

### Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 11/07/2011, covering the week from the 04<sup>th</sup> to the 10<sup>th</sup> July 2011

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

#### General weather patterns

During the week of the 04<sup>th</sup> to the 10<sup>th</sup> July 2011, four weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 06<sup>th</sup> July and the 10<sup>th</sup> July bulletins are presented in the figures below:

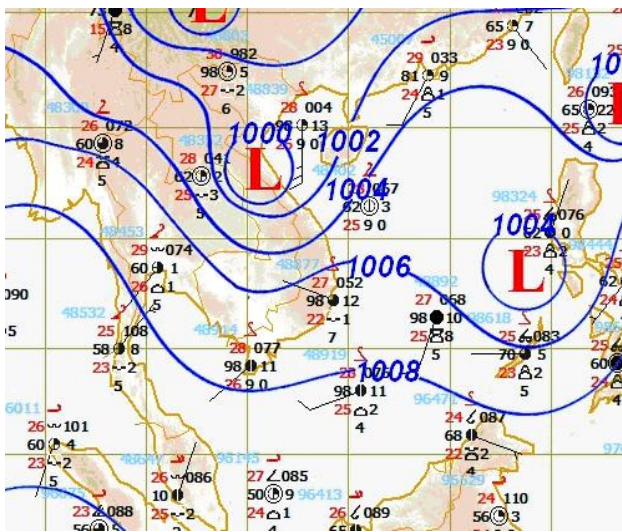


Figure 1: Weather map for 06<sup>th</sup> July 2011

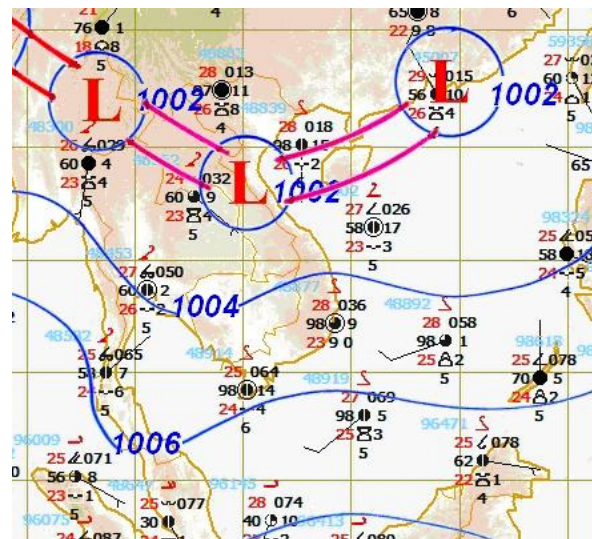


Figure 2: Weather map for 10<sup>th</sup> July 2011

#### Strong South-West (SW) Monsoon

Strong SW monsoon prevailed over Andaman Sea and the Gulf of Thailand during last week (Figure 1 and 2).

#### Inter Tropical Convergence Zone (ITCZ)

During 10 and 11<sup>th</sup> July, ITCZ laid across the upper part of Myanmar, Thailand, Lao PDR and Viet Nam (Figure 2).

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

No TD, TS or TY was observed in this week.

#### Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

#### Over weather situation

Strong SW and trough of low pressure were observed frequently in the reporting period. Therefore, thundershower and isolated heavy rain occurred in the Northern part of Thailand, Lao PDR, Viet Nam and the South, Southeast and central of Cambodia as the result of these phenomena.

### **General behaviour of the Mekong River**

Most stations along the Mekong River were recording levels that are somewhat above the long-term average for this time of the year. Water levels at stations in the upper and middle reaches of Lower Mekong Basin were falling while water levels at stations in the lower reach showed rising and falling trend during the monitoring period. Regarding to two stations in downstream at Tan Chau and Chau Doc, water levels at those two stations were influenced by tidal with slightly rising trend during last week.

#### ***For stations from Chiang Saen to Chiang Khan***

Water levels were falling toward the end of the week. The stations were recording levels that were somewhat above the long-term average for this time of the year.

#### ***For stations from Vientiane/Nong Khai to Savannakhet/Muckdahan***

Water levels at Vientiane and Nong Khai were slightly rising in the beginning of the week and then falling toward the end of the week while water levels at other stations showed a falling trend during reporting period. All these stations were recording levels that were above the long-term average for this time of the year.

