

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 30/07/2012, covering the week from the 23rd July to the 29th July 2012

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

General weather patterns

During the week of the 23rd July to 29th July 2012, five weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 23rd July and 29th July bulletins are presented in the figures below:

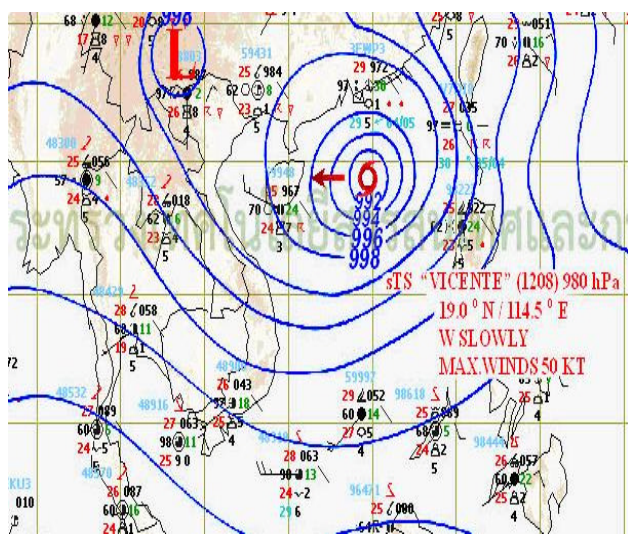


Figure 1: Weather map for 23rd July 2012

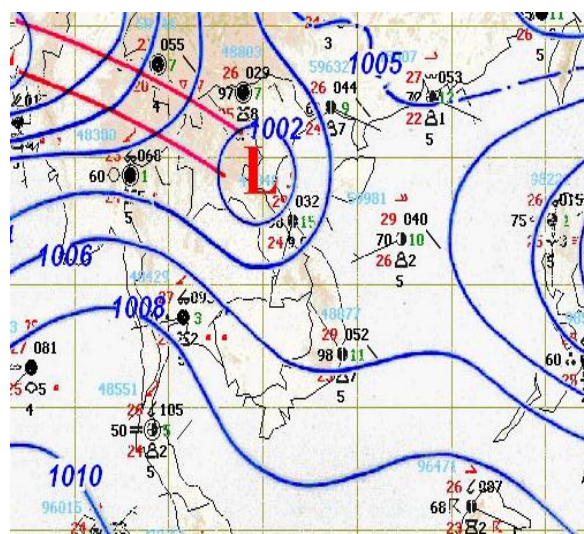


Figure 2: Weather map for 29th July 2012

South-West (SW) Monsoon

Moderate SW monsoon prevailed over Amندا Sea and the Gulf of Thailand and was stationary in the whole last week (Figure 1 and 2).

Inter Tropical Convergence Zone (ITCZ)

Inter Tropical Convergence Zone (ITCZ) was observed from 27th July till the end of the week, after Tropical Storm "VICENTE" disappeared (Figure 2).

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

A Tropical Storm named "VICENTE" (1208), which was formed in the South China Sea on the 22nd July, upgraded to the Typhoon on 23rd July afternoon when moving north-west ward close to South China coastline and made landfall on 24th July. It was downgraded into a tropical depression on 25th July and became a low pressure after moving deep into the mainland of China territory. Figure 5 presents the recorded track of Typhoon VICENTE.

Figure 3 and 4 illustrated the weather map for TY VICENTE before and after landing over South Coast of China.

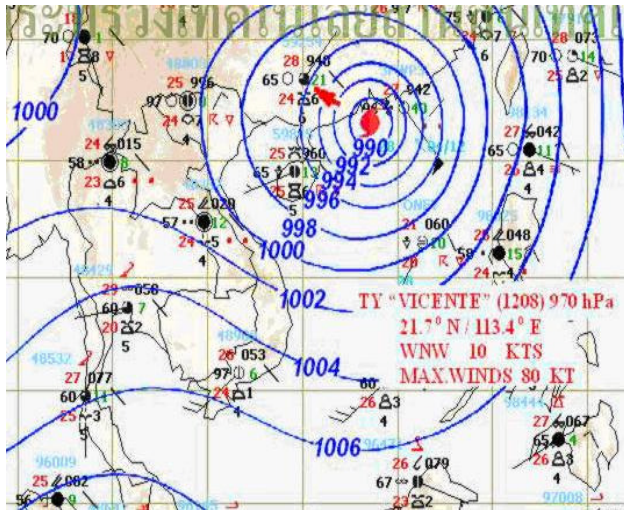


Figure 3: Weather map for VICENTE Typhoon on 24 July 2012, before landing

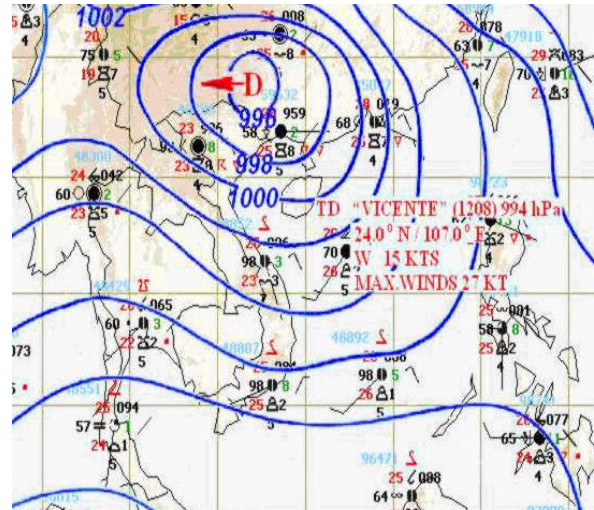


Figure 4: Weather map for VICENTE Tropical Depression on 25 July 2012, after landing

Source: Thai Meteorological Department.

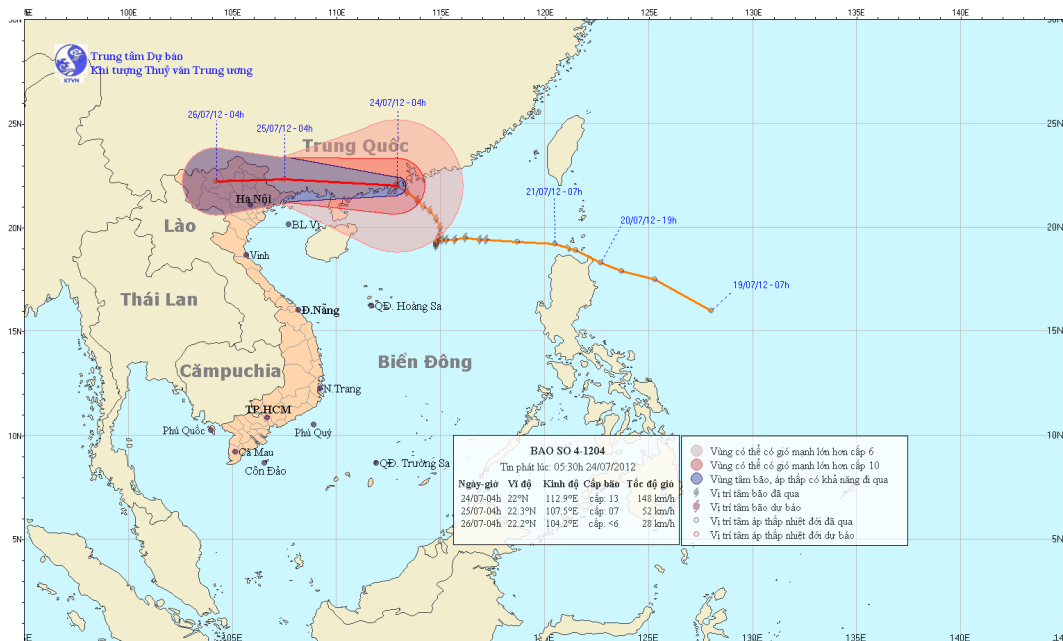


Figure 5: VICENTE Storm track

Source: Viet Nam National Centre for Hydro-Meteorological Forecasting.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Overall weather situation

A severe weather situation was occurred last week as a result of Typhoon VICENTE and ITCZ influences together with Southwest monsoon stationary during the whole week. As the result of these phenomena, heavy rain occurred in the North, Northeast of Thailand, Lao PDR, Viet Nam, in the North, Northeast and the Central of Cambodia. Figure 6 illustrates rainfall amount distribution over the LMB covering last week. The heavy rain was concentrated on upper part of the LMB and on some tributaries areas in the middle part from Nakhon Phanom to Pakse.

