Mekong River Commission

Regional Flood Management and Mitigation Centre

Weekly Flood Situation Report for the Mekong River Basin

Prepared at: 23/09/2013, covering the week from the 16th September to the 23rd September 2013

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

General weather patterns

During the week of 16th September to 23rd September 2013 five weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 16th September and 22nd September are presented in the figures below:

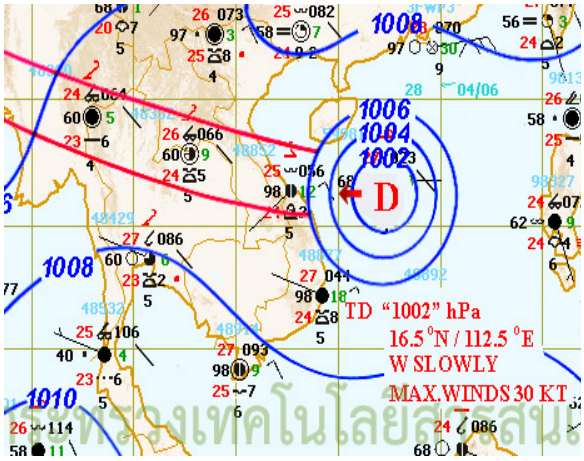


Figure 1: Weather map for 16th September 2013

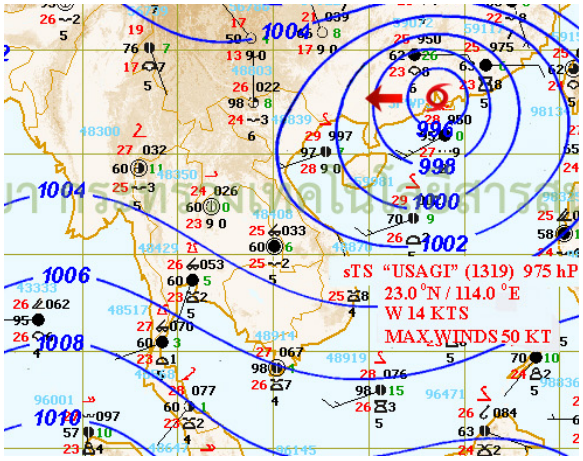


Figure 2: Weather map for 22nd September 2013

Moderate South-West (SW) Monsoon

Strong SW monsoon prevailed over Andaman Sea, the gulf of Thailand, Thailand and Indochina Peninsular during second half of last week (Figure 1 and 2).

Inter Tropical Convergence Zone (ITCZ)

ITCZ was laid across Myanmar, north of Thailand, Lao PDR and Viet Nam during last week of monitoring period.

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

TD was observed on the east of central Viet Nam and made landfall over the central Viet Nam during the first half of last week. The TS "USAGI" was centred at Guangdong, China and moved to Guangxi during second half of the last week and had less influenced on the LMB during last week.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Over weather situation

ITCZ which prevailing across Myanmar, north of Thailand, southern of Lao PDR and Viet Nam was active during last week; followed by Tropical Depression during first half of last week and strong SW monsoon in the second half of last week. As a result, scattered isolated heavy rainfall occurred in many areas in middle reaches of LMB. The amount of rainfall from 16th September to 23rd September 2013 were recorded at Mukdahan 228.9 mm (with one day maximum was 76.6 mm), Savannakhet 207.9 mm (with

one day maximum was 90.2 mm), Khong Chiam 475.7 mm (with one day maximum was 131.0 mm), Pakse 591.6 mm (with one day maximum was 188.4mm) and Stung Treng 178.0 mm (with one day maximum was 60.0mm). See Figure 3 for Weekly Rainfall Distribution covering the week 16th September – 23rd September 2013.

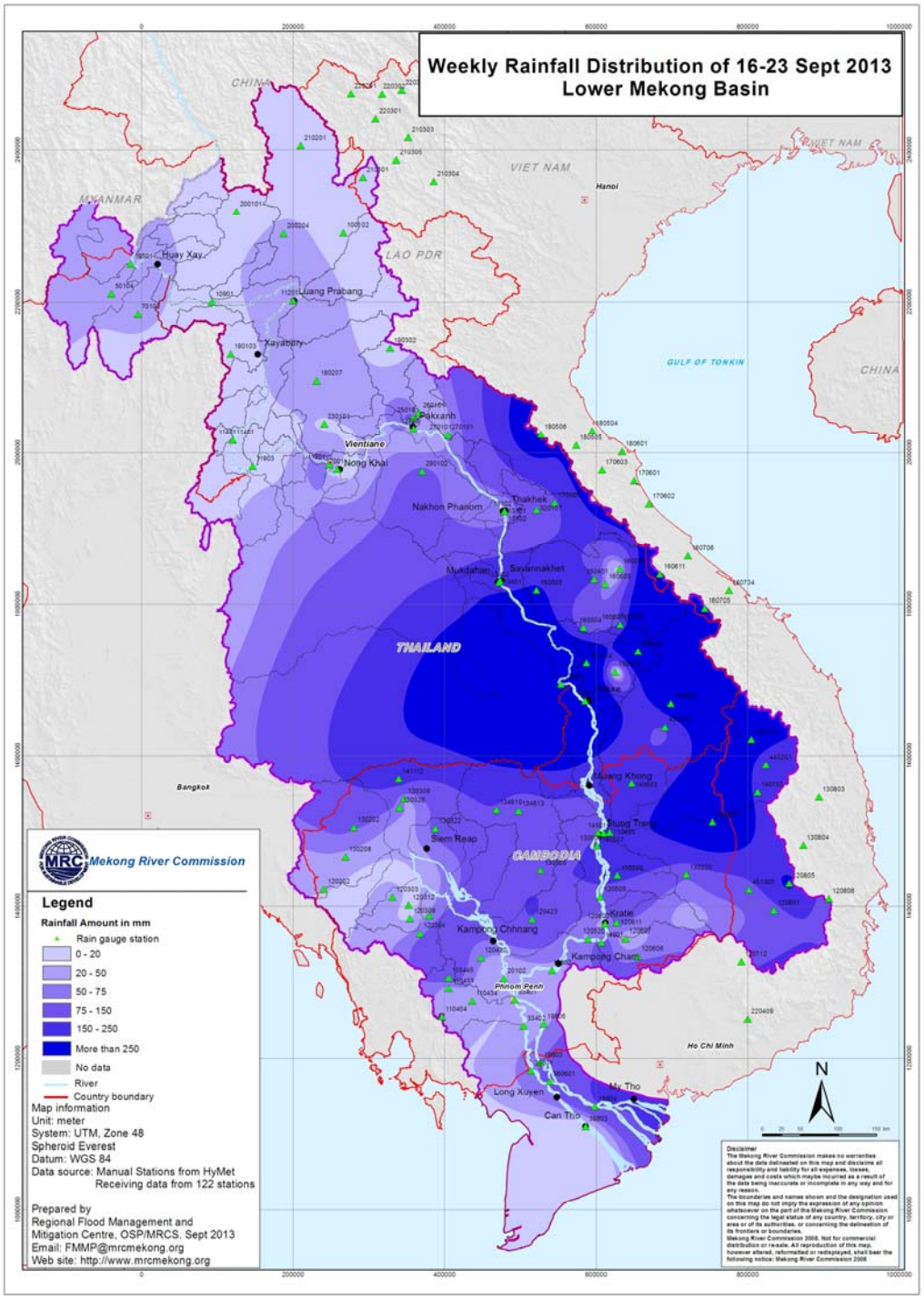


Figure 3: Weekly Rainfall Distribution covering the week 16th September – 23rd September 2013

General behaviour of the Mekong River

During last week, water levels at most stations in upper and some upstream stations of middle reaches of LMB recessed during last week below the long-term average water level (LTA); those water levels of downstream of middle reach of LMB and the lower reach of LMB were rose up during last week about/above LTA for this time of the year. However, water levels of two stations in downstream at Tan Chau and Chau Doc were less 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 recessed slowly during first half of last week and recessed quickly below LTA at the end of last week. All stations were recording water levels that were below the LTA for this time of the year.

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

Water levels of all stations started above the long-term average water level (LTA) at the beginning of last week and recessed during last week below LTA. All stations were recording water levels that were below the LTA for this time of the year.

For stations from Thakhet/Nakon Phanom to Pakse

Water levels at Thakhet/Nakon Phanom started below the LTA at the beginning of last week and recessed during last week but those of Mukdahan/Savannakhet at the beginning started about the LTA and recessed during first half of last week then rose up above the LTA for the rest of last week. Water levels at Khong Chiam and Pakse rose up during last week above LTA for this time of the year.

For stations from Stung Treng to Kampong Cham

Water levels at these stations started below the LTA at the beginning and rose up during last week above the LTA. All stations were recording water levels that were above the LTA for this time of the year.

For stations from Phnom Penh to Koh Khel/Neak Luong

Water levels at these stations started below the LTA at the beginning and rose up during last week above the LTA. All stations were recording water levels that were above the LTA for this time of the year.

Tan Chau and Chau Doc

Water levels at these stations started below the LTA at the beginning and rose up during last week below the LTA. All stations were recording water levels that were below the LTA and were less affected by the tide 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:

There were alarm stage (where the forecast is expected to reach flood level within three days) reported at Pakse, Stung Treng, Kratie, Kompong Cham and Koh Khel stations on the mainstream of the Mekong River during the last week. Water level at Pakse is expected to reach flood levels (as defined by the national agency) on 24th September 2013 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
16/09	535.40	4.27	10.41	10.96	8.48	9.72	11.30	9.16	10.25	8.93	7.89	11.10	9.35	7.96	17.50	11.96	8.30	7.45	6.78	5.90	7.42	2.92	2.49
17/09	535.35	4.28	10.45	10.57	8.10	9.32	11.02	9.07	10.15	8.98	7.94	11.58	10.05	8.86	18.45	12.35	8.37	7.52	6.82	5.95	7.47	2.99	2.55
18/09	535.34	4.26	10.43	10.32	7.65	8.90	10.82	8.93	10.00	8.88	7.83	11.94	10.30	9.54	19.55	13.04	8.50	7.71	6.89	6.02	7.57	3.03	2.58
19/09	535.34	4.27	10.14	10.22	7.34	8.55	10.60	8.67	9.74	8.76	7.72	12.89	11.07	10.25	20.40	13.60	8.67	7.81	7.01	6.12	7.73	3.04	2.54
20/09	535.33	4.12	10.02	10.08	7.20	8.34	10.16	8.41	9.49	8.76	7.71	13.56	11.77	10.87	21.05	14.12	8.89	7.90	7.15	6.28	7.89	3.14	2.63
21/09	535.33	3.87	9.81	9.81	7.00	8.11	9.96	8.21	9.31	8.61	7.57	13.34	11.77	11.40	21.72	14.55	9.08	8.18	7.26	6.43	8.01	3.22	2.65
22/09	535.34	3.72	9.49	9.66	6.72	7.78	10.00	8.27	9.39	8.59	7.52	13.39	11.65	11.48	22.12	15.05	9.27	8.28	7.36	6.57	8.16	3.28	2.64
23/09	535.35	3.59	9.12	9.54	6.58	7.58	9.70	8.23	9.32	8.73	7.69	14.04	11.90	11.53	22.30	15.38	9.45	8.44	7.44	6.70	8.31	3.36	2.70

