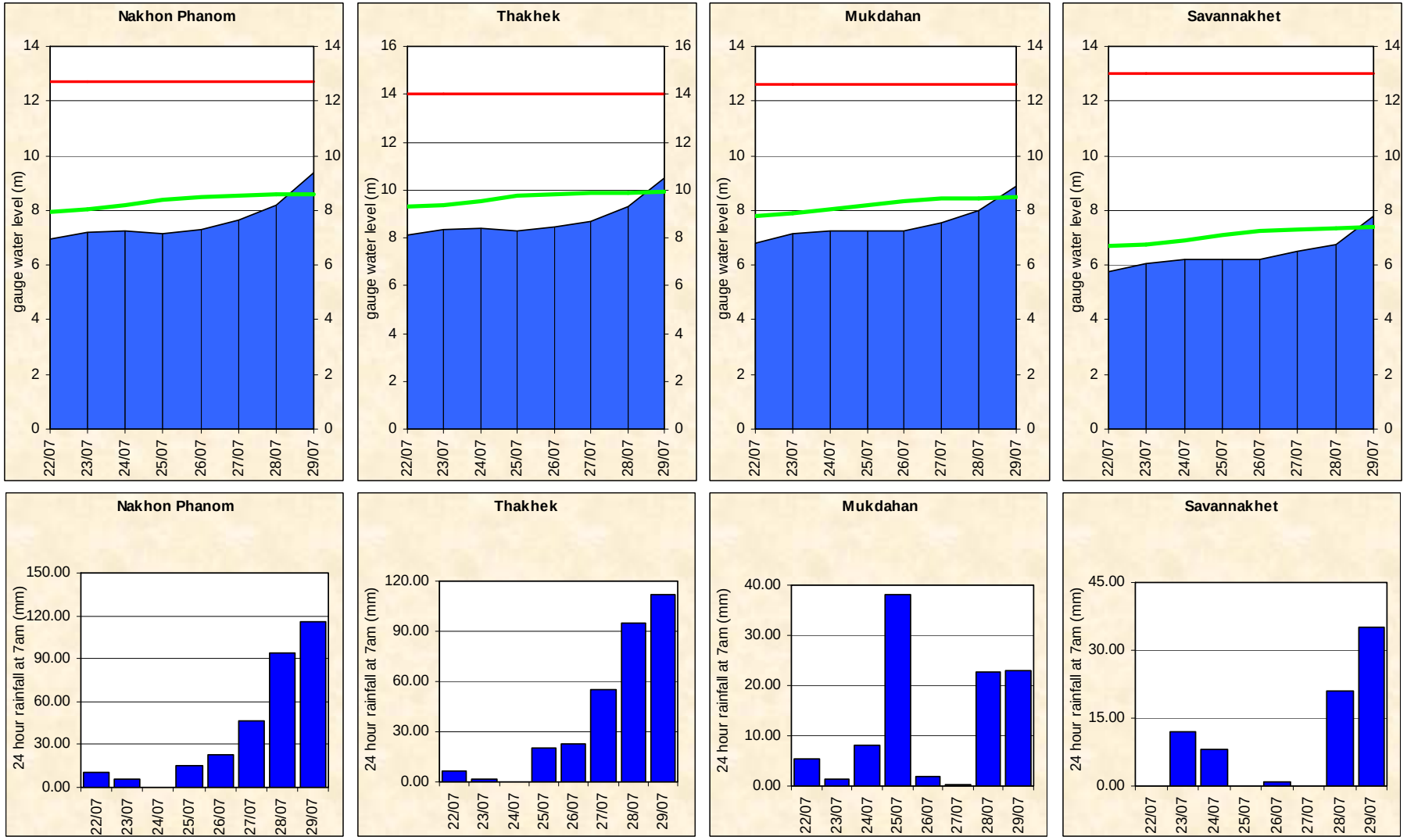


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

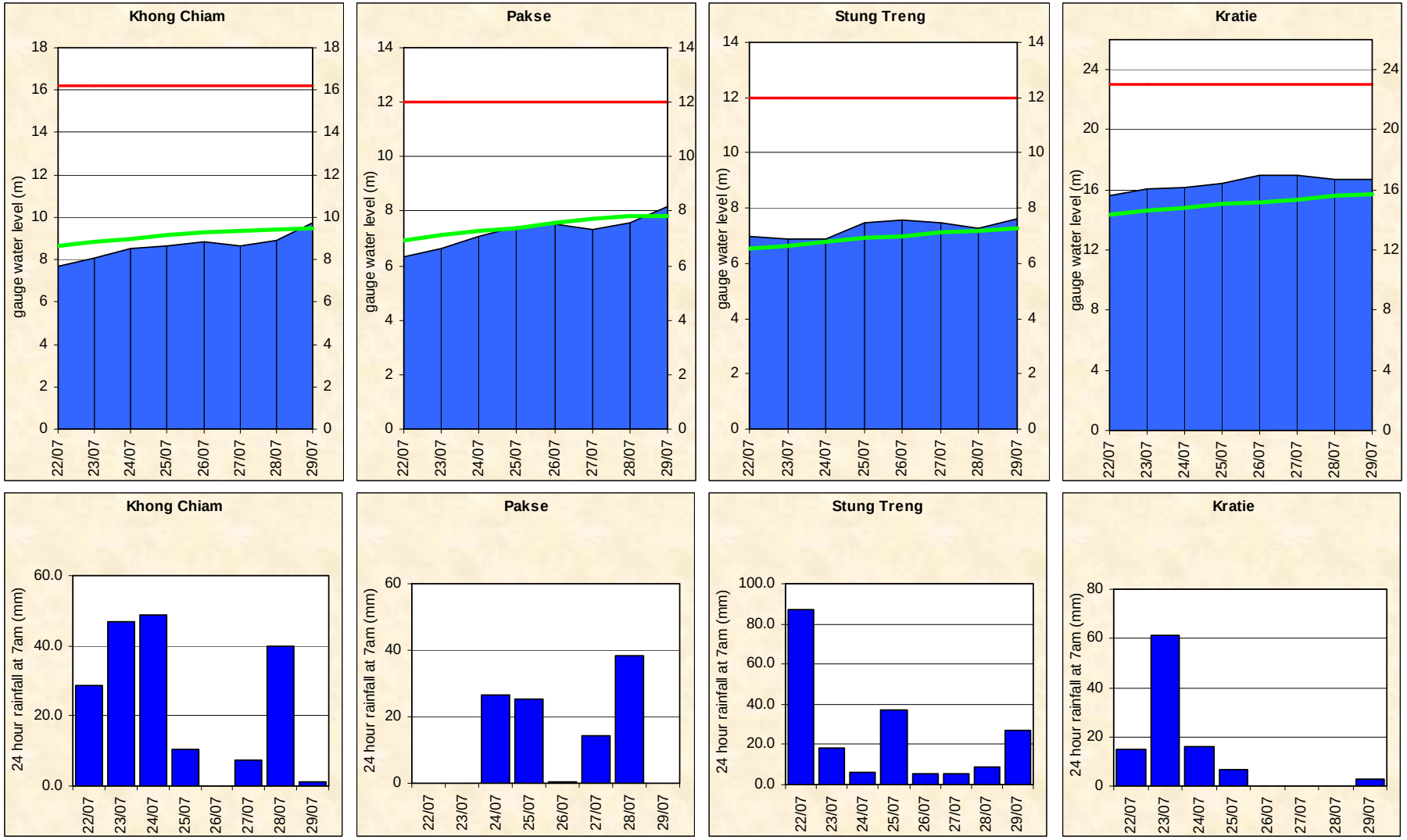


Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

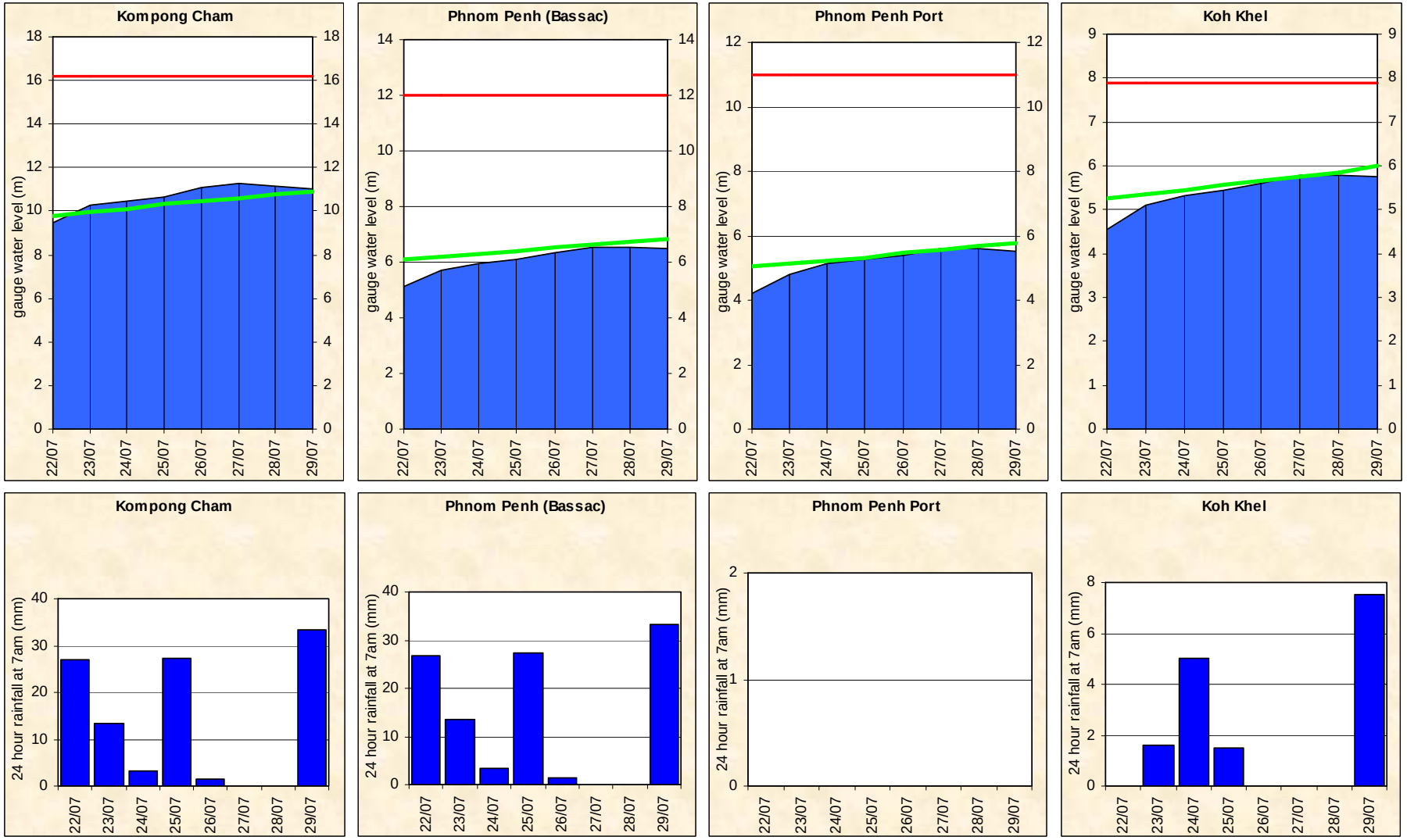
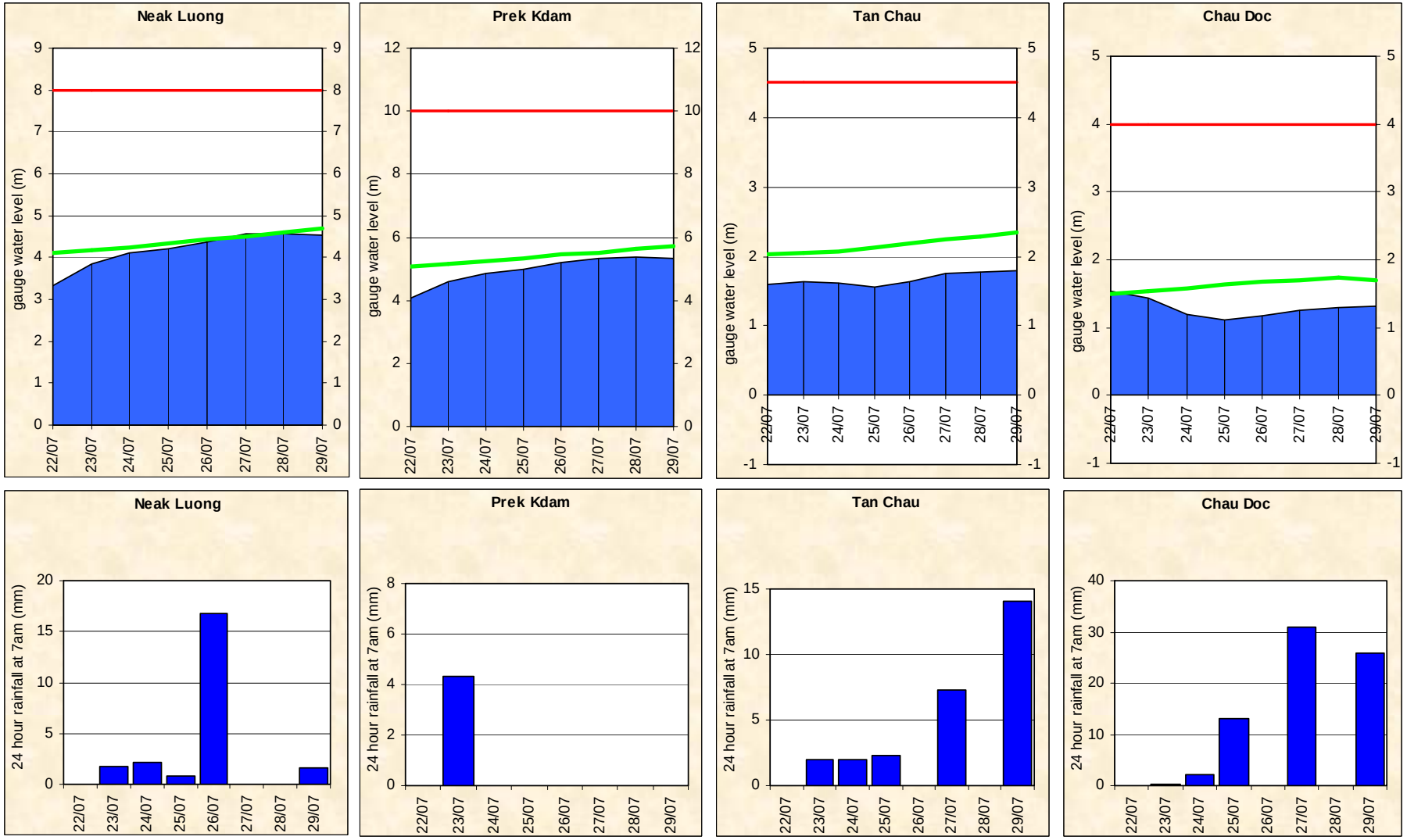


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



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.

In general the overall accuracy is fair for 1-day to 5-day forecast lead time at all stations in LMB. However, the accuracies at middle reach of LMB stations (Paksane to Savannakhet) and Kratie for 2-day to 4-day forecast were less than expected.

The above differences due to three main factors: (1) internal model functionality in forecasting; for which the parameter adjustment in the model is not possible; (2) the adjustment by utilizing the practical knowledge and experience of flood forecaster-in-charge; (3) scattered local heavy rainfall induced by ITCZ happened in many tributaries and resulted in rapid rising water levels.