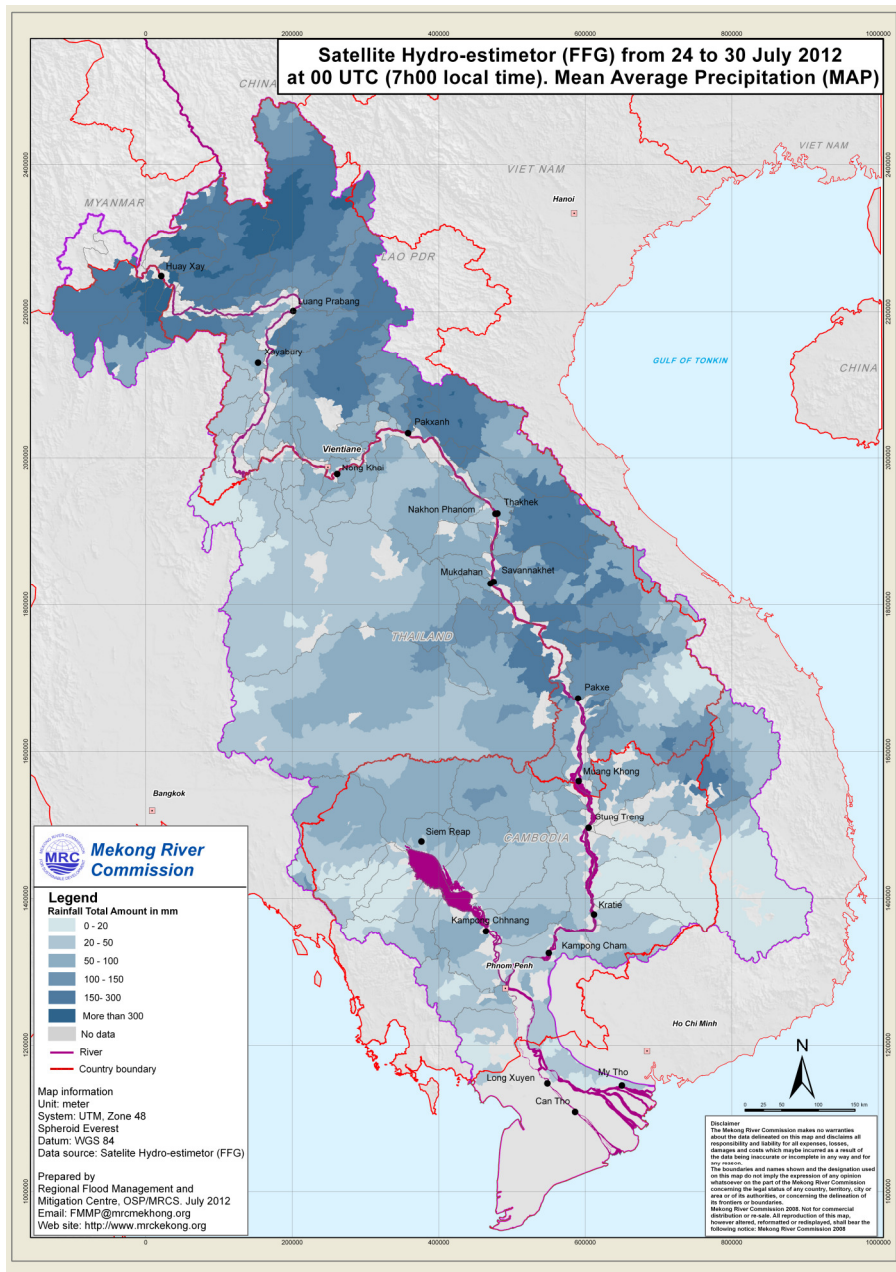


Figure 6: Rainfall distribution over the LMB, from 24th July to 30th July, 2012

General behaviour of the Mekong River

There was a sharp rising of water level in the upper reach of the LMB from Chiang Saen to Paksane by the influence of VICENTE typhoon and ITCZ appearance during the reporting period. Water levels at most stations in the middle reach were more-or-less stable during the first half of the week then were rising till the end of the week, while water levels at stations in the lower reach were more-or-less stable during last week.

Regarding to 2 stations in downstream at Tan Chau and Chau Doc, water levels at those 2 stations showed a rising trend in last week. These stations were recording levels that are below the long-term average for this time of the year.

For stations from Chiang Saen to Paksane

During the monitoring period, water levels in the mainstream of the Mekong from boundary of China and Thailand to Paksane were rapidly increasing with high amplitude as a result of heavy rain occurrence in

the upper part as well as strange rising of water level from China, which is illustrated by water level at Jinghong station in Figure 7.

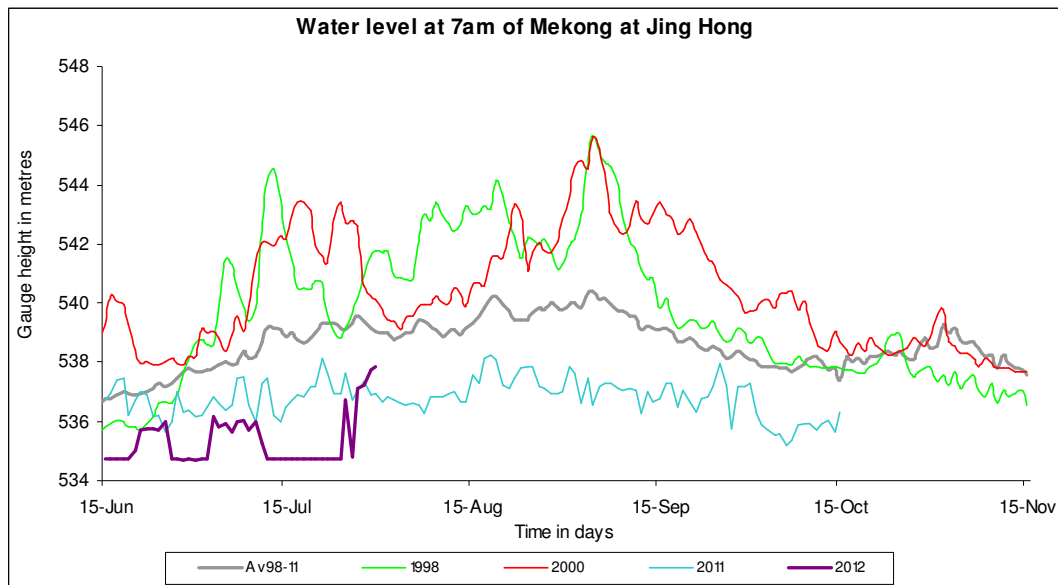


Figure 7: Strange rising of water level at Jing Hong station from 25 July, 2012

Figure 8 shows water levels at Chiang Saen and Xieng Kok were increasing rapidly from the mid to the end of the week with water increasing amplitudes of 4.67m and 7.38m, respectively. Xieng Kok, which is an upstream station of Chiang Saen, located on the mainstream of Mekong river at the border of Lao PDR and Myanmar.