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
16/09	69.5	10.7	nr	0.0	66.8	1.1	1.4	3.5	11.8	44.2	38.9	97.5	188.4	12.5	2.5	0.8	3.1	-	nr	1.2	nr	18.7	5.0
17/09	20.5	21.8	23.6	0.0	nr	1.8	10.6	1.4	0.8	35.0	38.5	19.0	107.4	15.0	8.0	1.0	0.6	-	0.0	0.0	nr	0.7	0.0
18/09	2.0	0.0	20.4	1.0	0.4	5.5	19.0	16.7	16.7	23.7	5.1	96.5	59.0	24.5	42.5	7.2	0.3	-	0.0	0.0	2.5	nr	-
19/09	0.0	0.0	nr	0.0	nr	0.0	0.4	13.8	16.2	76.6	90.2	131.0	153.2	27.0	5.0	24.6	5.2	-	1.7	0.0	3.2	0.7	-
20/09	0.0	1.0	nr	0.0	nr	0.7	0.6	11.1	10.5	1.2	2.3	3.5	6.6	8.5	10.5	5.5	0.4	-	0.0	0.0	0.0	1.4	9.0
21/09	0.0	0.0	nr	0.7	nr	0.0	2.4	5.0	5.8	7.2	3.7	21.5	31.2	60.0	19.5	5.0	15.9	-	24.5	43.2	7.5	40.9	40.0
22/09	0.00	0.5	nr	4.0	nr	5.8	nr	0.9	1.2	41.0	24.8	49.0	38.6	13.5	0.0	nr	0.4	-	1.6	0.0	3.4	3.9	15.0
23/09	0.00	0.0	nr	0.0	nr	0.0	nr	0.0	0.2	0.0	4.4	57.7	7.2	17.0	1.0	1.5	0.0	-	1.8	0.0	4.5	9.0	-