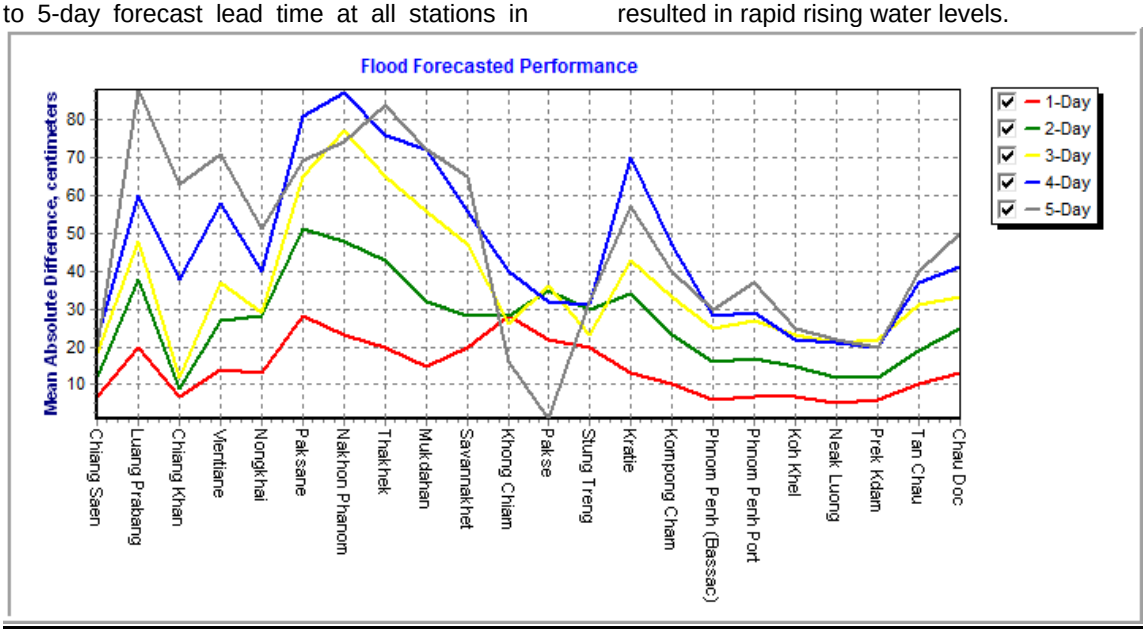


Figure B1: Average flood forecast accuracy along the Mekong mainstream

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	57.1	100.0	42.9	42.9	14.3	28.6	42.9	57.1	42.9	0.0	14.3	14.3	42.9	57.1	85.7	85.7	85.7	100.0	100.0	57.1	71.4	***56.5***
2-day	100.0	66.7	100.0	66.7	50.0	0.0	33.3	33.3	33.3	66.7	66.7	33.3	50.0	66.7	66.7	50.0	33.3	33.3	50.0	33.3	33.3	33.3	***50.0***
3-day	100.0	60.0	100.0	40.0	60.0	20.0	20.0	20.0	20.0	20.0	60.0	40.0	80.0	60.0	40.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	***35.5***
4-day	100.0	75.0	75.0	50.0	100.0	50.0	25.0	25.0	25.0	50.0	50.0	100.0	100.0	50.0	50.0	0.0	25.0	0.0	75.0	75.0	0.0	0.0	***50.0***
5-day	100.0	33.3	33.3	66.7	66.7	33.3	33.3	33.3	33.3	33.3	100.0	100.0	66.7	33.3	66.7	33.3	33.3	66.7	66.7	66.7	33.3	0.0	***51.5***

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)						
2013	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	*10:23*	*0*	*-*	*4*	*08:15*	*08:17*	*07:22*	*05:01*	*08:51*	*07:43*	*07:27*	*0*	*0*	*3*	*91*	*292*	*0*	*71*
month	*10:27*	*0*	*-*	*15*	*08:13*	*08:18*	*07:12*	*05:48*	*08:48*	*07:30*	*07:09*	*3*	*4*	*14*	*274*	*890*	*2*	*158*
season	*10:29*	*3*	*-*	*31*	*08:13*	*08:39*	*07:13*	*06:05*	*08:55*	*07:19*	*07:08*	*3*	*16*	*66*	*521*	*1731*	*4*	*320*

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.

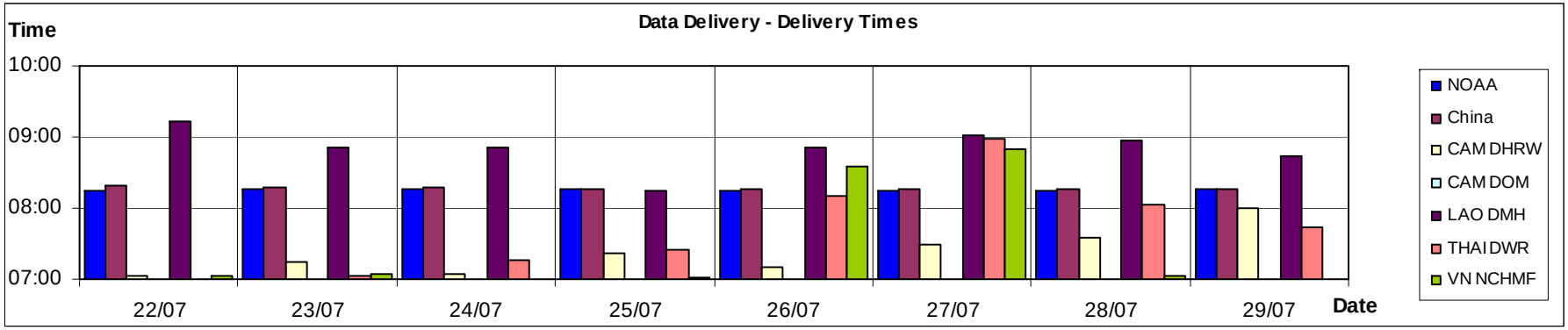


Figure B2: Data delivery times for the past 8 days including the current report date