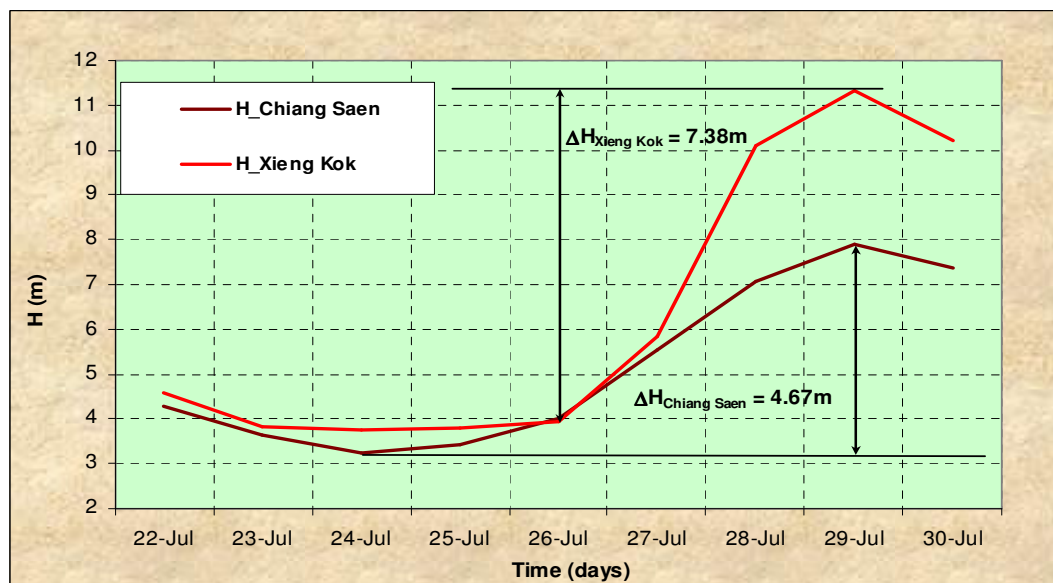


Figure 8: Quick rising of water levels at stations: Xieng Kok and Chiang Saen

Water levels at Luang Prabang rose 4.62m from 25 July to the end of the week and other upstream stations as Chiang Khong, Pak Beng were recorded levels that rise sharply in the reporting period particularly at Pak Beng where water level showed an imaging rising with the amplitude of 11.86m from 26 July to 30 July. The hydrograph of water levels at those stations is illustrated in Figure 9.

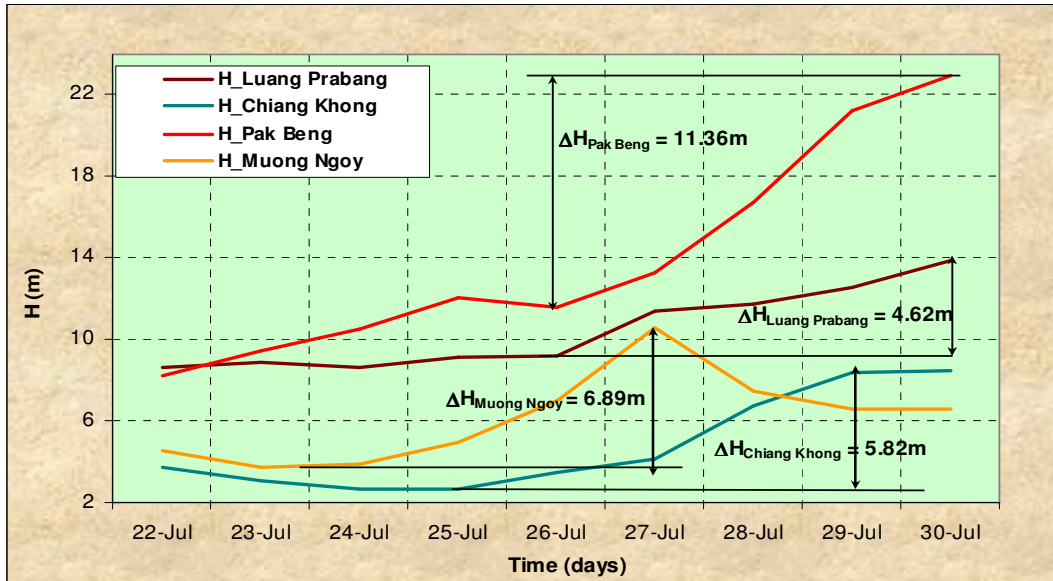


Figure 9: Water level rising at stations: Pak Beng, Chiang Khong, Muong Ngoy and Luang Prabang

Water levels at stations Vientiane, Nong Khai and Paksane showed a rising trend in last week. Most stations were recording levels that are below the long term average for this time of the year.

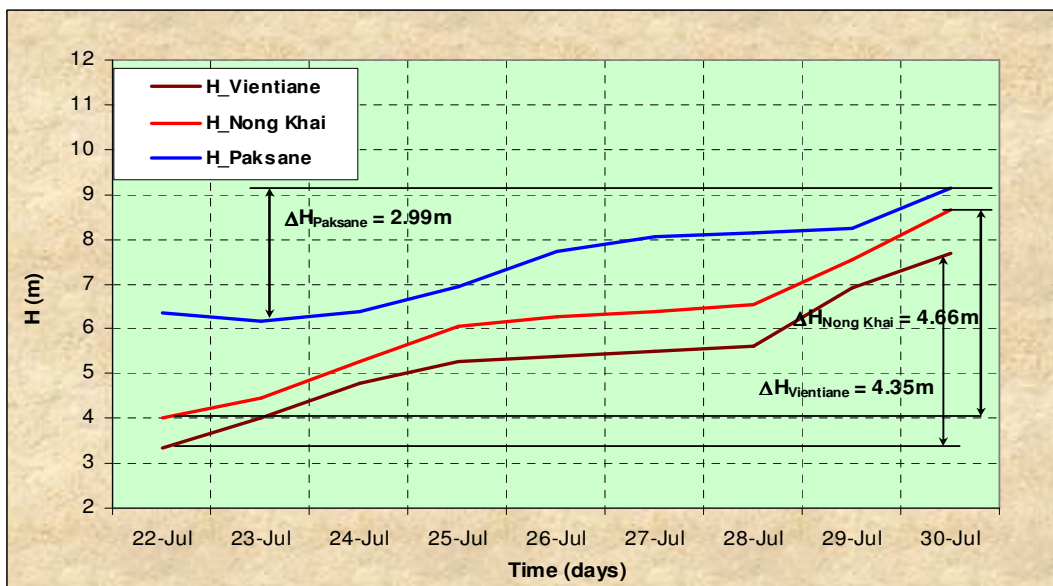


Figure 10: Water level rising at stations: Vientiane, Nong Khai and Paksane

For stations from Nakon Phanom/ Thakhek to Pakse

Water levels showed a rising trend during last week. These stations were recording levels that are below the long-term average for this time of the year.

For stations from Stung Treng to Kompong Cham

Water levels were more-or-less stable in the first half of the week, then increasing till the end of the week. These stations were recording levels that are somewhat below the long-term average for this time of the year.

For stations from Phnom Penh to Koh Khel. Neak Luong

Water levels at these stations were slightly falling in the first half of the week then rising till the end of the week and below the long-term average for this time of the year.

Tan Chau and Chau Doc

Water levels showed an increasing trend during last week. Both stations were recording levels that are below the long-term average for this time of the year and significantly affected by tidal effects.