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

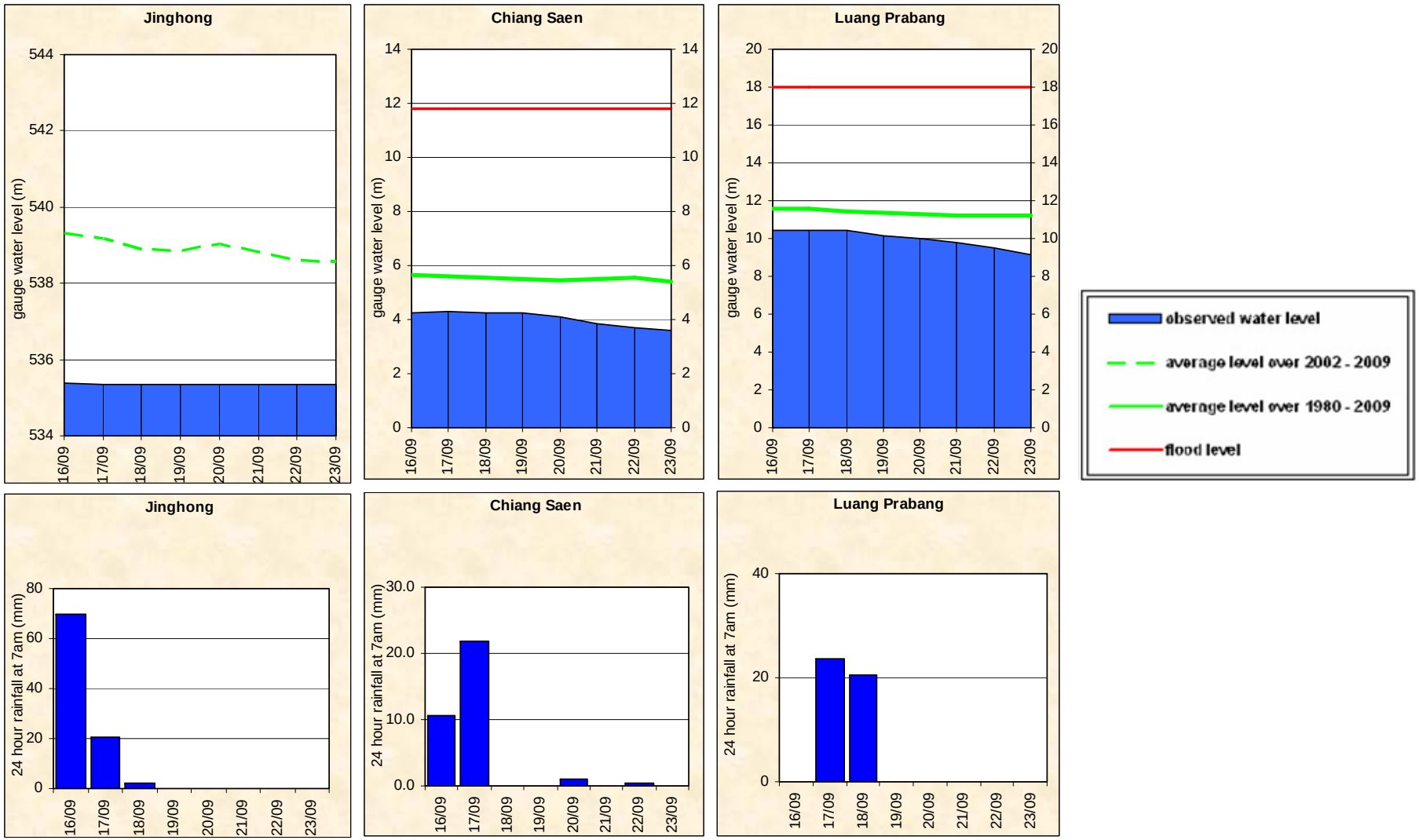


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

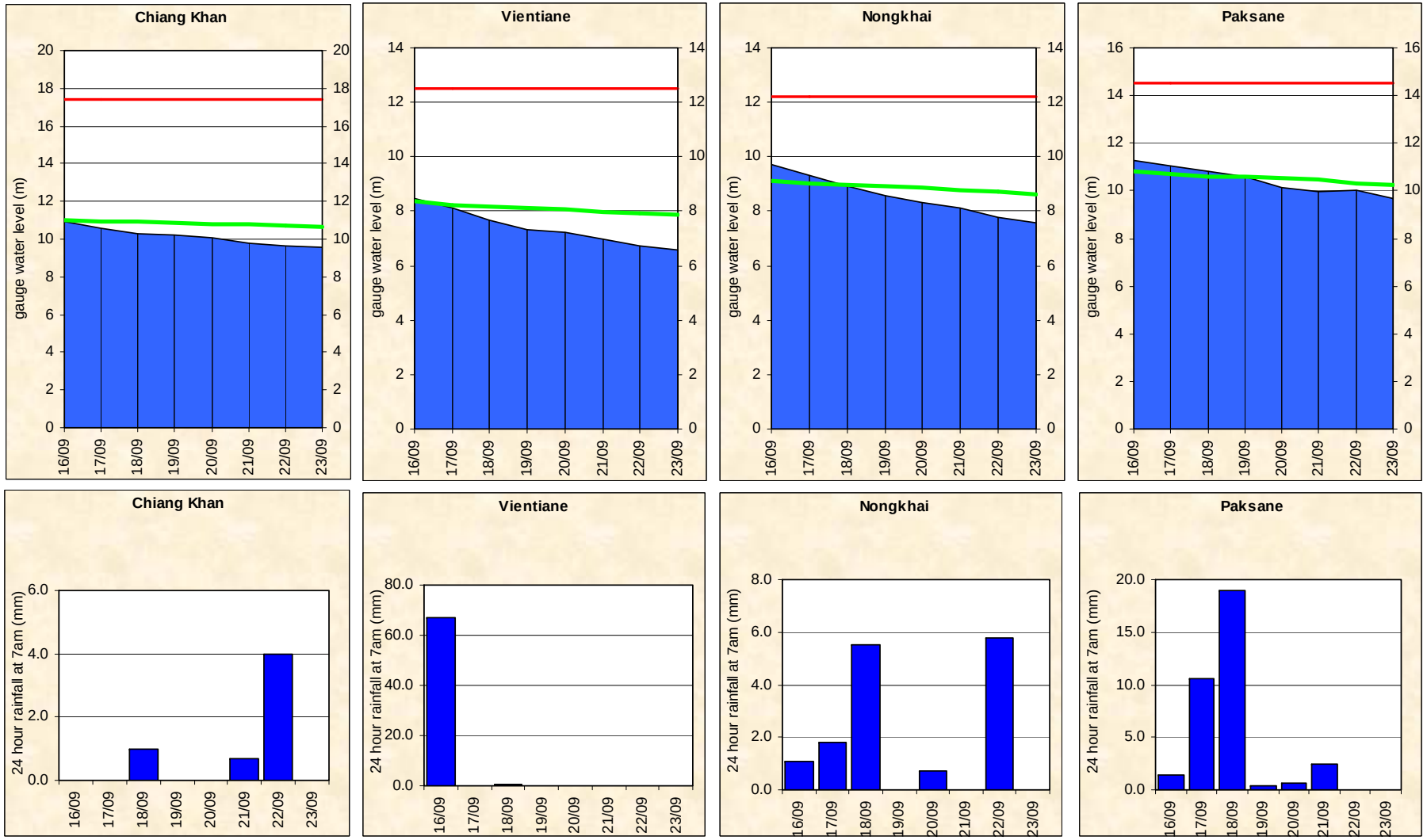


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

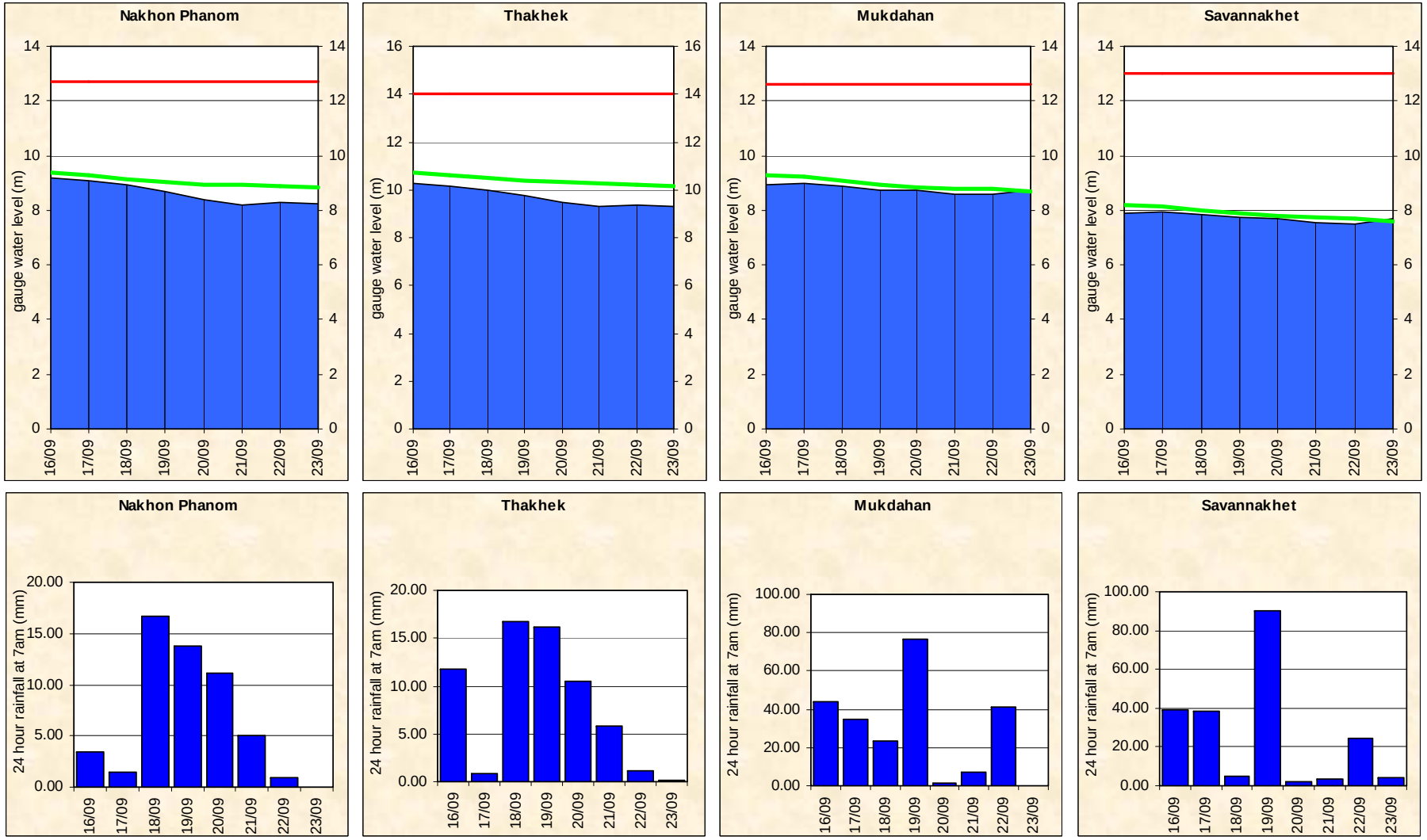


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

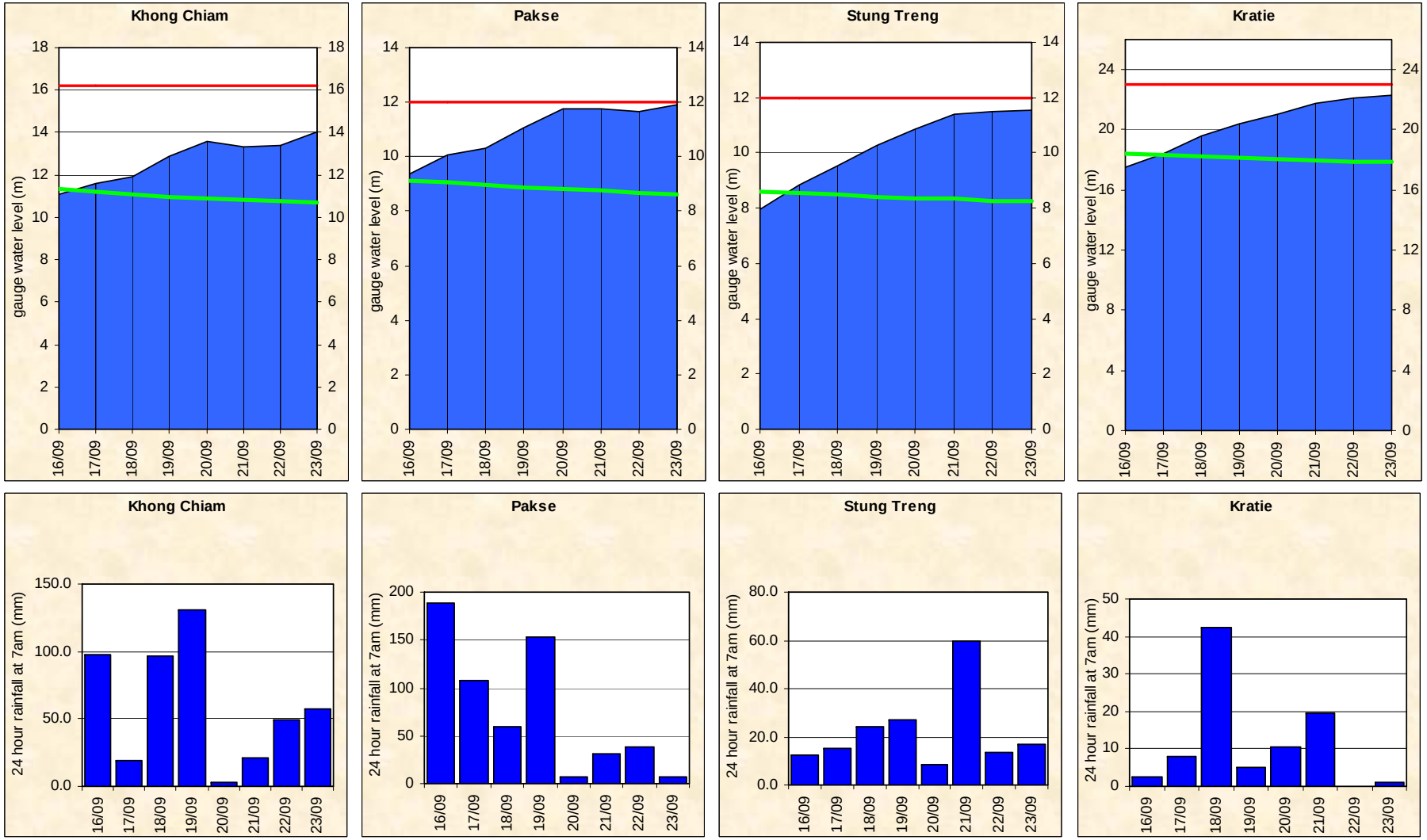


Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

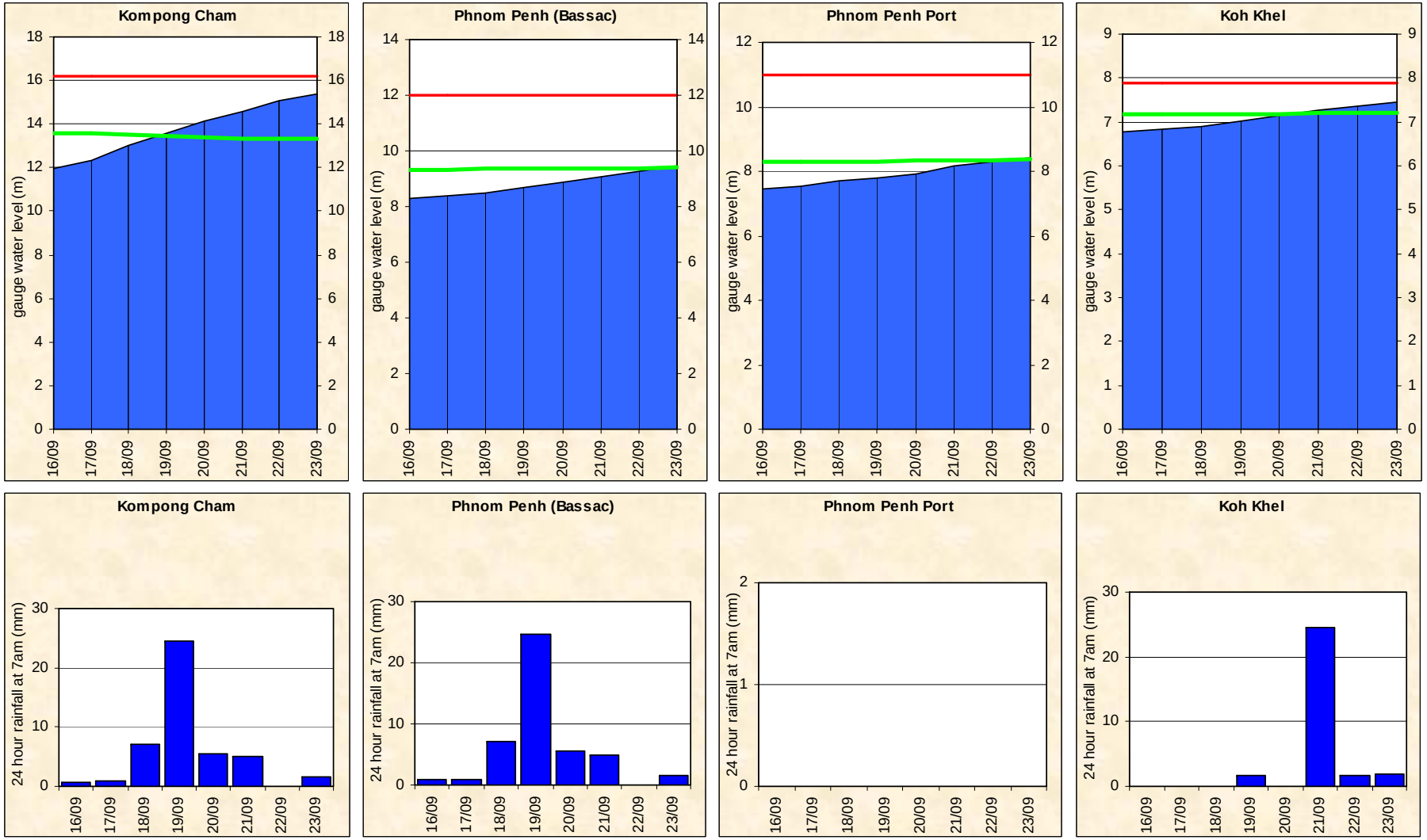
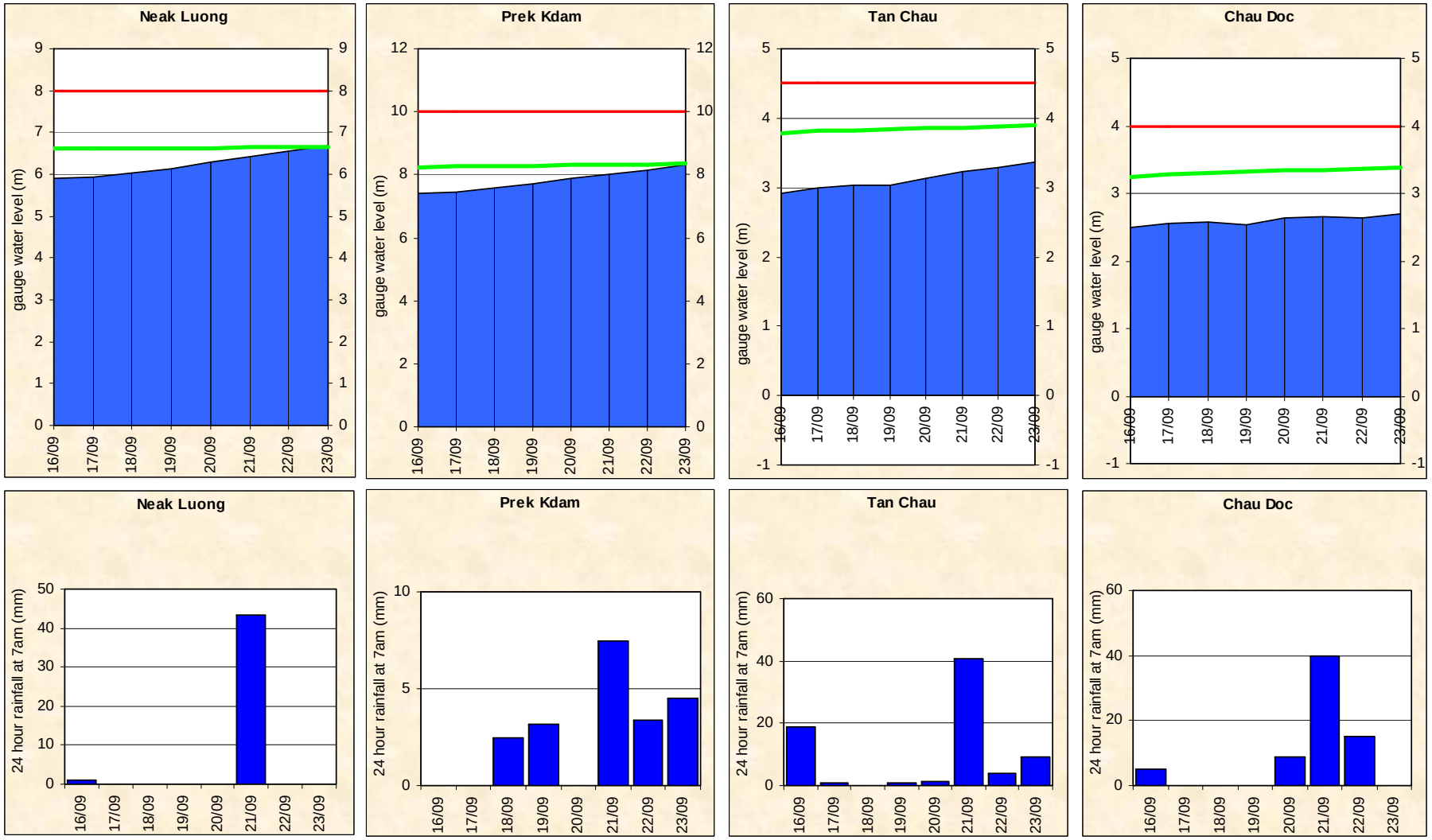