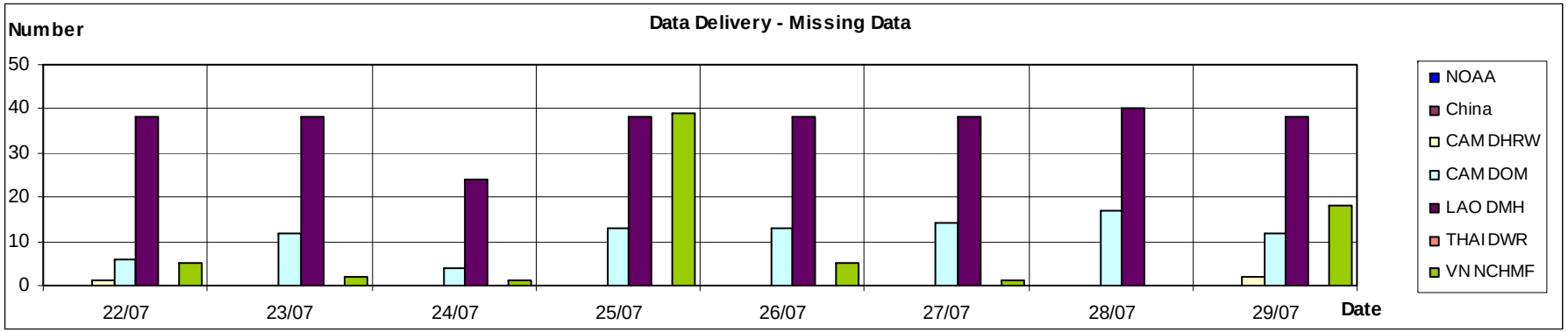


Figure B3: Missing data for the past 8 days including the current report date

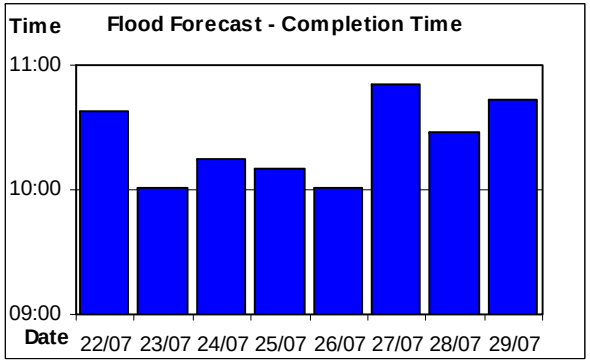


Figure B4: Flood forecast completion time

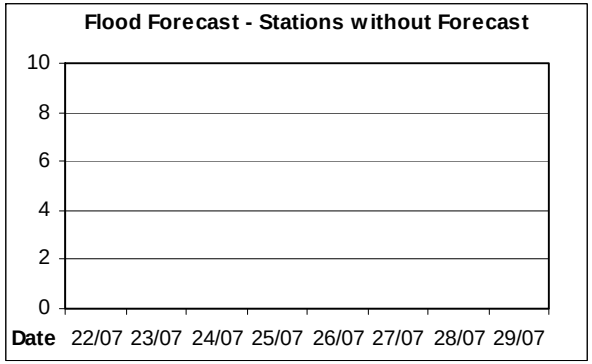


Figure B5: Flood forecast stations without forecast

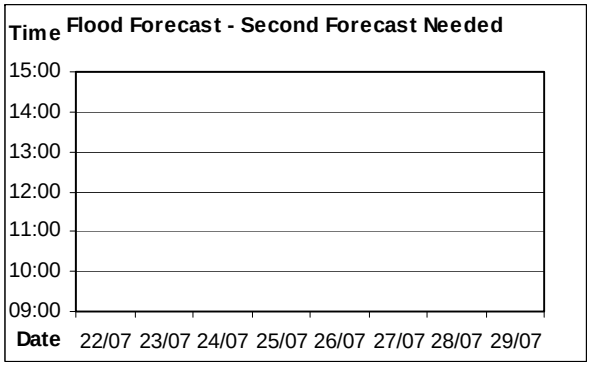


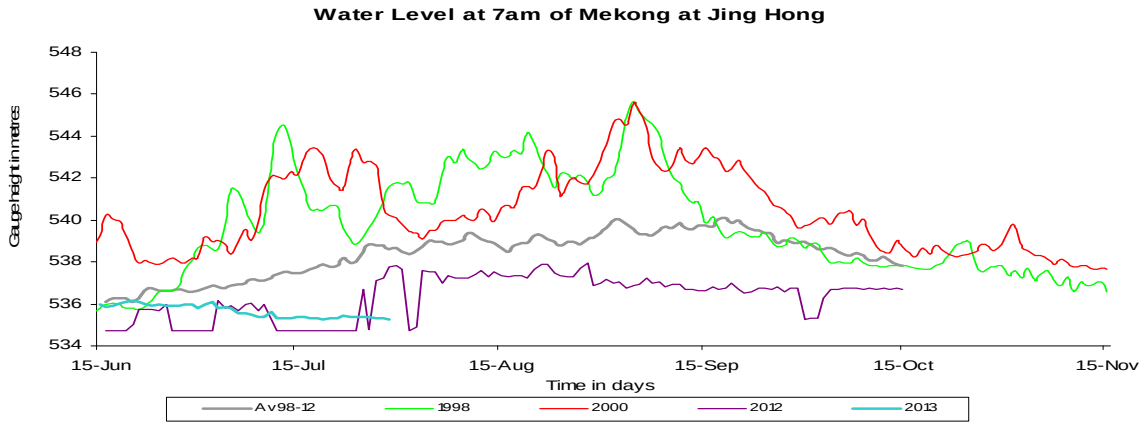
Figure B6: Second forecast needed

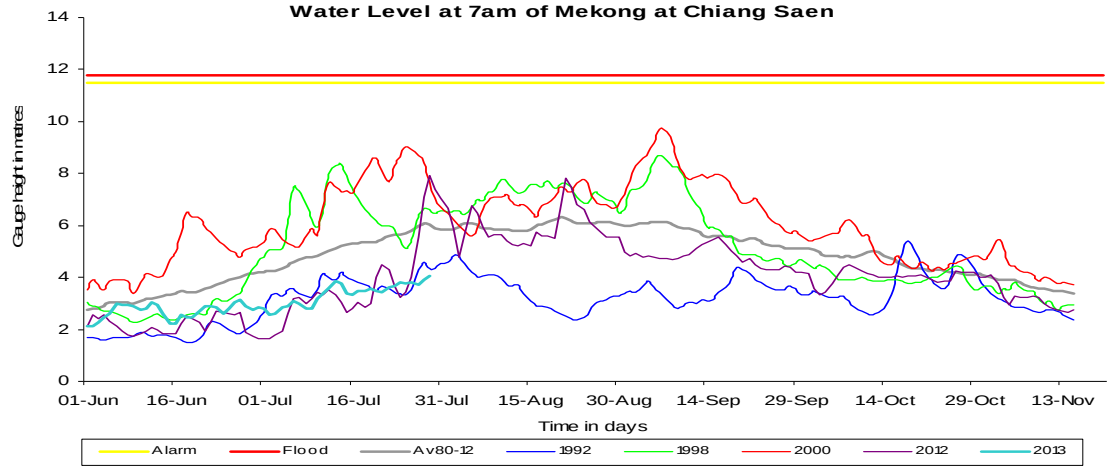
Annex C: Season Water Level Graphs

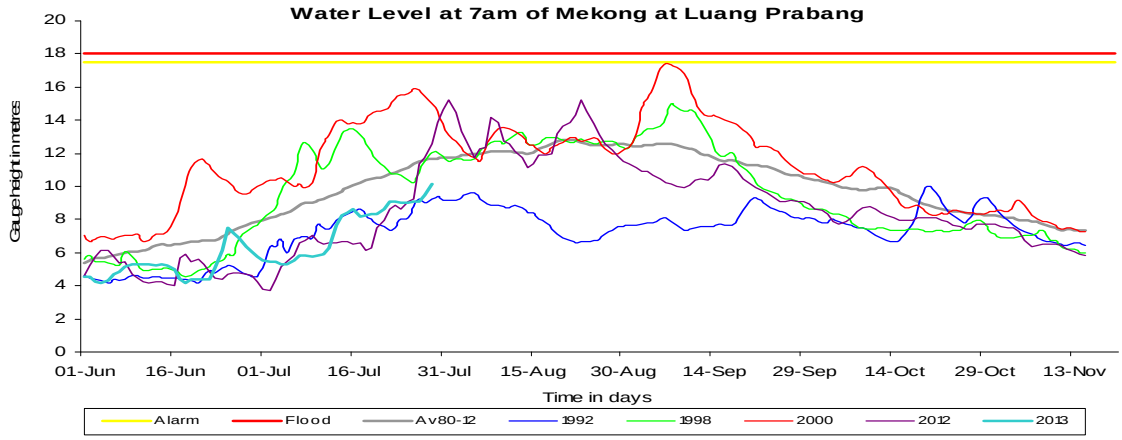
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

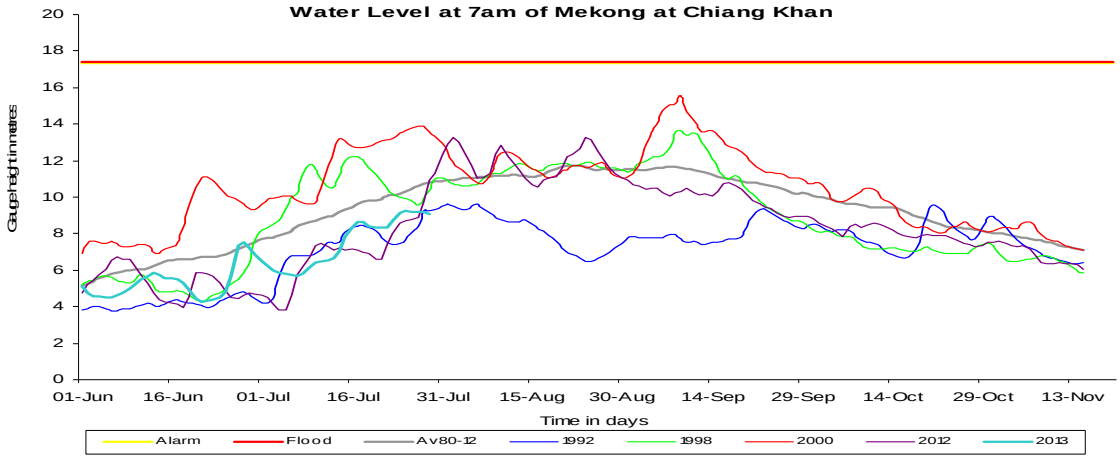
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