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
23/07	534.73	3.66	8.87	8.05	4.00	4.45	6.16	4.87	6.06	4.93	3.82	5.71	4.45	5.06	12.84	8.11	5.08	4.20	4.54	3.45	4.16	1.12	0.77
24/07	534.73	3.24	8.65	8.57	4.78	5.27	6.38	4.69	6.00	4.71	3.62	5.52	4.35	4.95	12.44	7.81	4.95	4.07	4.46	3.38	4.07	1.09	0.76
25/07	536.72	3.43	9.08	8.69	5.26	6.05	6.96	5.03	6.22	4.73	3.60	5.35	4.30	4.91	12.22	7.56	4.88	4.00	4.37	3.34	3.99	1.09	0.80
26/07	534.77	4.02	9.23	8.76	5.40	6.28	7.72	5.69	6.91	5.26	3.76	5.48	4.31	5.11	12.13	7.40	4.81	3.92	4.32	3.28	3.93	1.13	0.87
27/07	537.11	5.56	11.39	8.88	5.48	6.39	8.05	6.26	7.44	5.92	3.90	6.18	4.70	5.28	12.49	7.47	4.83	3.94	4.28	3.28	3.96	1.19	0.93
28/07	537.21	7.09	11.72	9.76	5.60	6.52	8.14	6.41	7.55	6.26	5.00	6.79	5.25	5.47	12.82	7.74	4.93	4.04	4.37	3.35	4.03	1.30	1.06
29/07	537.75	7.91	12.58	10.93	6.90	7.55	8.25	6.35	7.50	6.26	5.18	7.07	5.52	5.77	13.39	8.09	4.94	4.05	4.40	3.35	4.04	1.42	1.19
30/07	537.85	7.38	13.85	11.30	7.70	8.67	9.15	6.34	7.50	6.19	5.29	7.16	5.74	5.97	13.89	8.55	5.09	4.21	4.52	3.44	4.17	1.64	1.51
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
23/07	8.00	8.70	nr	nr	nr	nr	6.00	0.50	0.50	nr	nr	nr		nr	nr	nr	nr		nr	nr	nr	nr	
24/07	44.0	19.4	34.6	8.3	8.5	4.7	16.4	11.5	11.9	1.4	nr	33.0	21.1	nr	nr	2.7	nr		nr	nr	nr	nr	
25/07	9.0	1.0	1.8	5.2	18.5	32.7	7.0	4.7	5.8	2.5	5.3	9.7	nr	nr	4.0	1.0	0.4		0.3	6.4	nr	nr	2.0
26/07	9.0	33.5	13.8	9.6	2.8	5.8	8.5	1.9	3.8	nr	nr	nr	nr	nr	nr	nr	nr		nr	nr	nr	nr	
27/07	75.0	30.4	nr	3.7	nr	16.5	41.0	20.2	11.0	nr	nr	nr	27.0	52.0	19.7	2.1	nr		0.0	nr	nr	3.1	2.0
28/07	9.0	28.5	4.8	nr	nr	nr	3.3	3.4	5.0	nr	nr	nr	15.4	5.5	34.0	2.7	0.2		5.1	1.2	nr	nr	
29/07	14.0	18.8	5.2	3.6	2.3	1.0	0.3	4.8	6.6	9.2	20.0	52.3	17.1	17.5	80.6	33.6	0.5		5.5	7.4	nr		
30/07	7.00	7.10	nr	0.90	11.20	9.00	25.20	14.30	15.20	3.20	3.20	12.70		1.50	nr	nr	nr		nr	nr	nr	0.00	