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



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 good for 1-day to 5-day forecast lead time at all stations in LMB. However, the accuracies at Khong Chiam, Pakse, Stung Treng, Kratie and Kompong Cham for 3-day to 5-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, Tropical Depression happened in many tributaries and resulted in rapid rising water levels.

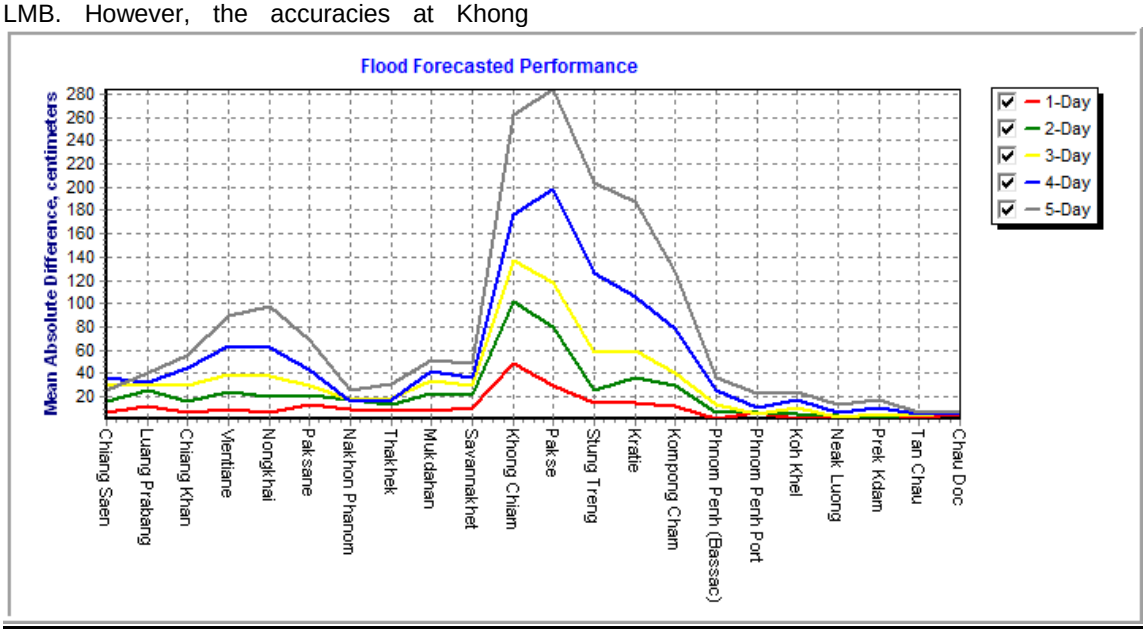


Figure B1: Average flood forecast accuracy along the Mekong mainstream

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	85.7	100.0	57.1	85.7	42.9	71.4	85.7	71.4	57.1	0.0	0.0	57.1	57.1	42.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	***73.4***
2-day	100.0	83.3	100.0	50.0	50.0	50.0	66.7	83.3	66.7	66.7	0.0	33.3	66.7	33.3	50.0	100.0	83.3	100.0	100.0	100.0	100.0	66.7	***70.5***
3-day	100.0	100.0	80.0	40.0	40.0	40.0	80.0	60.0	40.0	20.0	0.0	20.0	40.0	40.0	20.0	20.0	80.0	40.0	100.0	100.0	100.0	80.0	***56.4***
4-day	100.0	100.0	25.0	25.0	25.0	50.0	100.0	100.0	75.0	100.0	0.0	25.0	25.0	25.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0	75.0	***56.8***
5-day	100.0	66.7	66.7	0.0	0.0	0.0	100.0	100.0	33.3	66.7	0.0	0.0	0.0	0.0	0.0	0.0	66.7	66.7	100.0	100.0	100.0	100.0	***48.5***

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 informaition 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	*10:18*	*0*	*-*	*5*	*08:15*	*08:17*	*07:09*	*06:22*	*08:50*	*07:10*	*07:02*	*0*	*0*	*0*	*108*	*168*	*0*	*39*
month	*10:10*	*0*	*-*	*17*	*08:16*	*08:17*	*07:07*	*05:44*	*08:24*	*07:35*	*07:03*	*10*	*0*	*3*	*392*	*606*	*0*	*135*
season	*10:24*	*5*	*-*	*61*	*08:14*	*08:26*	*07:10*	*05:48*	*08:48*	*07:29*	*07:09*	*16*	*16*	*73*	*1183*	*2965*	*29*	*589*

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.

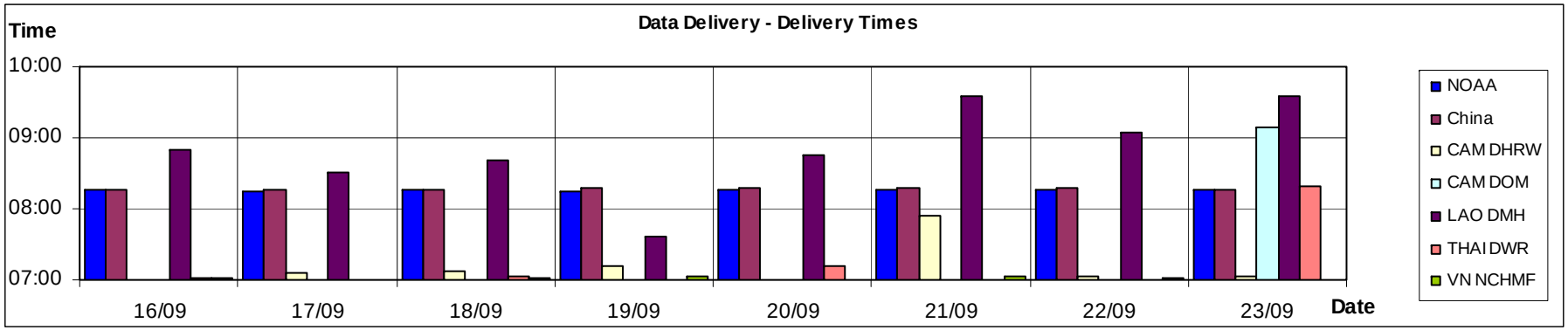


Figure B2: Data delivery times for the past 8 days including the current report date