#### ***For stations from Khong Chiam to Kratie***

Water levels were more-or-less stable in the beginning of the week and then falling till the end of the week. Water levels of these stations were above the long-term average for this time of the year.

#### ***For stations from Kompong Chiam to Koh Khel/Neak Luong***

Water levels were slightly increasing at first half of the week and then decreasing till the end of the week. Water levels of these stations were above the long-term average for this time of the year.

#### ***Tan Chau and Chau Doc***

Water levels were rising from the beginning to the mid of the week, then more-or-less stable till the end of the week. Both stations were recording levels that are somewhat above the long-term average for this time of the year and significantly affected by tidal.

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

### **Flood Situation**

- Flood stage or alarm stage:

No alarm stage (where the forecast is expected to reach flood level within three days) was reported anywhere on the mainstream of the Mekong River during the past week. Water levels are still significantly below flood levels (as defined by the national agency) at all forecast stations.

- Damage or victims:

No damage or loss of life due to river flooding was recorded anywhere along the Mekong River during the past week.

For more details see the following annex:

- tables and graphs for water level and rainfall for the last week in Annex A
- a graph for accuracy in Annex B
- a table of forecast achievement in Annex B
- tables and graphs for performance in Annex B
- the water level graphs showing the observed water level for the season in Annex C

**Annex A: Graphs and Tables**

Table A1: observed water levels

unit in m

2011	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
04/07	536.59	5.16	10.86	10.46	7.08	8.30	11.74	10.06	11.13	10.03	8.80	10.72	8.75	7.49	16.47	10.73	6.15	5.17	5.45	4.14	4.96	1.53	0.99
05/07	536.40	5.21	10.58	10.60	7.47	8.67	11.23	9.82	10.85	9.85	8.70	10.74	8.78	7.51	16.62	10.90	6.31	5.39	5.58	4.26	5.12	1.65	1.12
06/07	536.53	4.78	10.45	10.29	7.42	8.74	10.86	9.48	10.50	9.51	8.67	10.50	8.60	7.58	16.85	11.02	6.42	5.52	5.67	4.37	5.22	1.73	1.20
07/07	537.44	4.42	10.06	10.10	7.10	8.38	10.53	9.11	10.16	9.10	8.36	10.09	8.30	7.50	17.00	11.26	6.55	5.67	5.77	4.46	5.34	1.79	1.27
08/07	537.54	4.30	9.42	9.90	6.92	8.13	10.05	8.69	9.73	8.66	7.95	9.65	7.90	7.26	16.73	11.19	6.59	5.71	5.80	4.48	5.38	1.82	1.30
09/07	536.53	4.56	8.90	9.54	6.61	7.85	9.86	8.25	9.30	8.17	7.90	9.13	7.52	7.03	16.37	10.94	6.54	5.66	5.74	4.44	5.34	1.81	1.31
10/07	535.98	4.49	8.84	9.05	6.20	7.42	9.62	8.05	9.14	7.78	6.97	8.62	7.10	6.83	16.03	10.66	6.35	5.46	5.61	4.36	5.23	1.78	1.34
11/07	537.29	4.01	8.88	9.10	5.84	7.09	9.38	7.77	8.85	7.60	6.80	8.25	6.78	6.52	15.71	10.41	6.23	5.35	5.51	4.22	5.14	1.81	1.42
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

2011	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
04/07	0.0	5.50	0.8	nr	0.2	52.5	5.2	4.0	0.3	nr	nr	nr	nr	7.8	9.6	13.3	nr		nr	nr	4.50	nr	0.80
05/07	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr		nr	nr	nr	8.6		nr	nr	nr	nr	0.6
06/07	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	3.0	3.5	3.5	0.4	19.1		50.2	4.1	nr	nr	13.0
07/07	nr	nr	nr	nr	nr	nr	nr	8.2	9.9	nr	nr	nr	nr	nr	nr	6.6	21.0		41.5	15.4	nr	27.9	11.0
08/07	nr	nr	8.2	nr	nr	nr	2.0	nr	nr	nr	nr	nr	nr	nr	nr	0.1	4.4		nr	8.6	5.4	7.0	19.1
09/07	nr	nr	29.2	nr	6.5	nr	111.5	nr	nr	nr	1.6	nr	nr	7.0	nr	0.0	nr		0.2	5.2	nr	7.9	12.9
10/07	nr	6.7	8.0	3.2	nr	1.4	nr	4.9	12.1	32.1	16.9	nr	10.0	17.0	42.0	nr	nr		nr	nr	6.5	0.0	0.0
11/07	2.0	0.30	11.0	4.3	2.5	61.8	96.2	nr	nr	nr	nr	4.9	nr	nr	16.0	5.7	1.6		nr	nr	nr	32.8	0.40