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

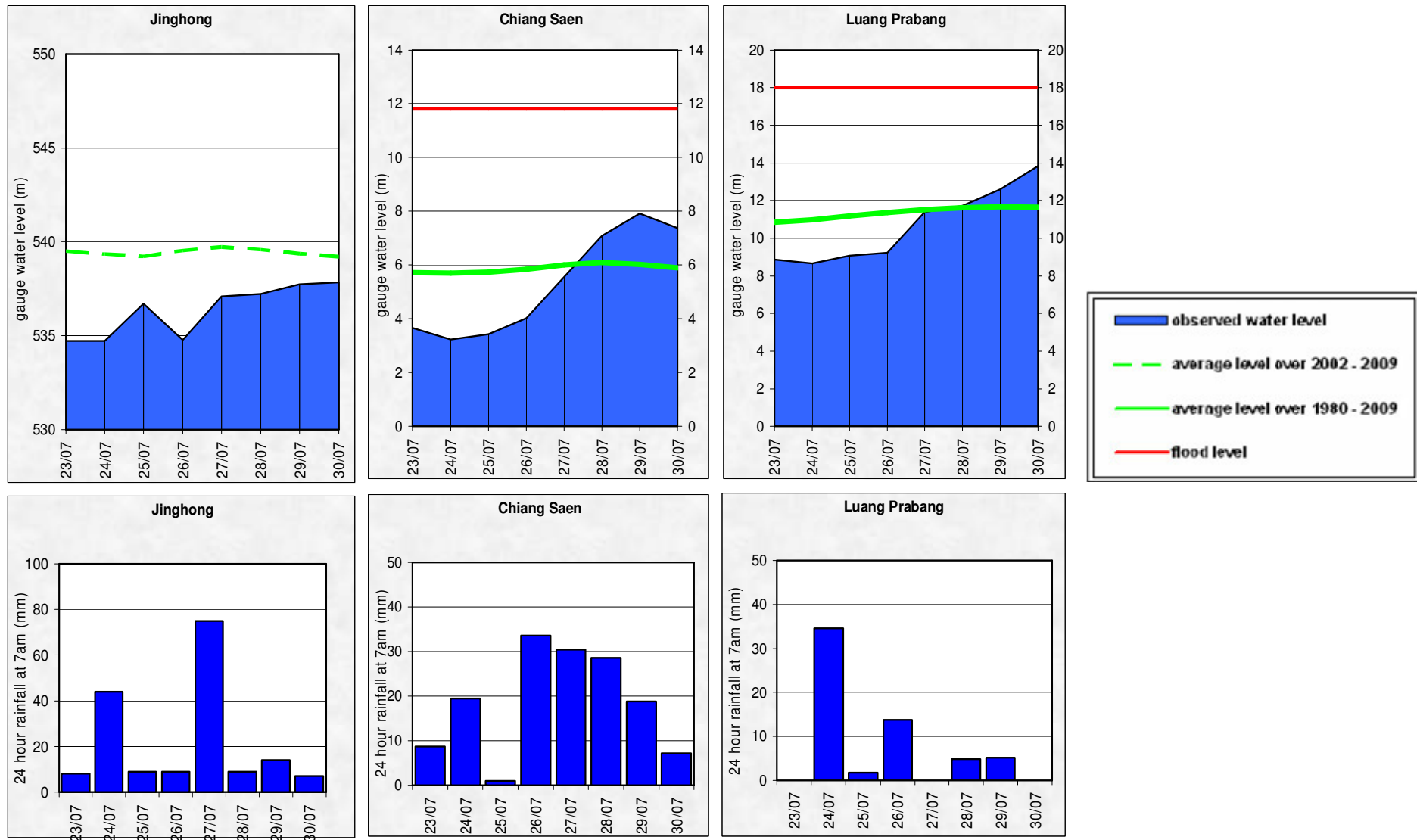


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

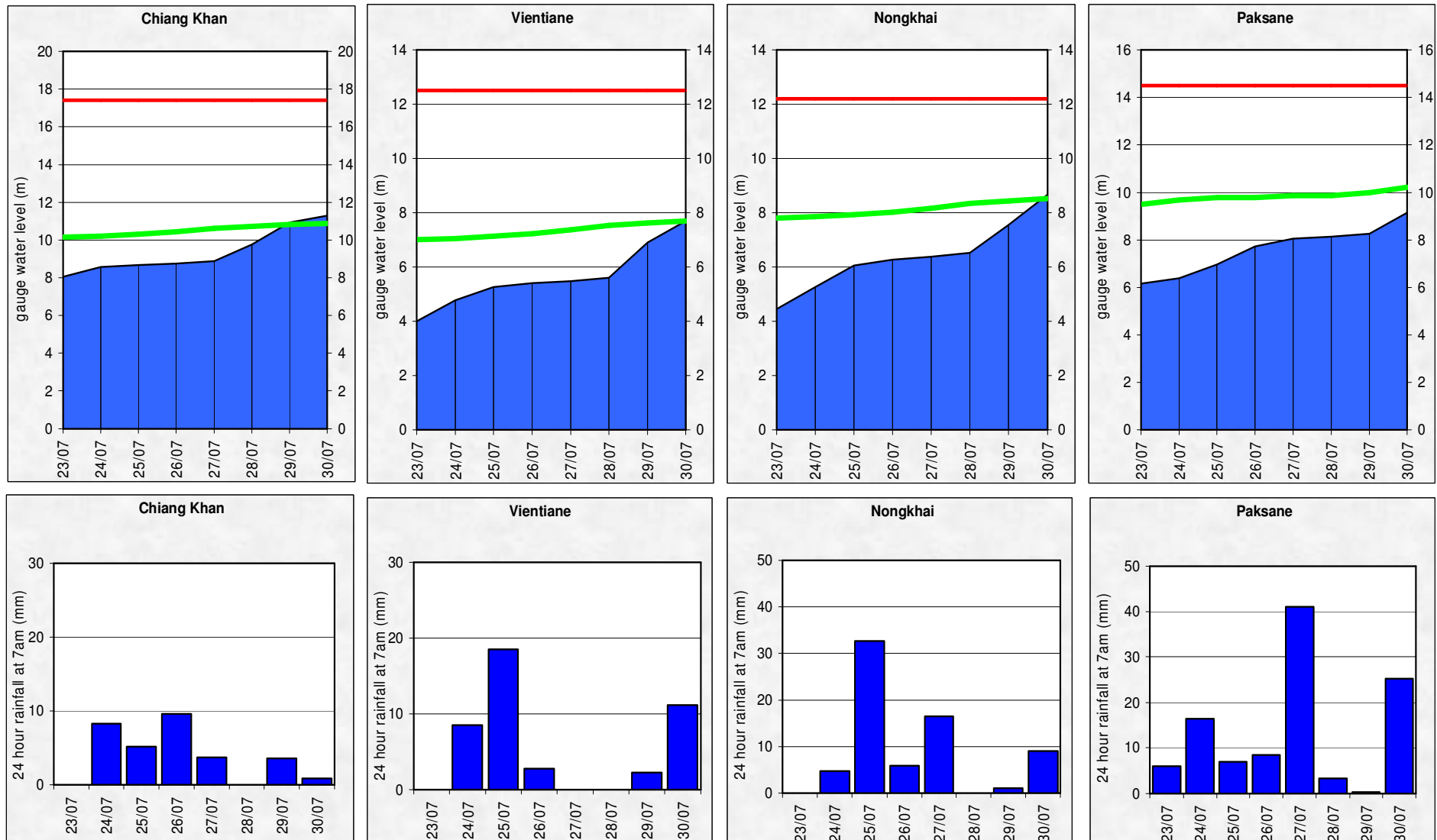


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