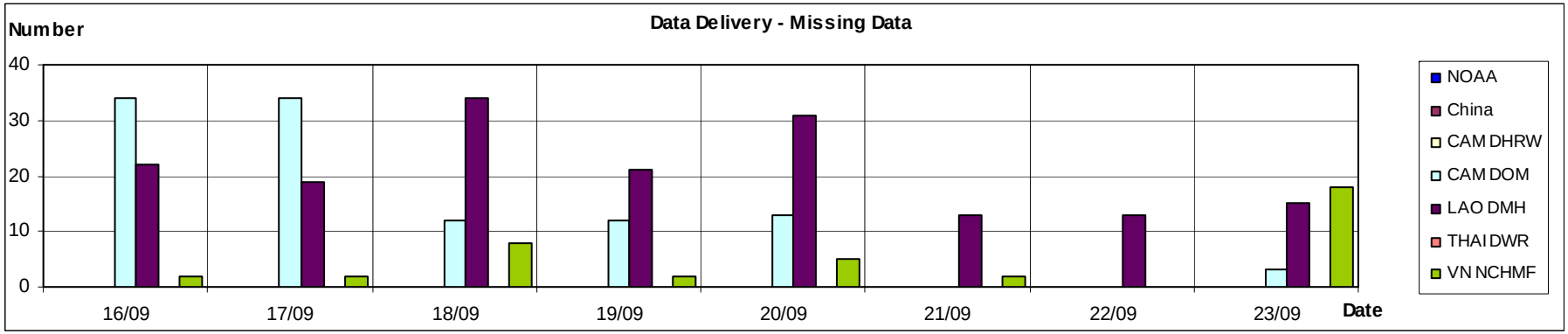


Figure B3: Missing data for the past 8 days including the current report date

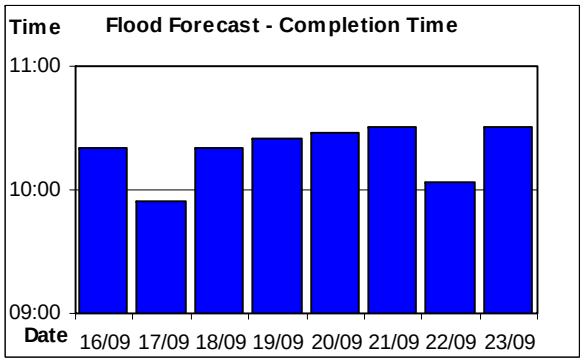


Figure B4: Flood forecast completion time

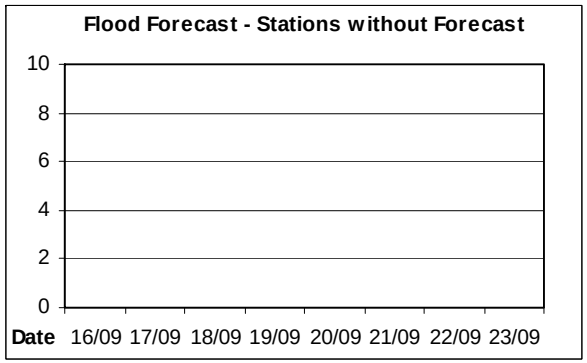


Figure B5: Flood forecast stations without forecast

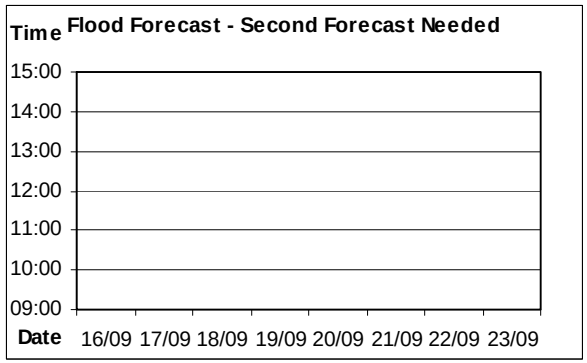


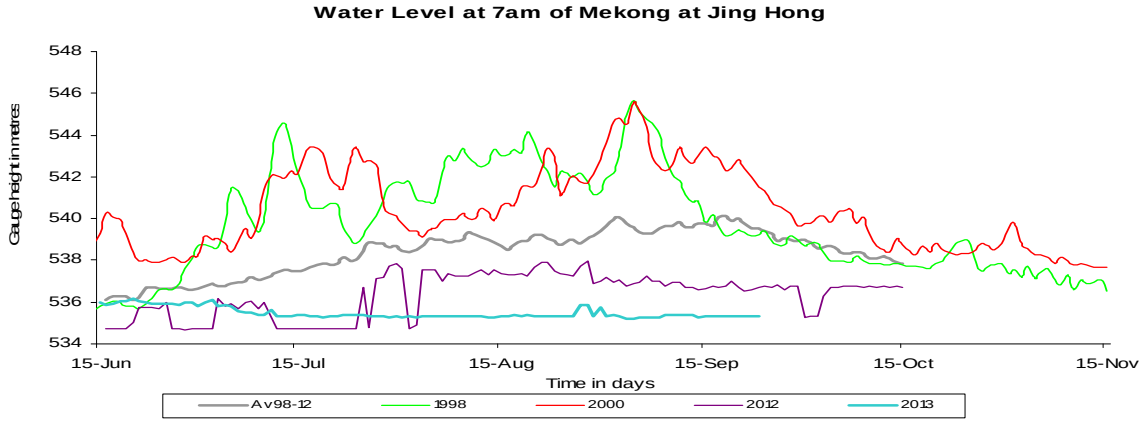
Figure B6: Second forecast needed

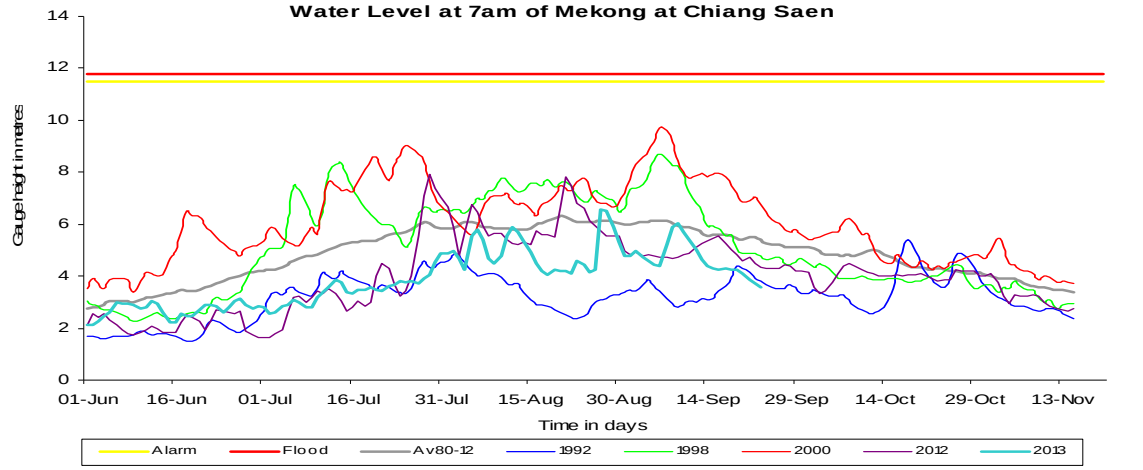
Annex C: Season Water Level Graphs

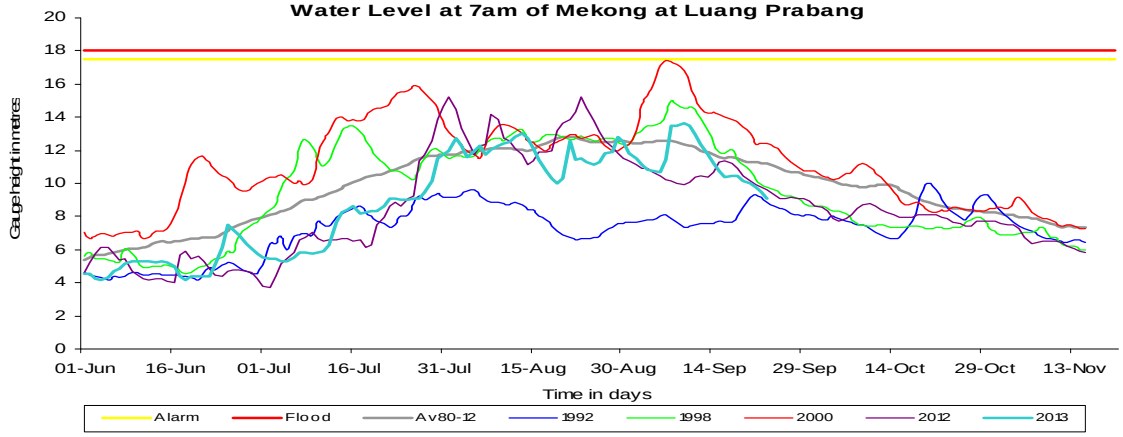
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

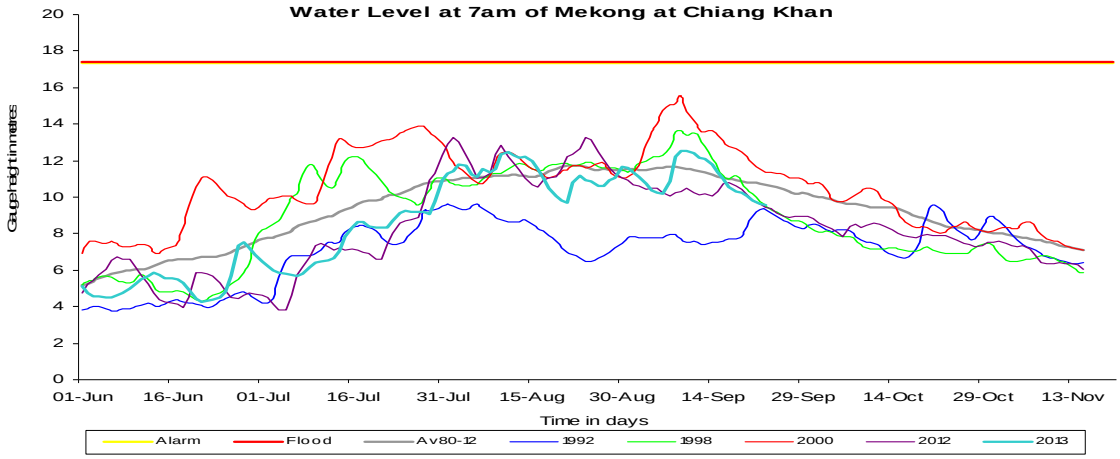
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS

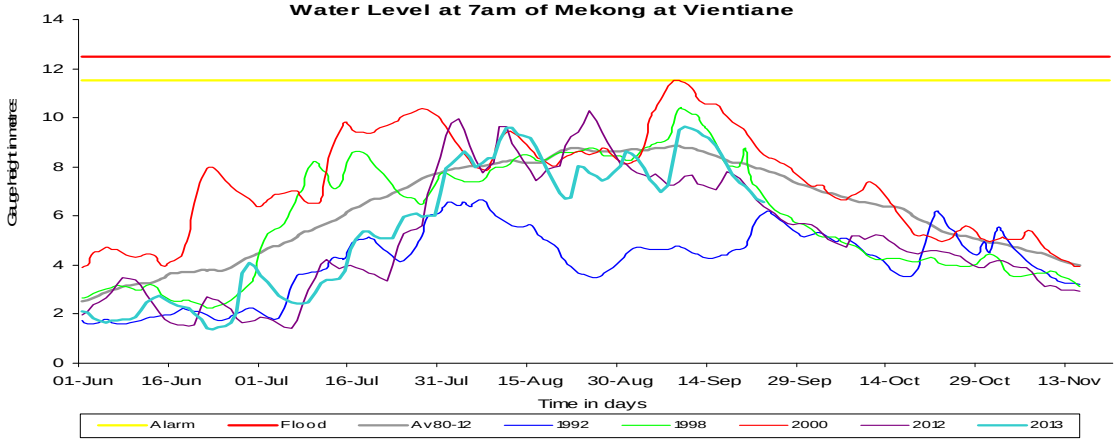
IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