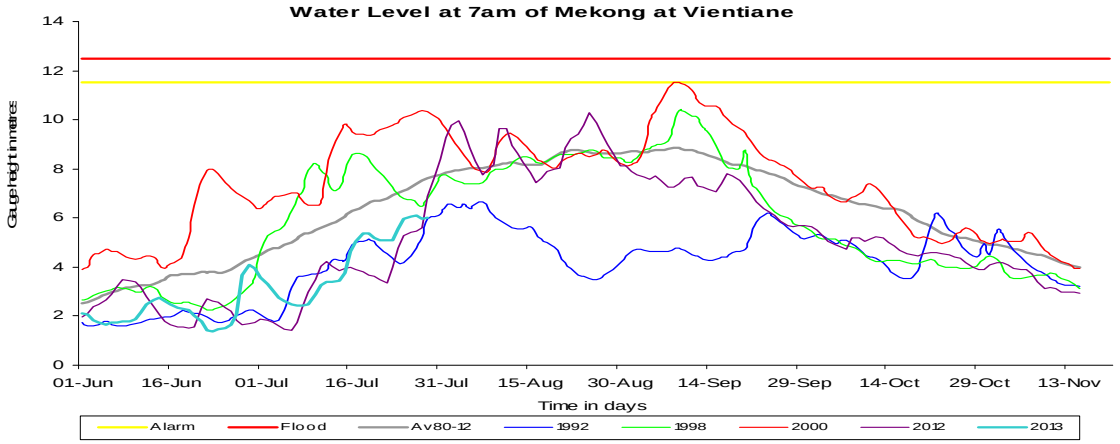
IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

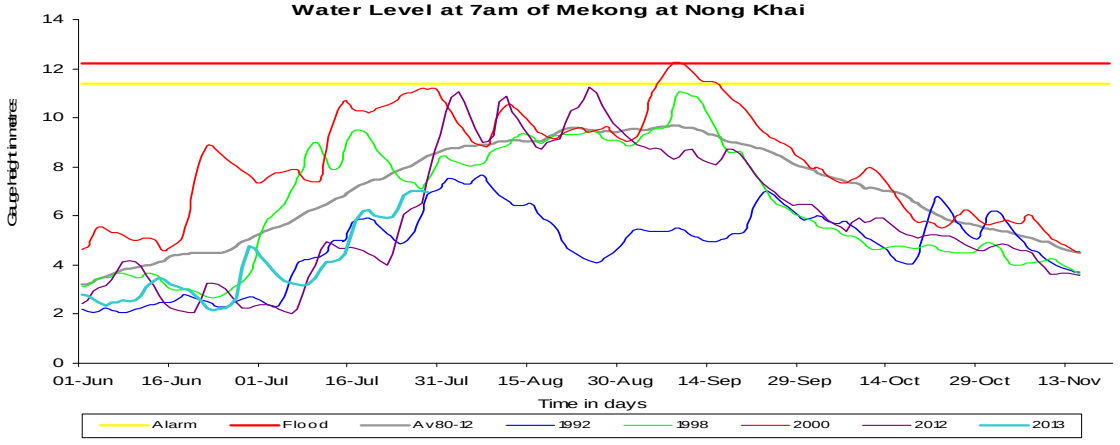


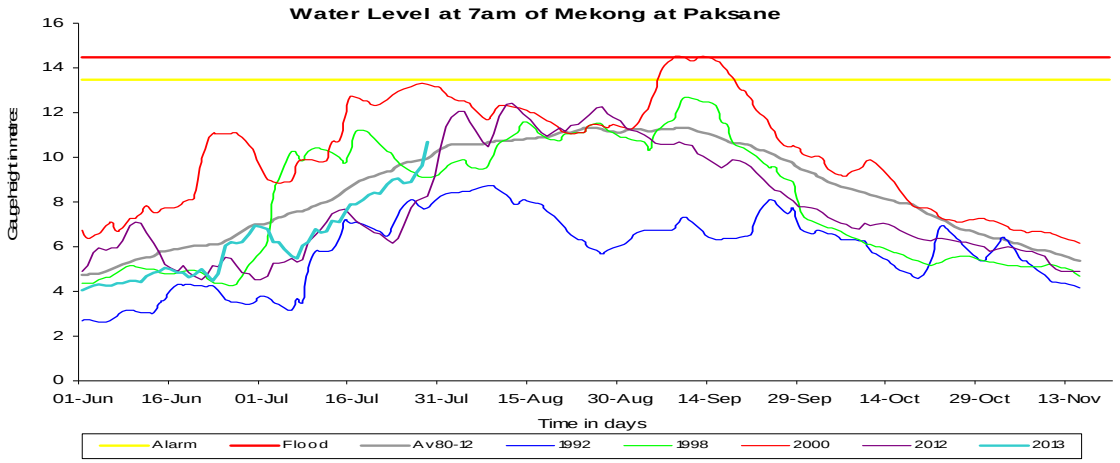


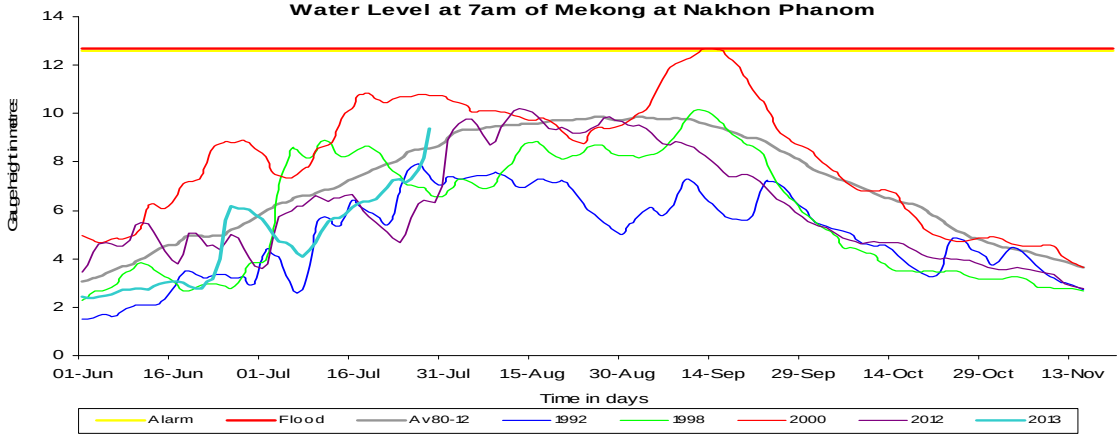


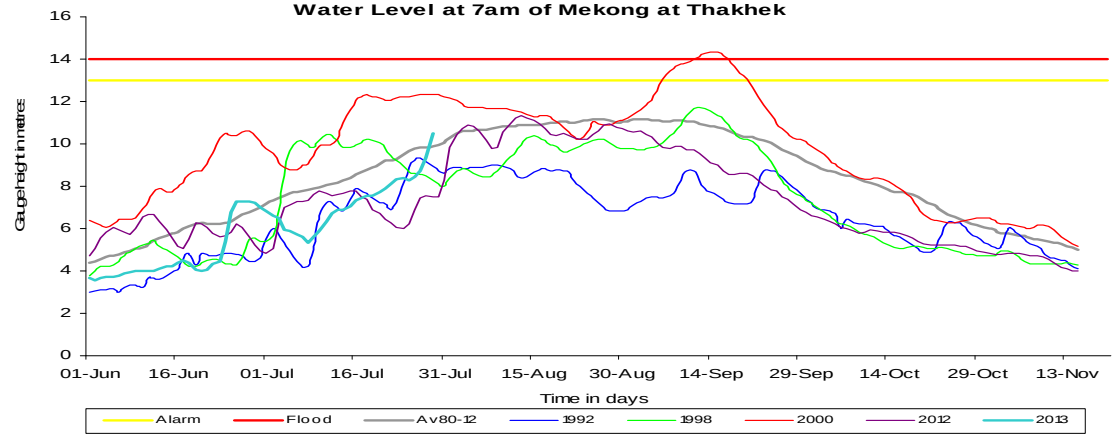

Water Level at 7am of Mekong at Chiang Khan
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