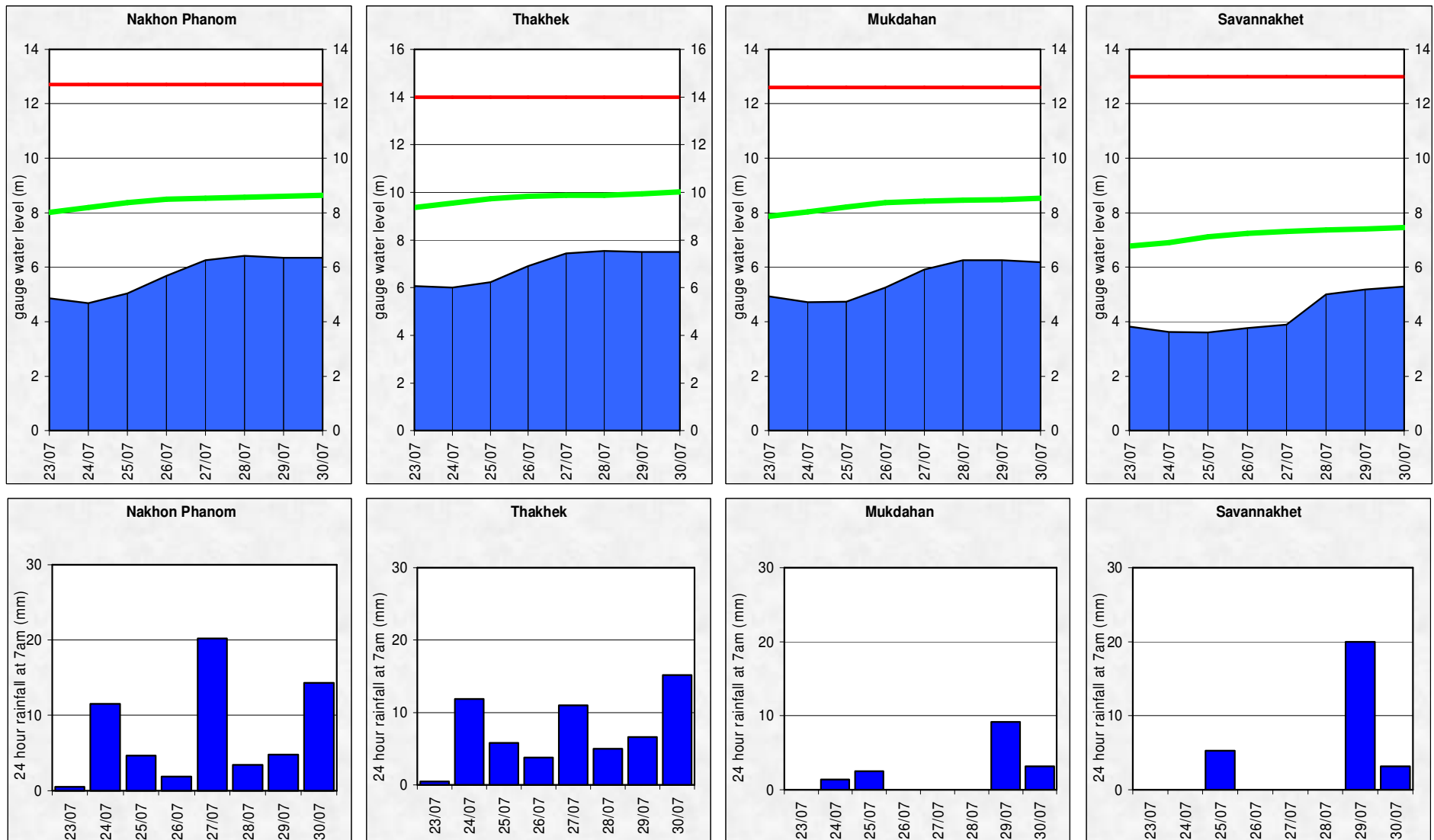


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

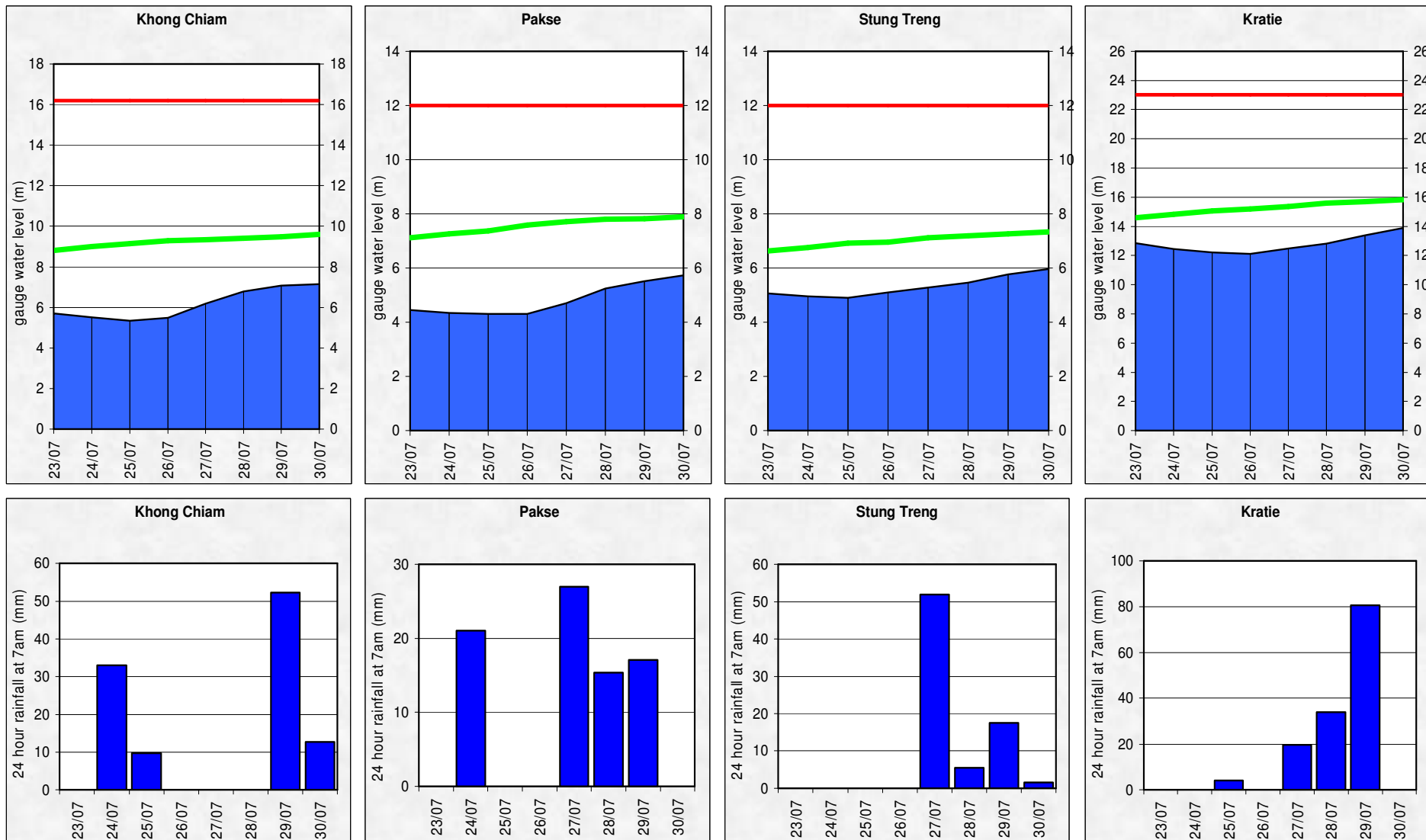


Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

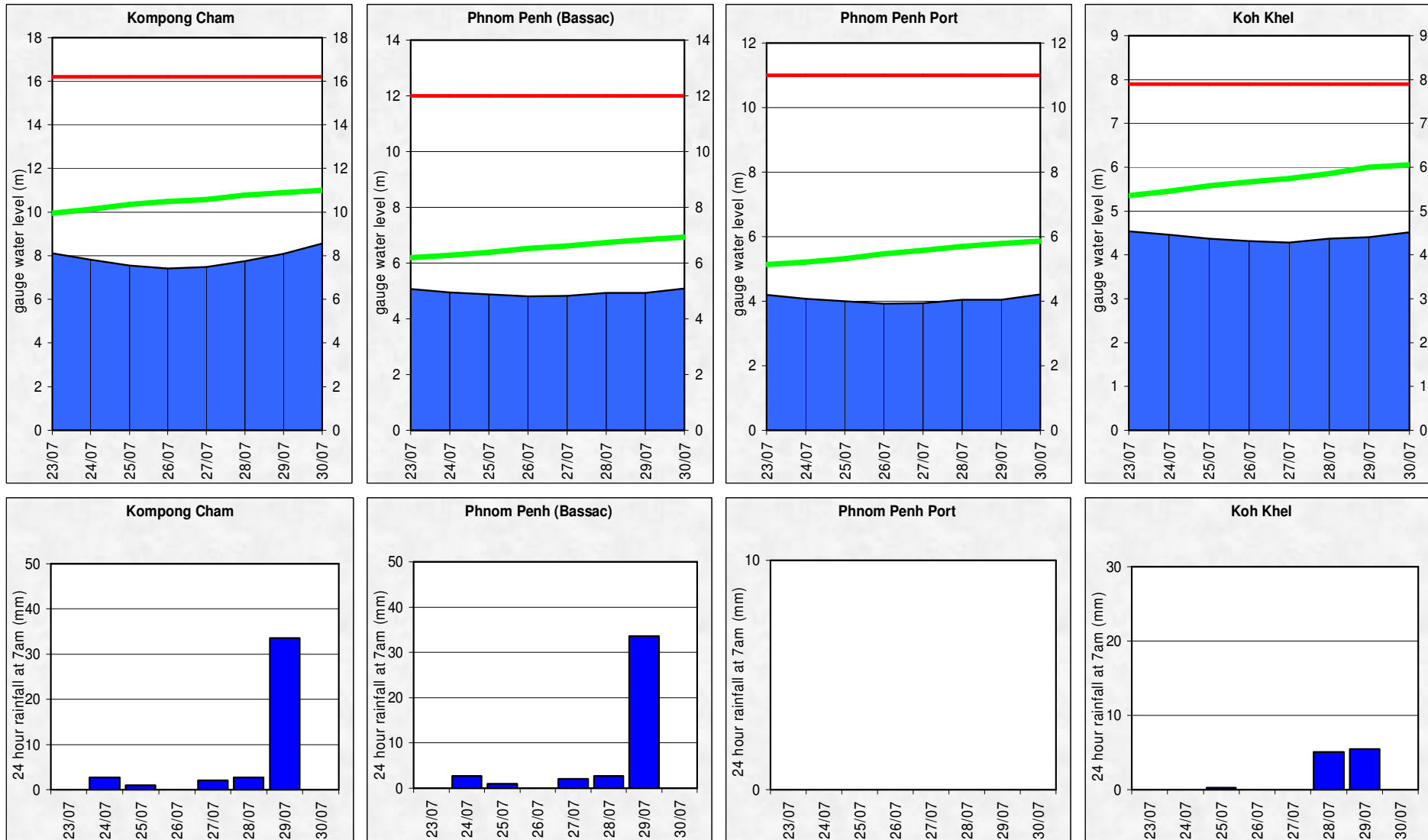
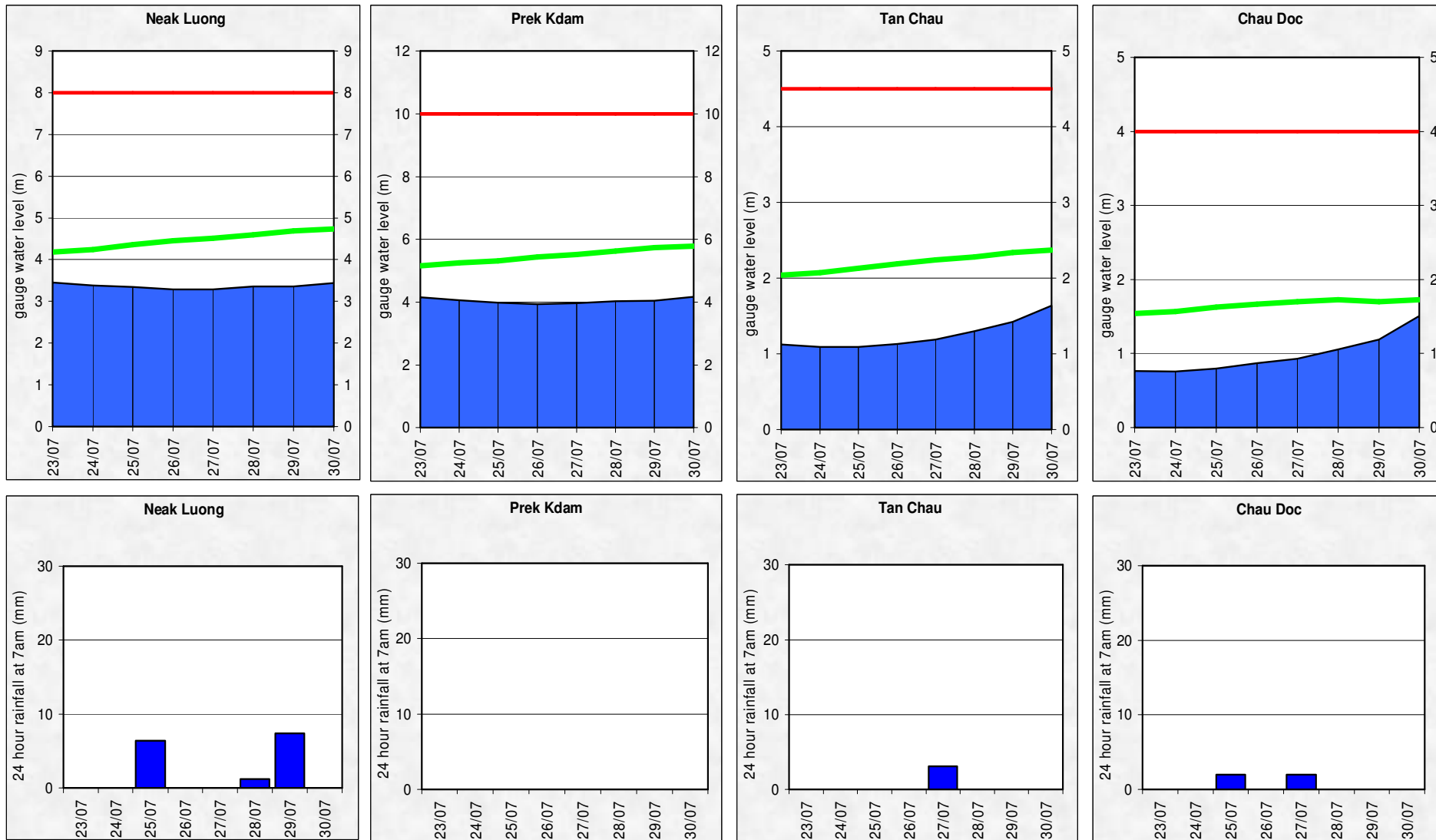