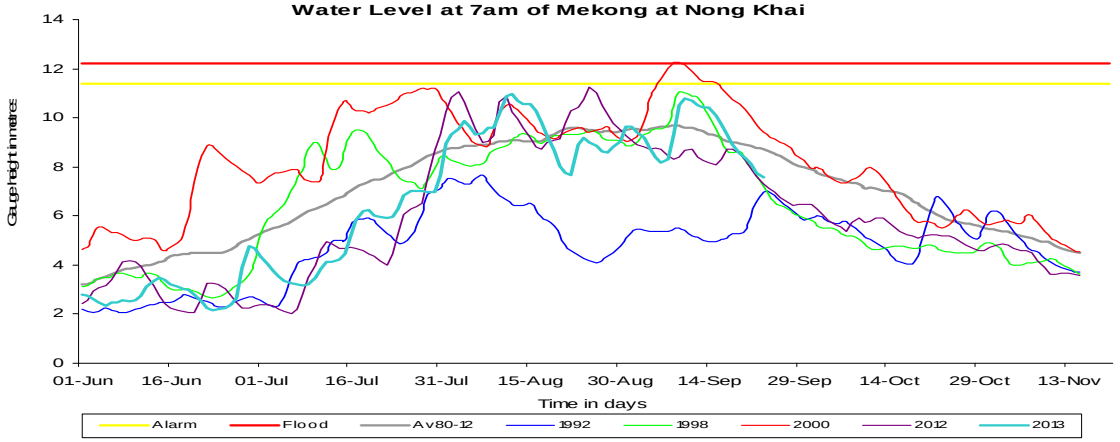


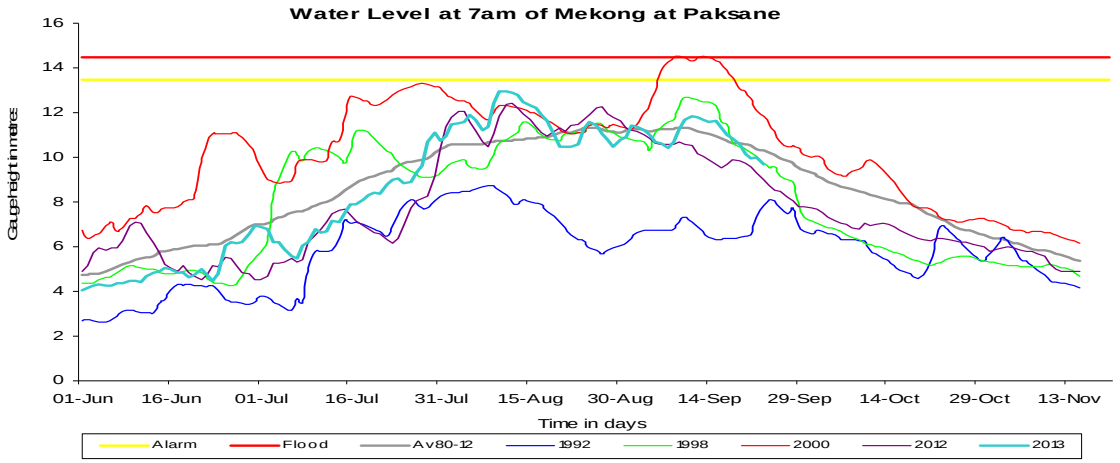


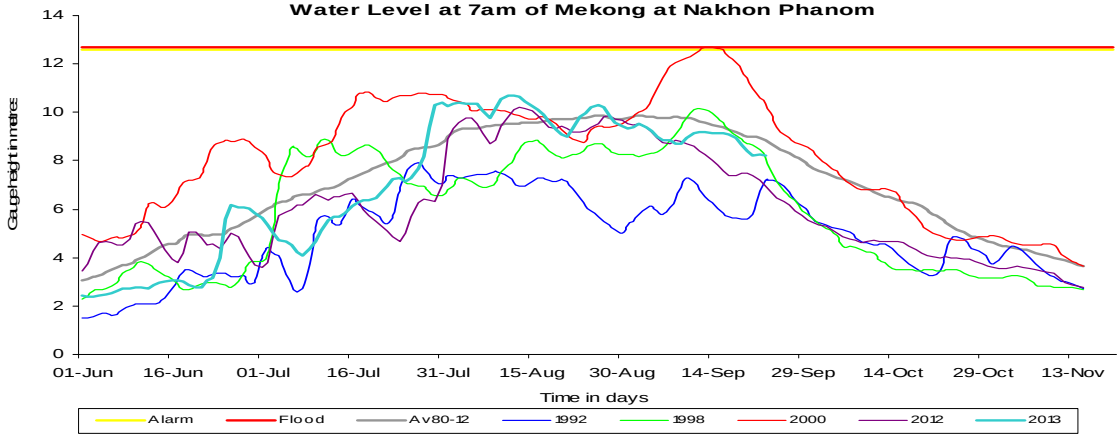


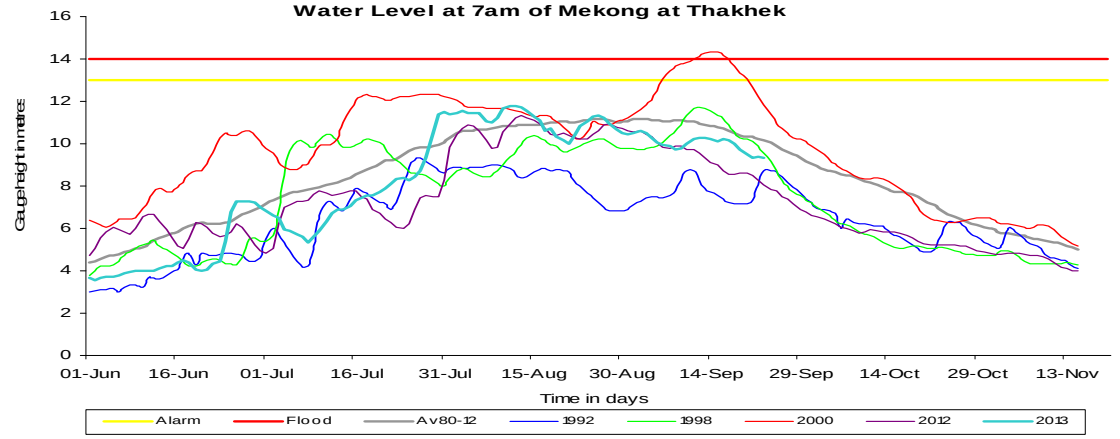

Water Level at 7am of Mekong at Chiang Khan
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

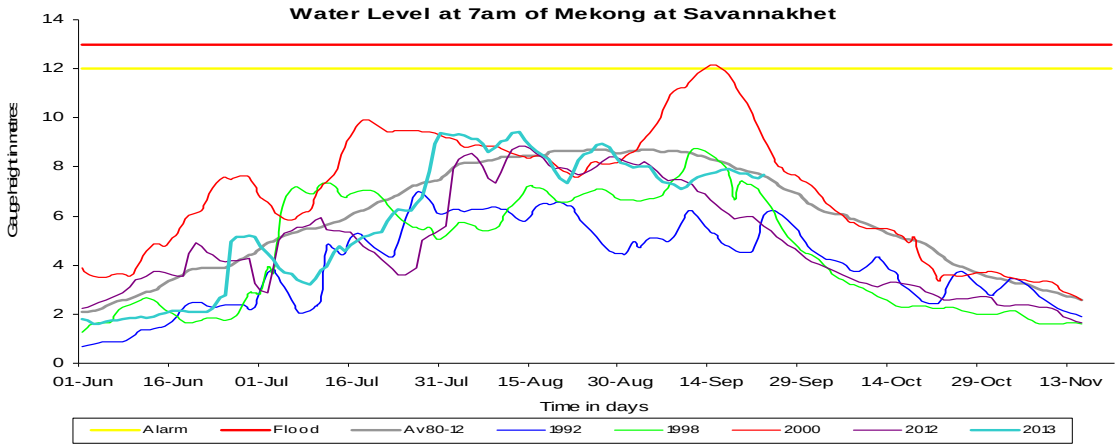

Water Level at 7am of Mekong at Vientiane
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

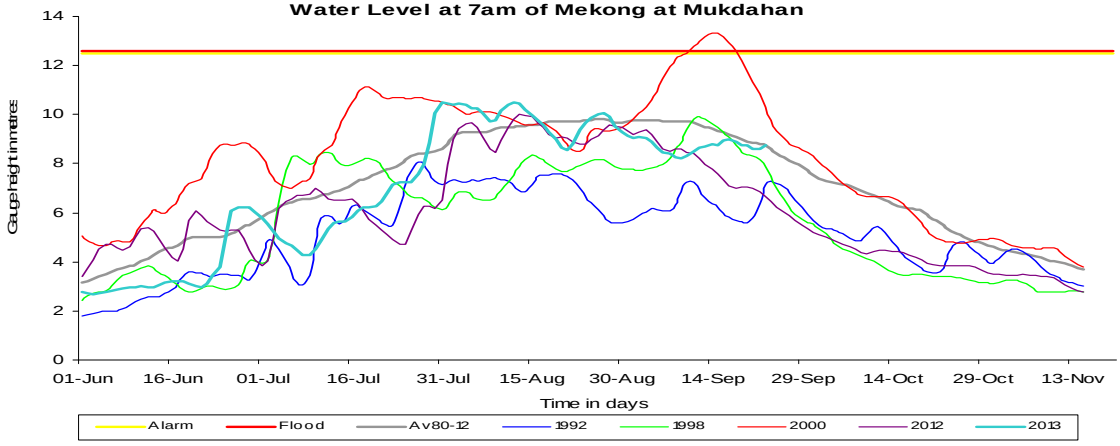

Water Level at 7am of Mekong at Nong Khai
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