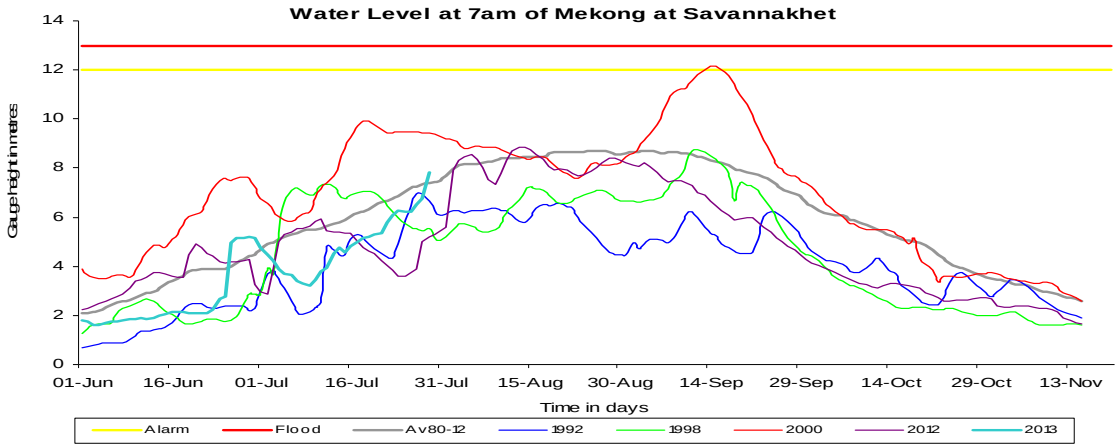

Water Level at 7am of Mekong at Vientiane
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

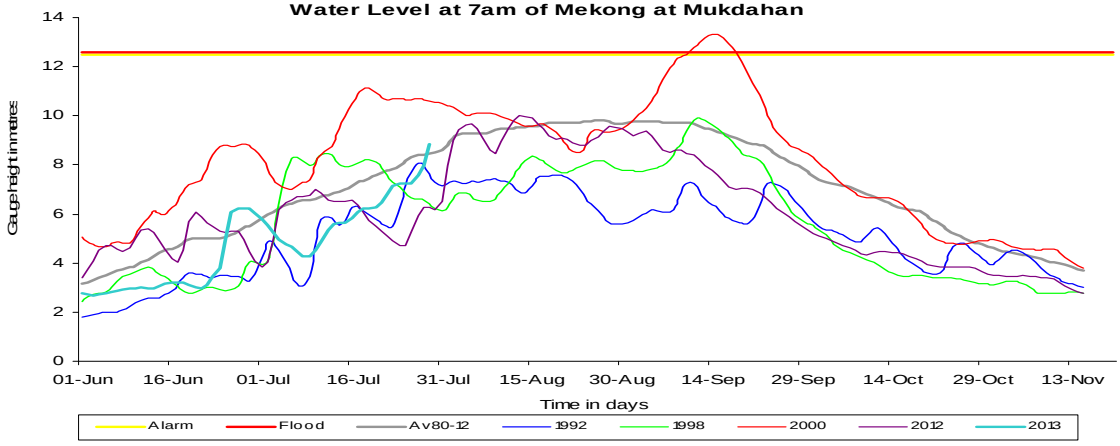

Water Level at 7am of Mekong at Nong Khai
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

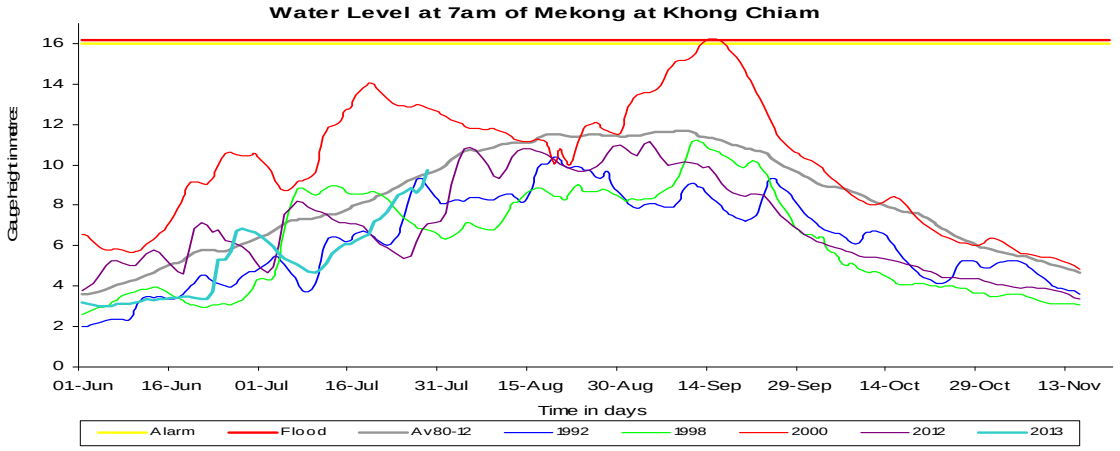

Water Level at 7am of Mekong at Paksane
Gaugeheightinmetres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

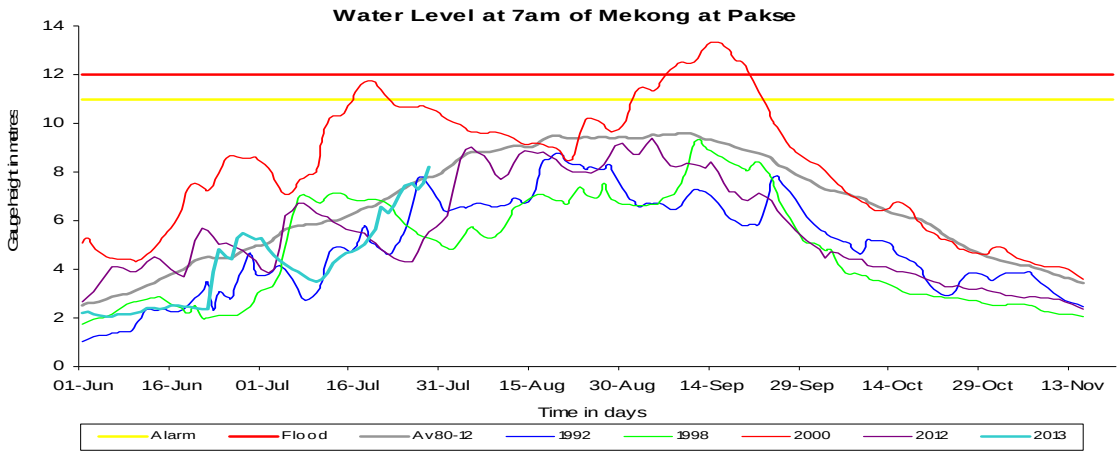

Water Level at 7am of Mekong at Nakhon Phanom
Gaugeheightinmetres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

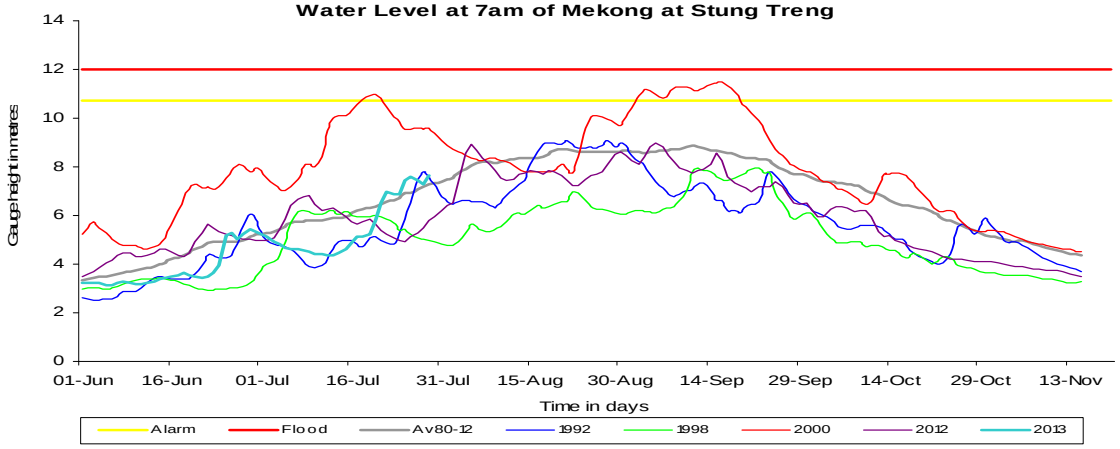

Water Level at 7am of Mekong at Thakhek
Gaugeheightinmetres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