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

Accuracy

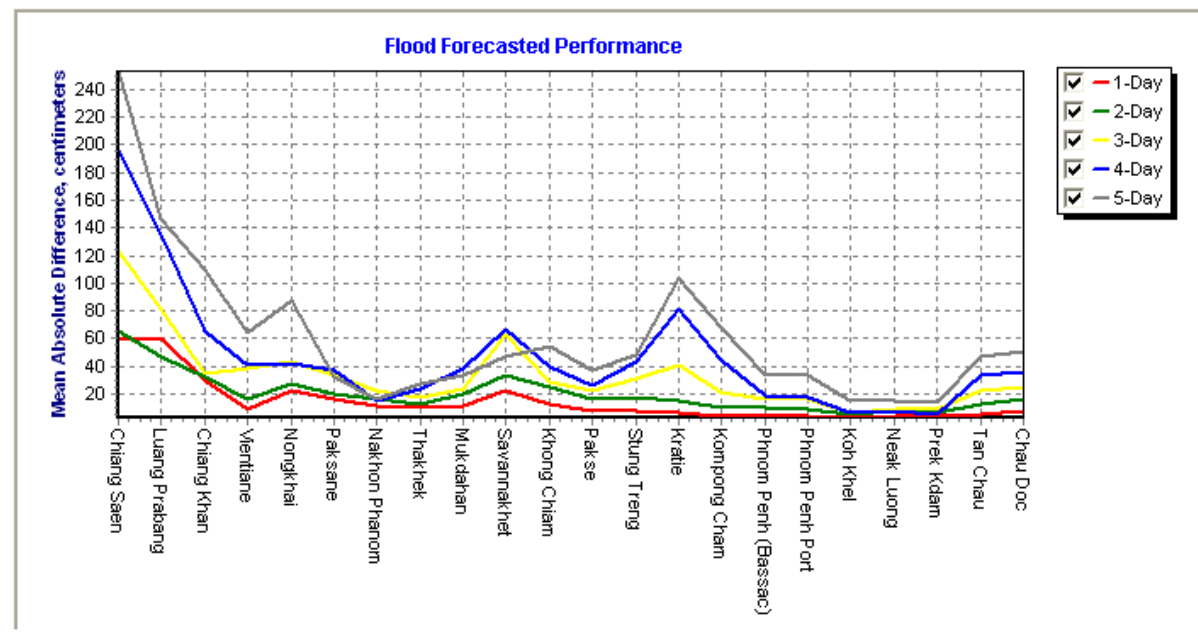
“Accuracy” describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster in Charge taking into consideration known biases in input data and his/her knowledge of the response of the model 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 normal pattern in which the accuracy is better if the forecast lead time is shorter.

In general, accuracies at most stations for 1-day to 3-day forecast lead time are quite good. However, the accuracies at Chiang Saen, Luang Prabang in the upper reach and Kratie for 4-day and 5-day forecast lead time were less than expected.

The above differences due to 2 main factors: (1) lack of rainfall forecast NWP from 24 to 30 July; (2) internal model functionality in forecasting especially at those stations; for which the parameter adjustment in the model is not possible.

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	57.1	71.4	85.7	85.7	57.1	71.4	100.0	0.0	85.7	28.6	57.1	57.1	71.4	71.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	57.1	75.3	
2-day	50.0	33.3	66.7	83.3	83.3	83.3	100.0	83.3	83.3	33.3	66.7	66.7	83.3	66.7	100.0	83.3	83.3	83.3	83.3	83.3	66.7	66.7	33.3	72.7	72.7
3-day	20.0	0.0	60.0	60.0	60.0	100.0	80.0	60.0	40.0	20.0	40.0	60.0	80.0	40.0	60.0	20.0	20.0	60.0	60.0	60.0	20.0	0.0	0.0	46.4	46.4
4-day	25.0	25.0	25.0	100.0	100.0	100.0	75.0	100.0	75.0	75.0	50.0	75.0	100.0	100.0	100.0	0.0	50.0	75.0	100.0	100.0	0.0	0.0	0.0	65.9	65.9
5-day	33.3	0.0	0.0	66.7	66.7	100.0	66.7	33.3	66.7	0.0	33.3	66.7	100.0	66.7	66.7	0.0	33.3	100.0	100.0	100.0	66.7	0.0	0.0	53.0	53.0

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	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	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	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	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	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

2012	Flood Forecast: time sent				Arrival time of input data (average)							Missing data (number)						
	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
<i>week</i>	10:38	0	-	5	08:12	08:13	07:14	06:11	08:55	07:36	07:05	6	0	6	33	107	0	96
<i>month</i>	10:32	1	-	17	07:36	07:57	07:20	06:04	08:46	07:12	07:12	6	0	8	82	506	7	374
<i>season</i>	10:37	1	-	36	07:24	08:02	07:24	06:09	08:50	07:23	07:16	7	0	77	579	1085	10	788

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.

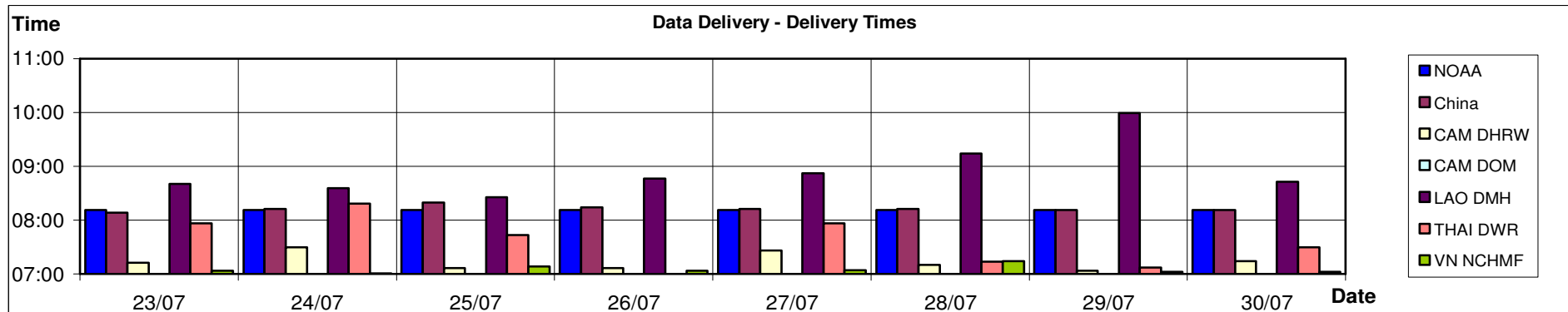


Figure B2: Data delivery times for the past 8 days including the current report date