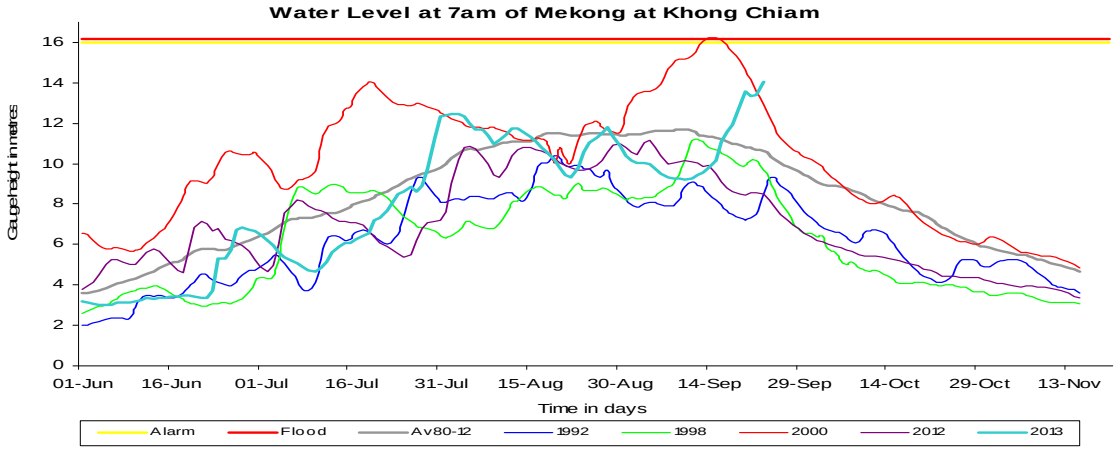

Water Level at 7am of Mekong at Paksane
Gaugeheightinmetres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

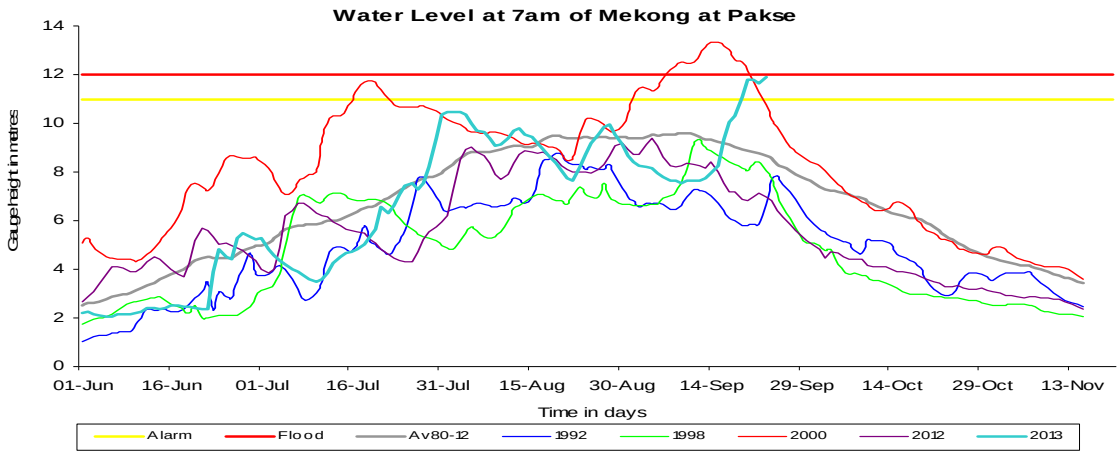

Water Level at 7am of Mekong at Nakhon Phanom
Gaugeheightinmetres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

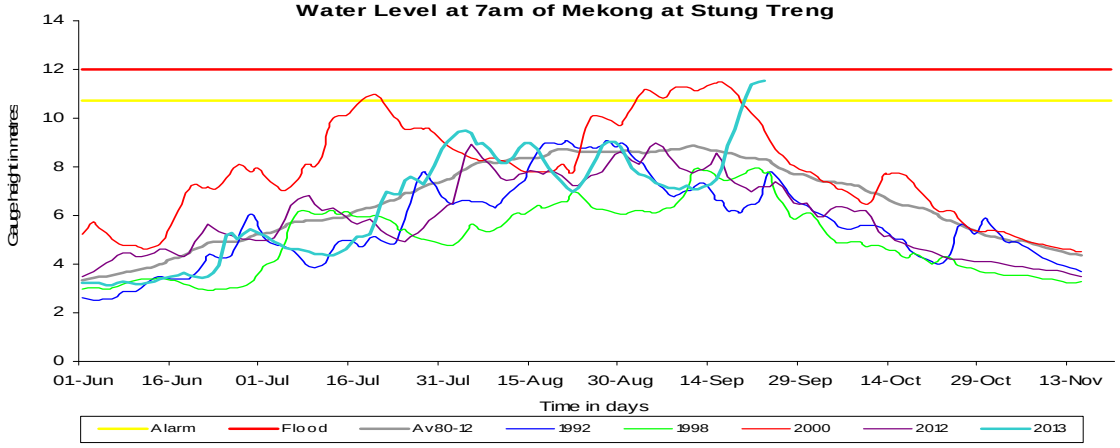

Water Level at 7am of Mekong at Thakhek
Gaugeheightinmetres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

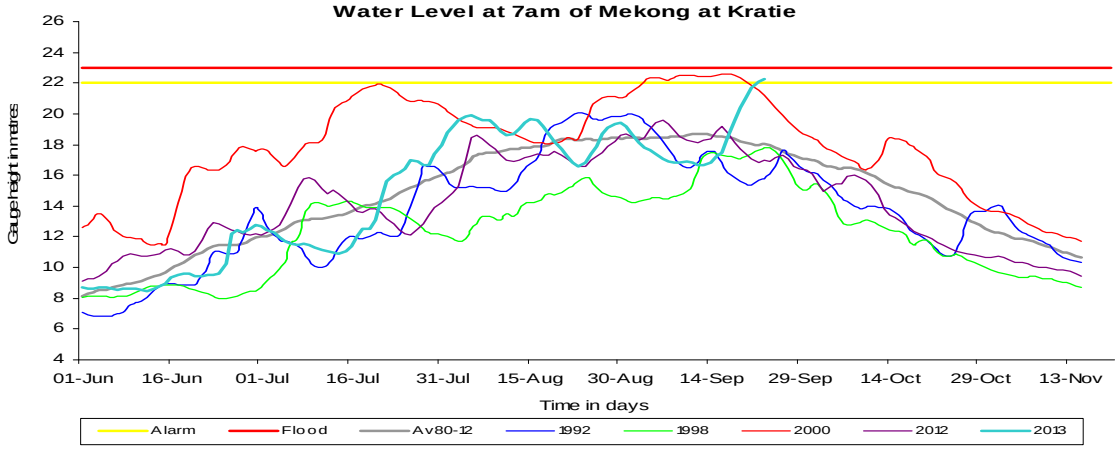

Water Level at 7am of Mekong at Savannakhet
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

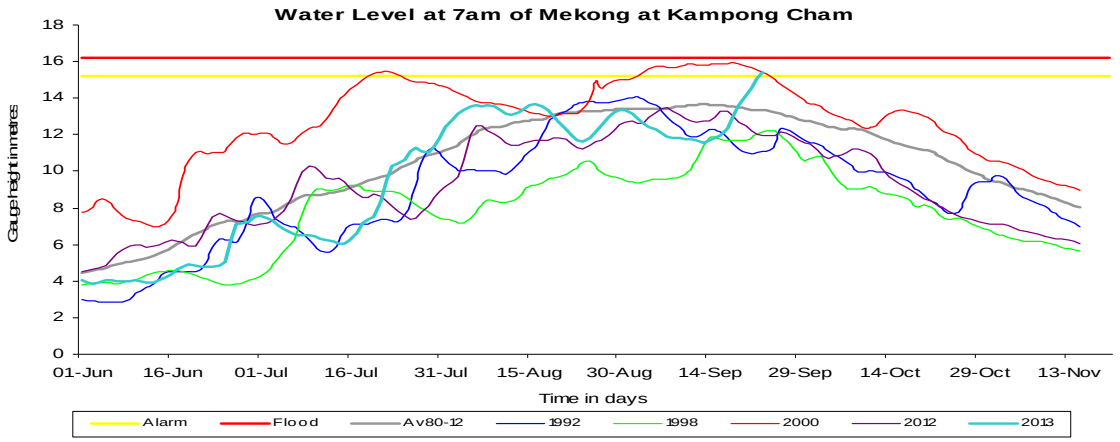

Water Level at 7am of Mekong at Mukdahan
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

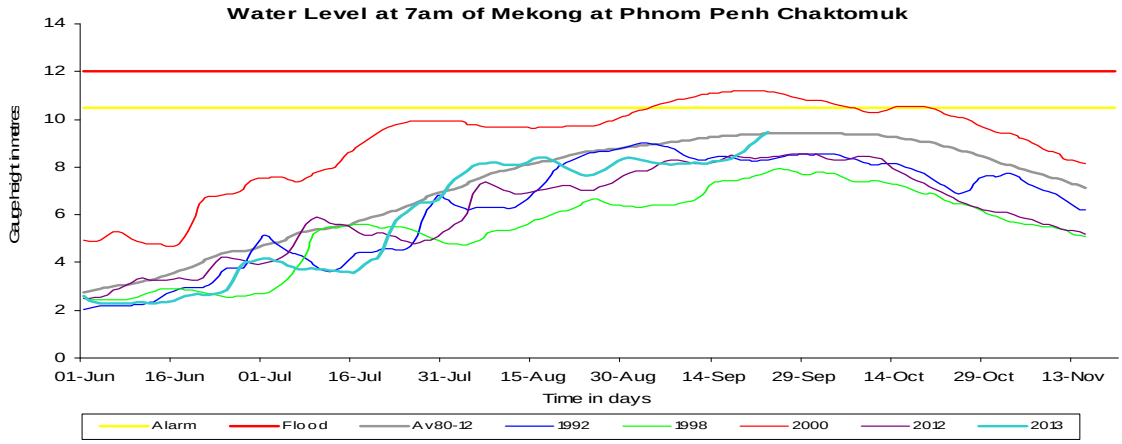

Water Level at 7am of Mekong at Khong Chiam
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

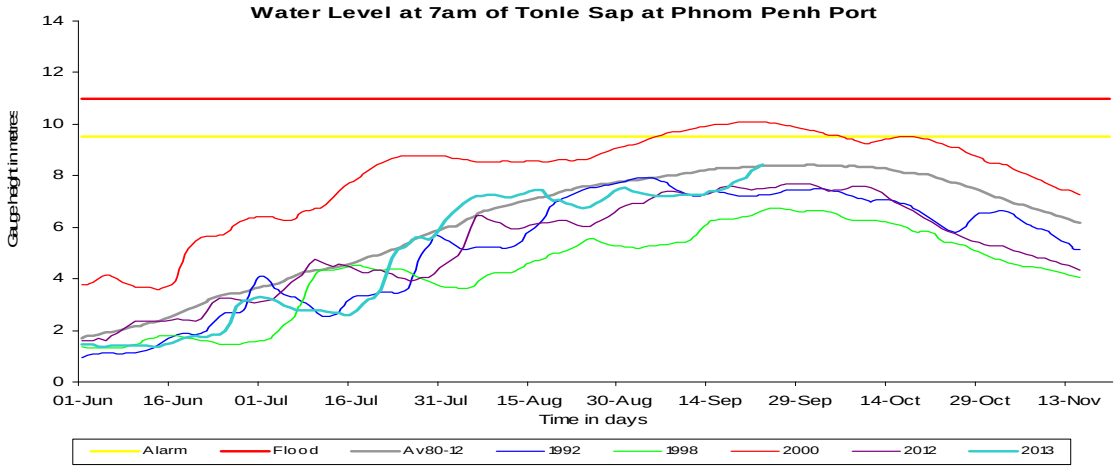

Water Level at 7am of Mekong at Pakse
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