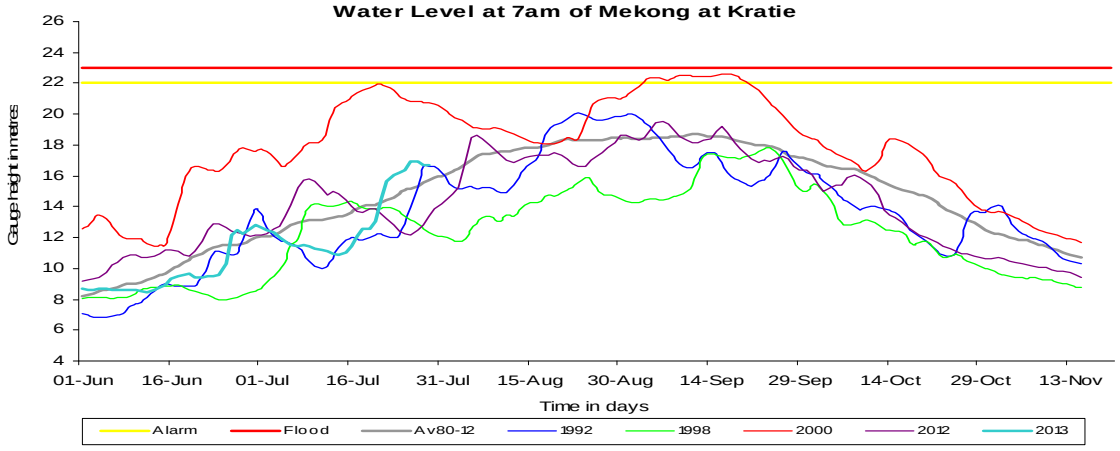

Water Level at 7am of Mekong at Savannakhet
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

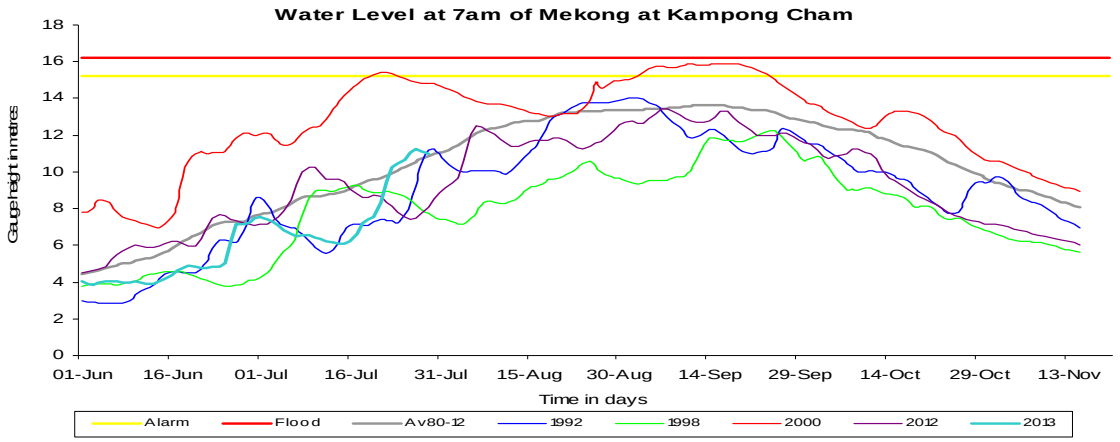

Water Level at 7am of Mekong at Mukdahan
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

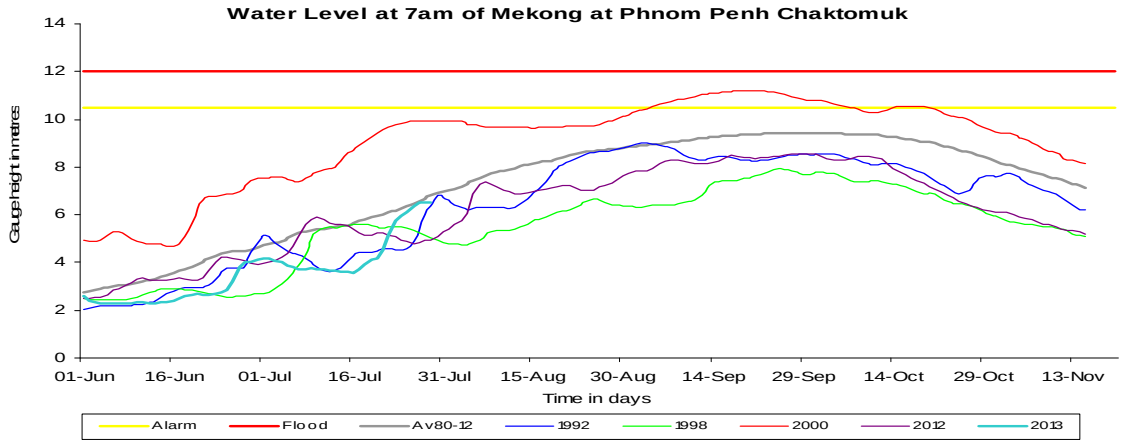

Water Level at 7am of Mekong at Khong Chiam
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

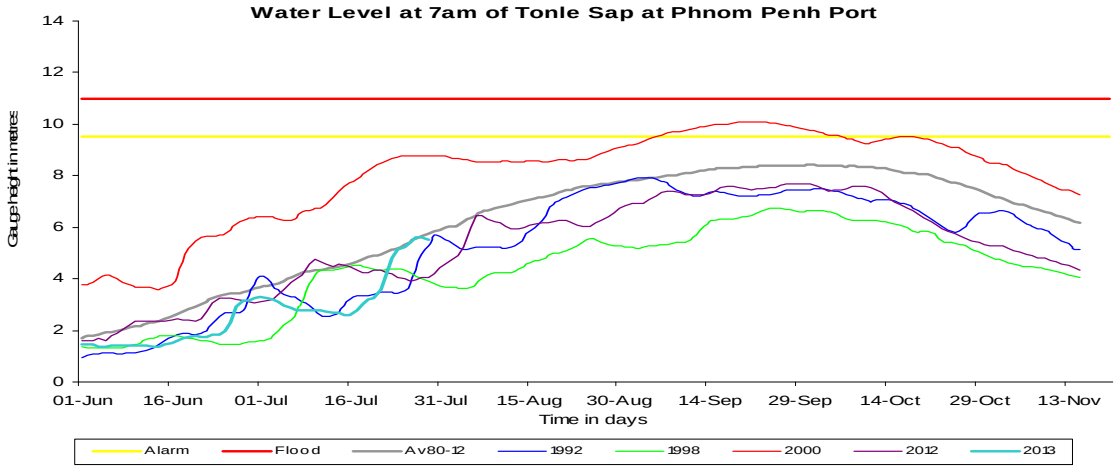

Water Level at 7am of Mekong at Pakse
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