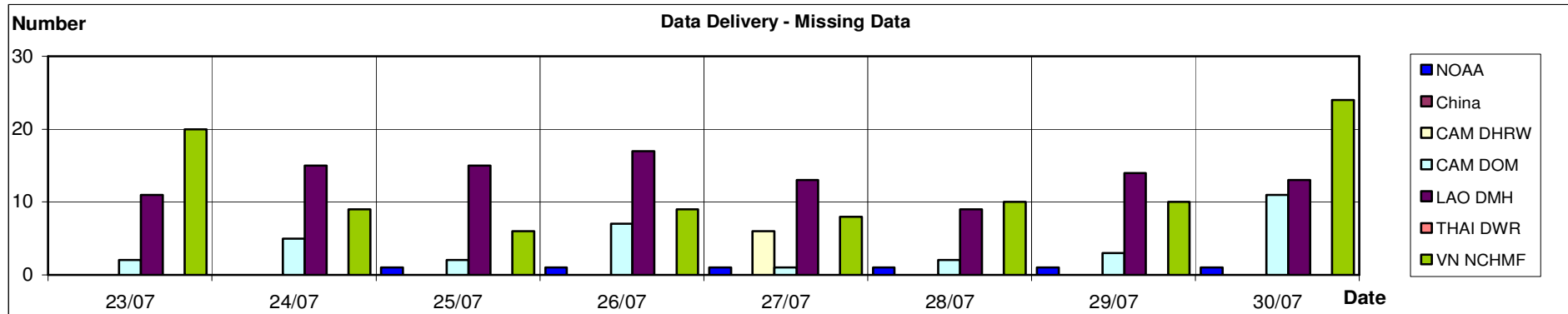


Figure B3: Missing data for the past 8 days including the current report date

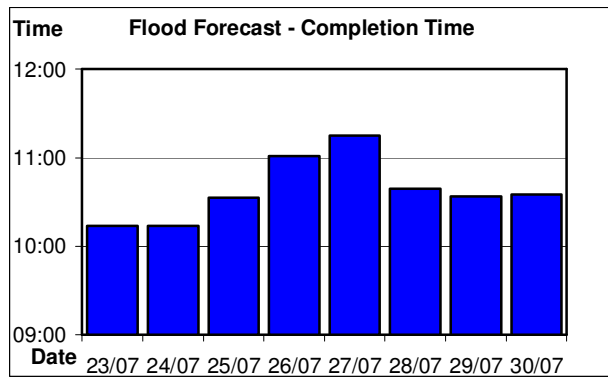


Figure B4: Flood forecast completion time

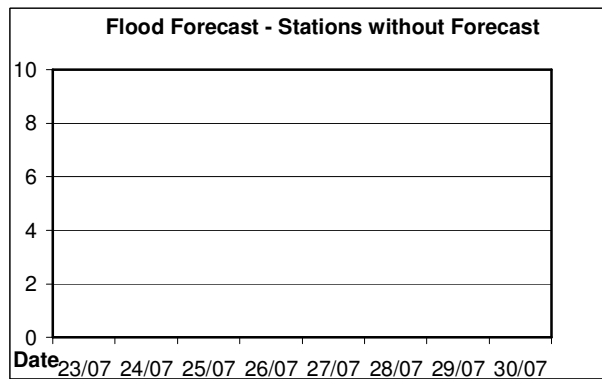


Figure B5: Flood forecast stations without forecast

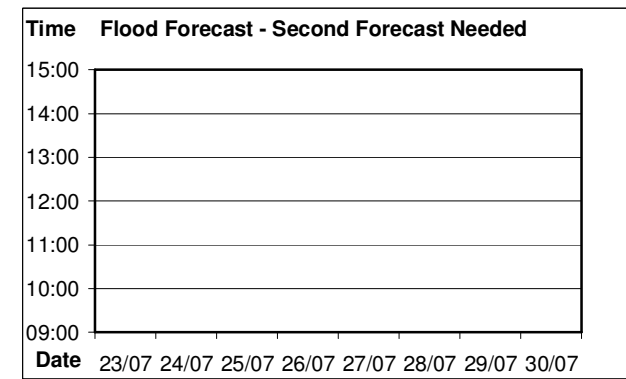
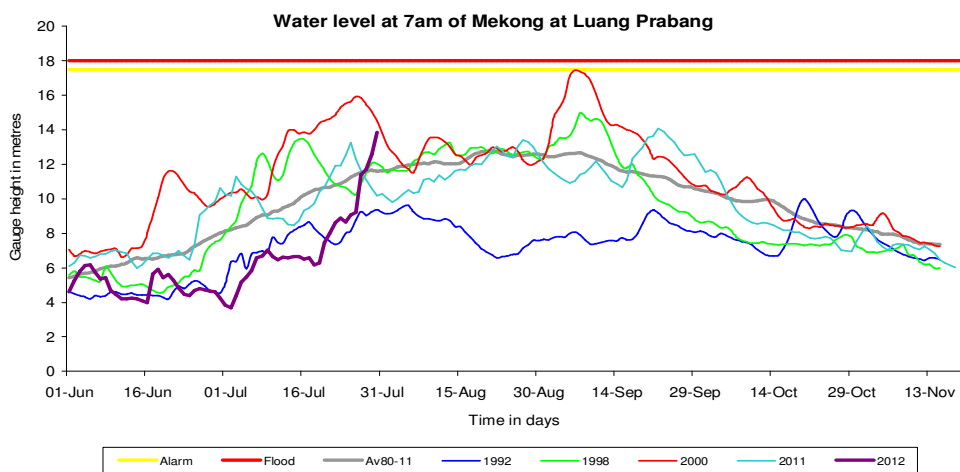
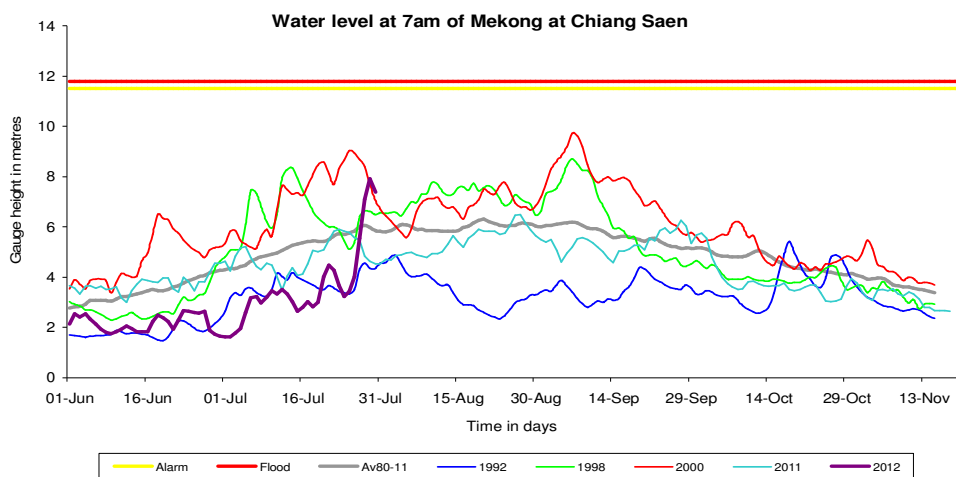
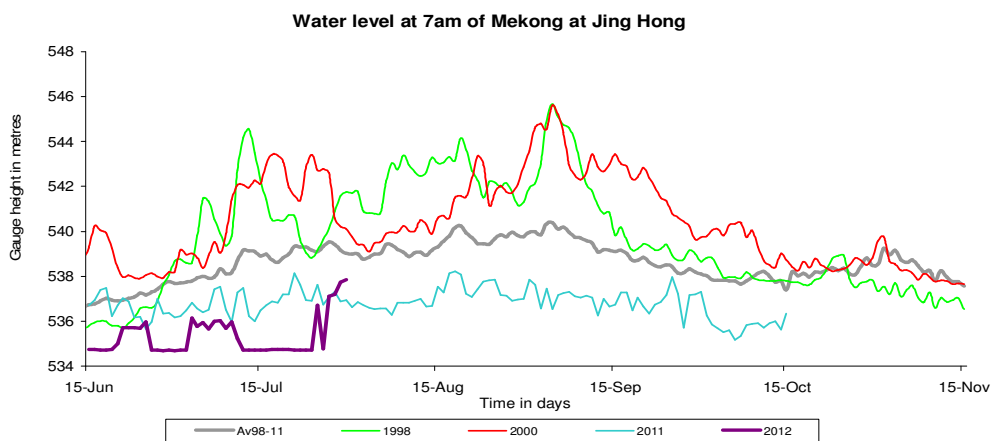


Figure B6: Second forecast needed

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