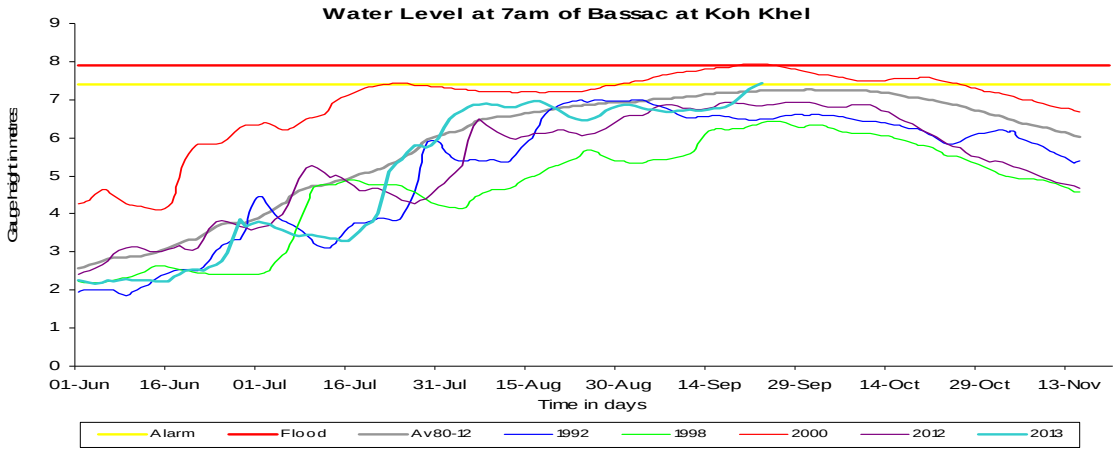

Water Level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

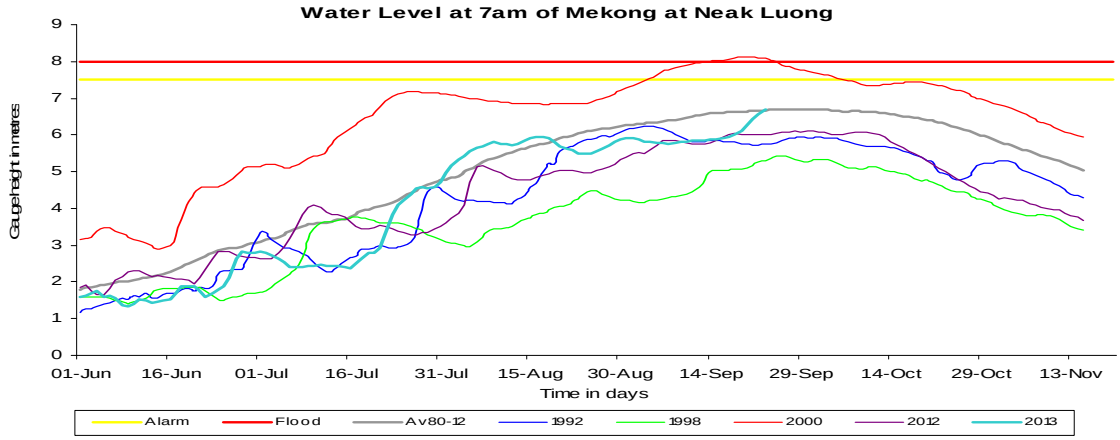

Water Level at 7am of Mekong at Kratie
Gauge height in metres
4
6
8
10
12
14
16
18
20
22
24
26
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Time in days
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

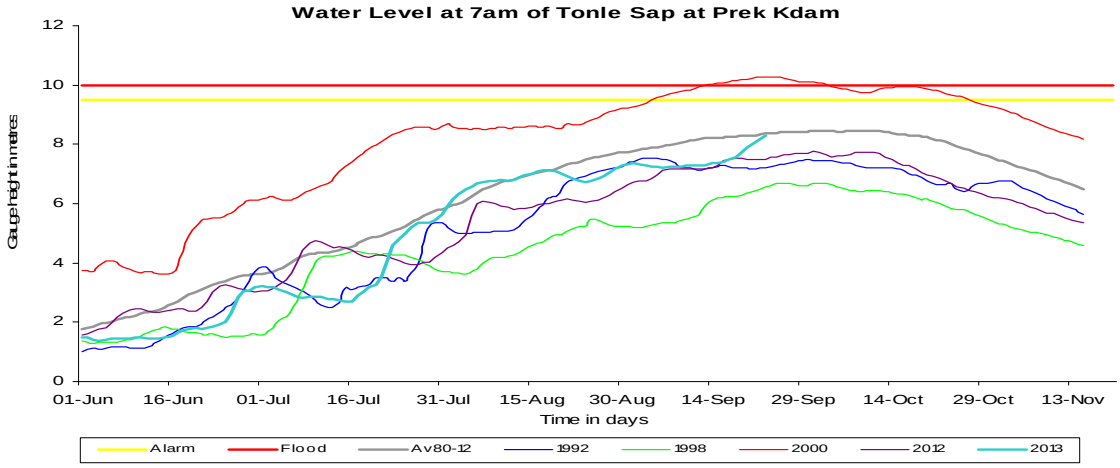

Water Level at 7am of Mekong at Kampong Cham
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

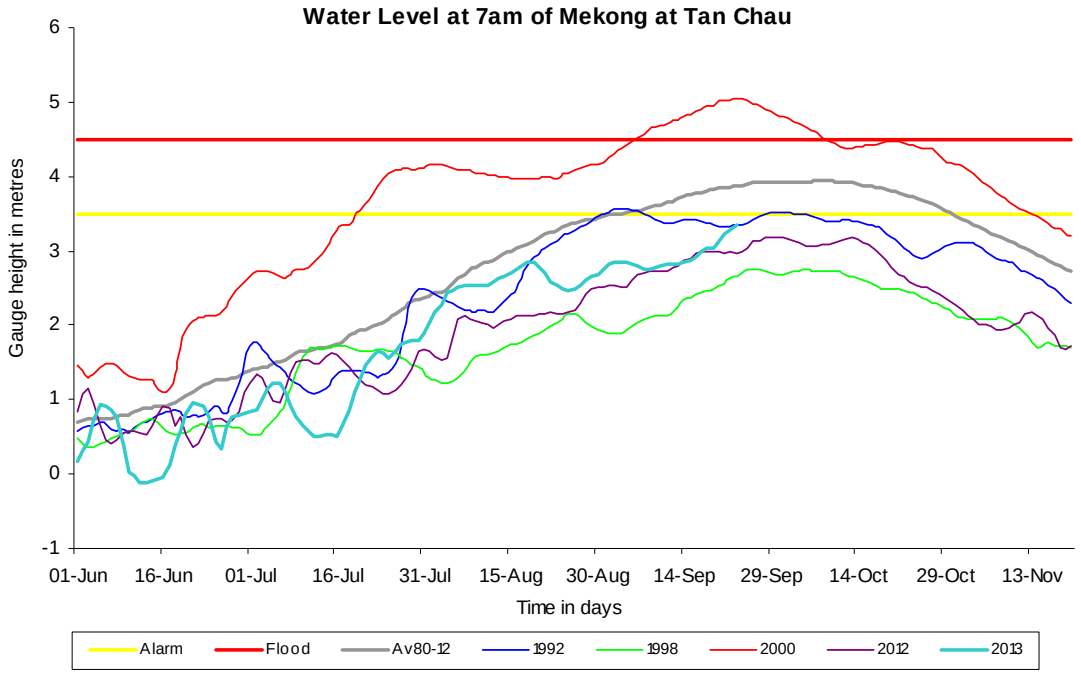

Water Level at 7am of Mekong at Phnom Penh Chaktomuk
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013

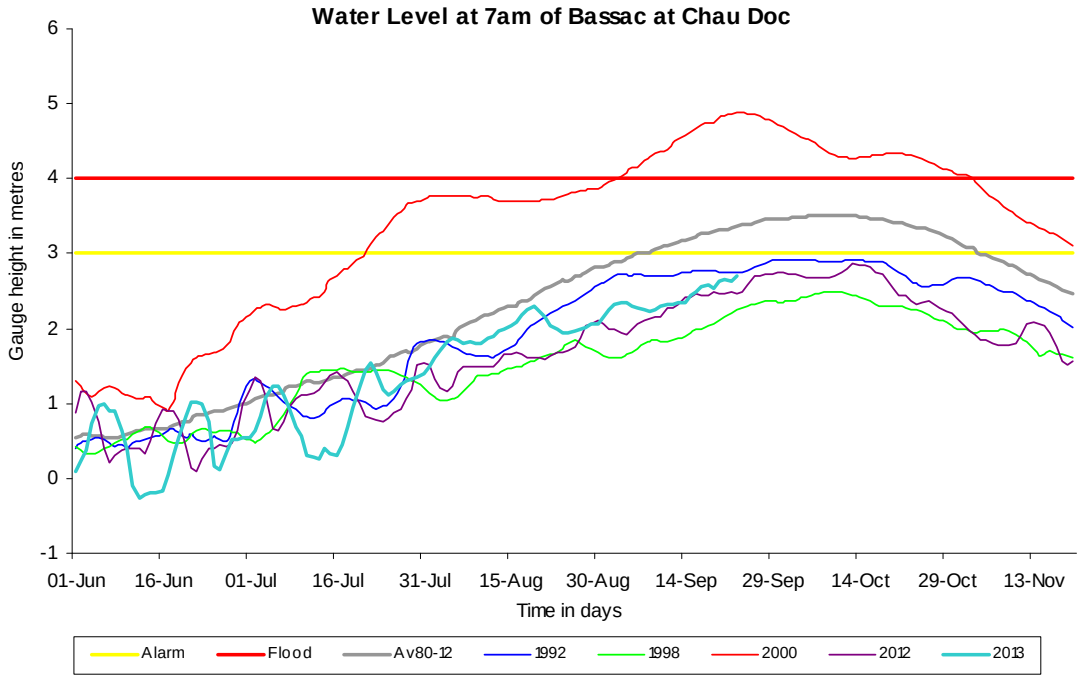

Water Level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
Time in days
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-12
1992
1998
2000
2012
2013


Water Level at 7am of Bassac at Koh Khel
Gauge height in metres
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 Neak Luong
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 Prek Kdam
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 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