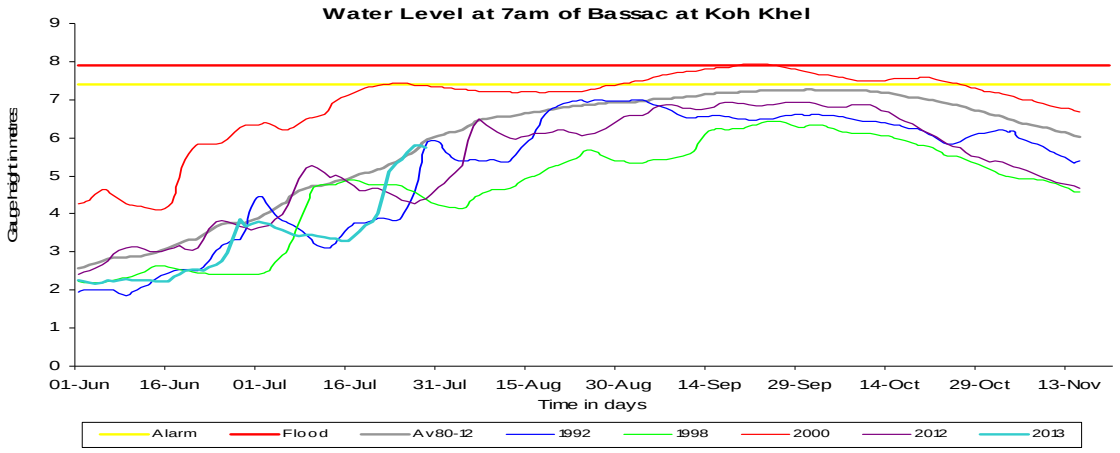

Water Level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

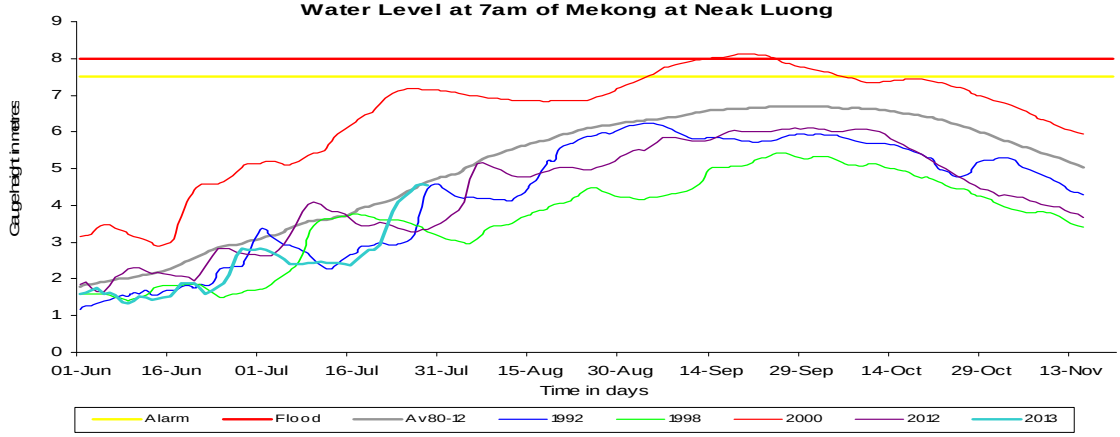

Water Level at 7am of Mekong at Kratie
Gauge height in metres
4
6
8
10
12
14
16
18
20
22
24
26
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

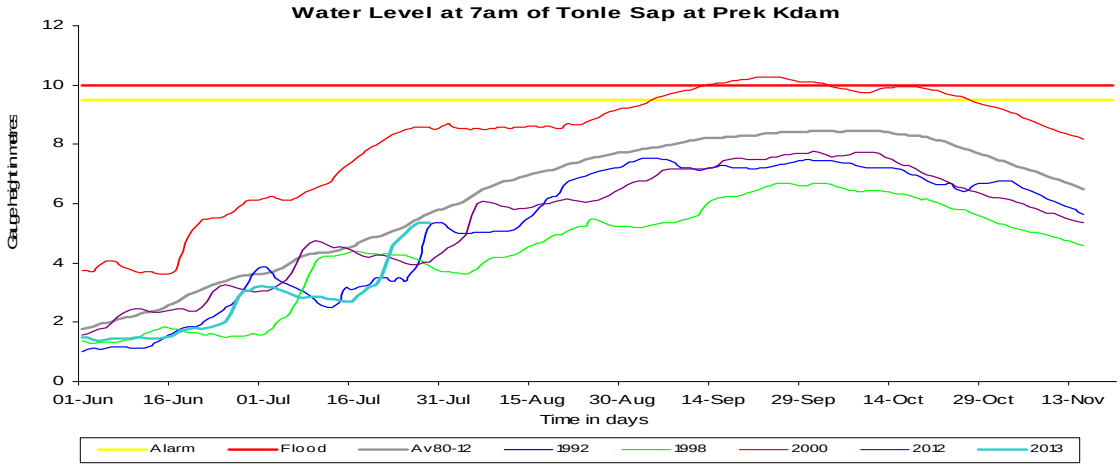

Water Level at 7am of Mekong at Kampong Cham
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

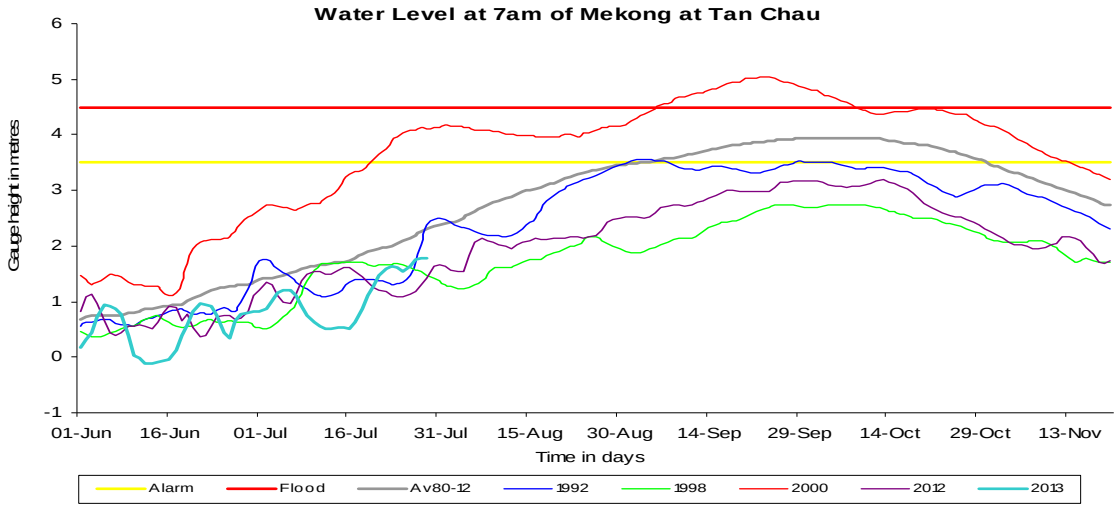

Water Level at 7am of Mekong at Phnom Penh Chaktomuk
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

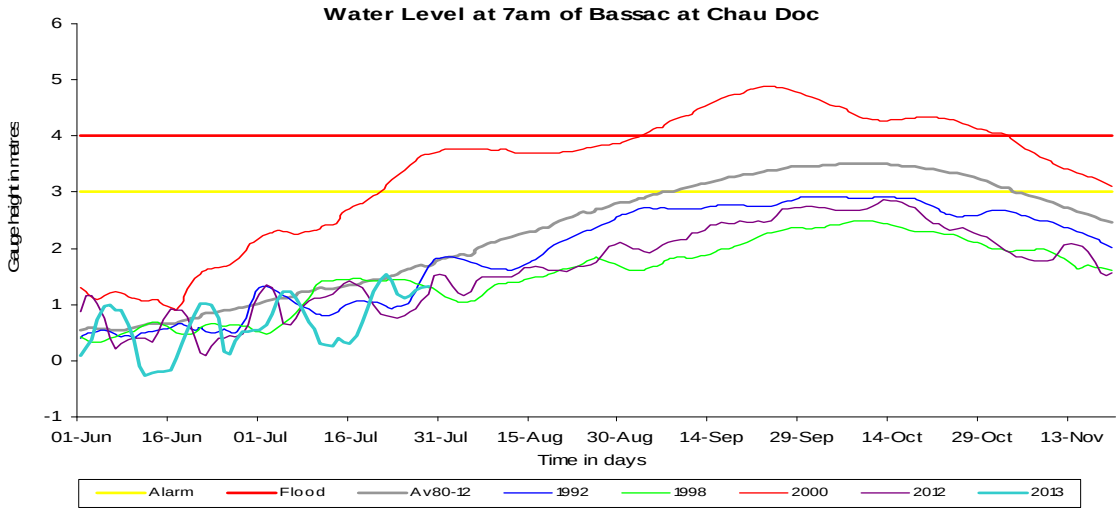

Water Level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013


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
Av80-12
1992
1998
2000
2012
2013


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
Av80-12
1992
1998
2000
2012
2013


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
Av80-12
1992
1998
2000
2012
2013


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
Av80-12
1992
1998
2000
2012
2013


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
Av80-12
1992
1998
2000
2012
2013