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

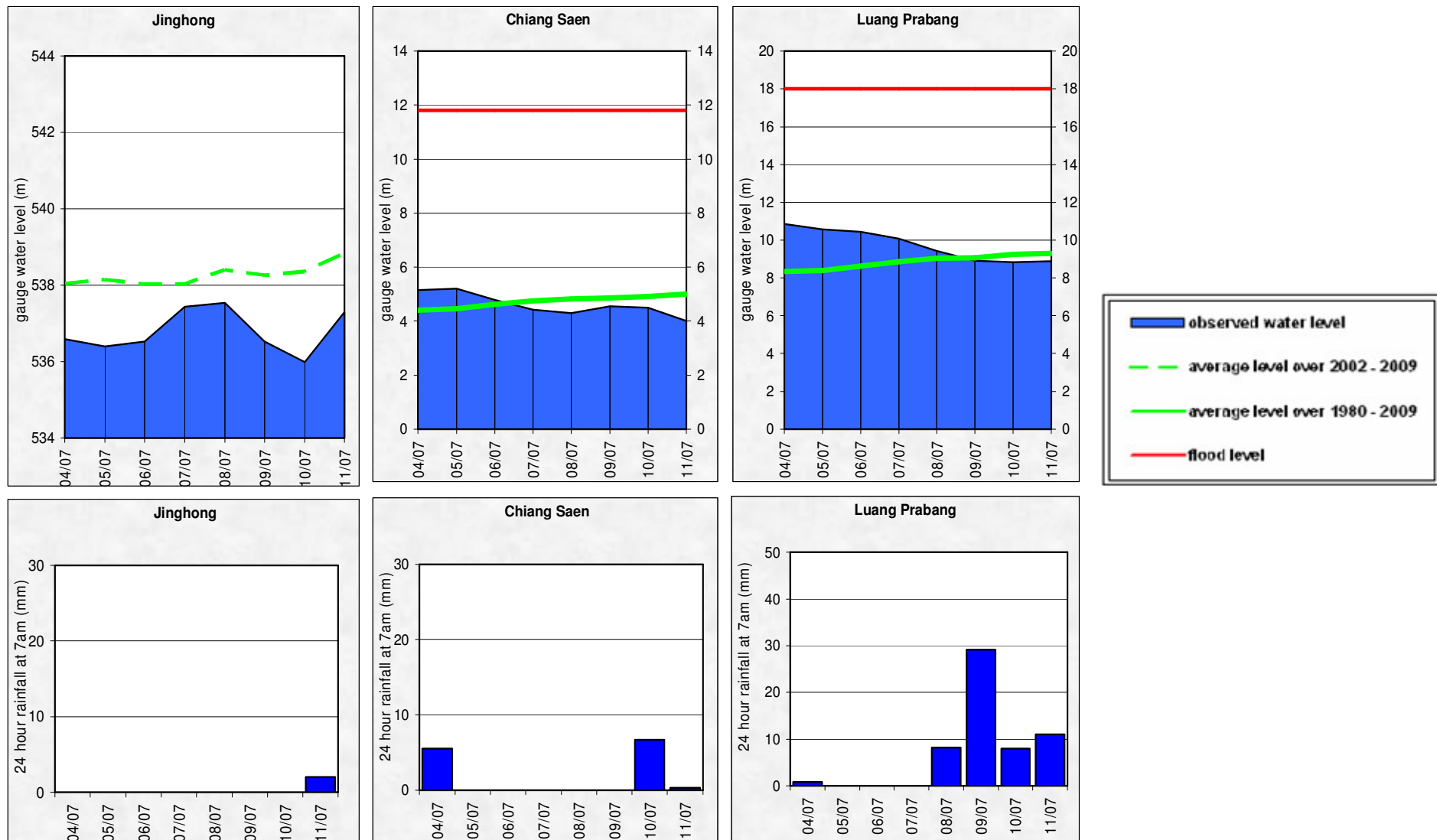


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

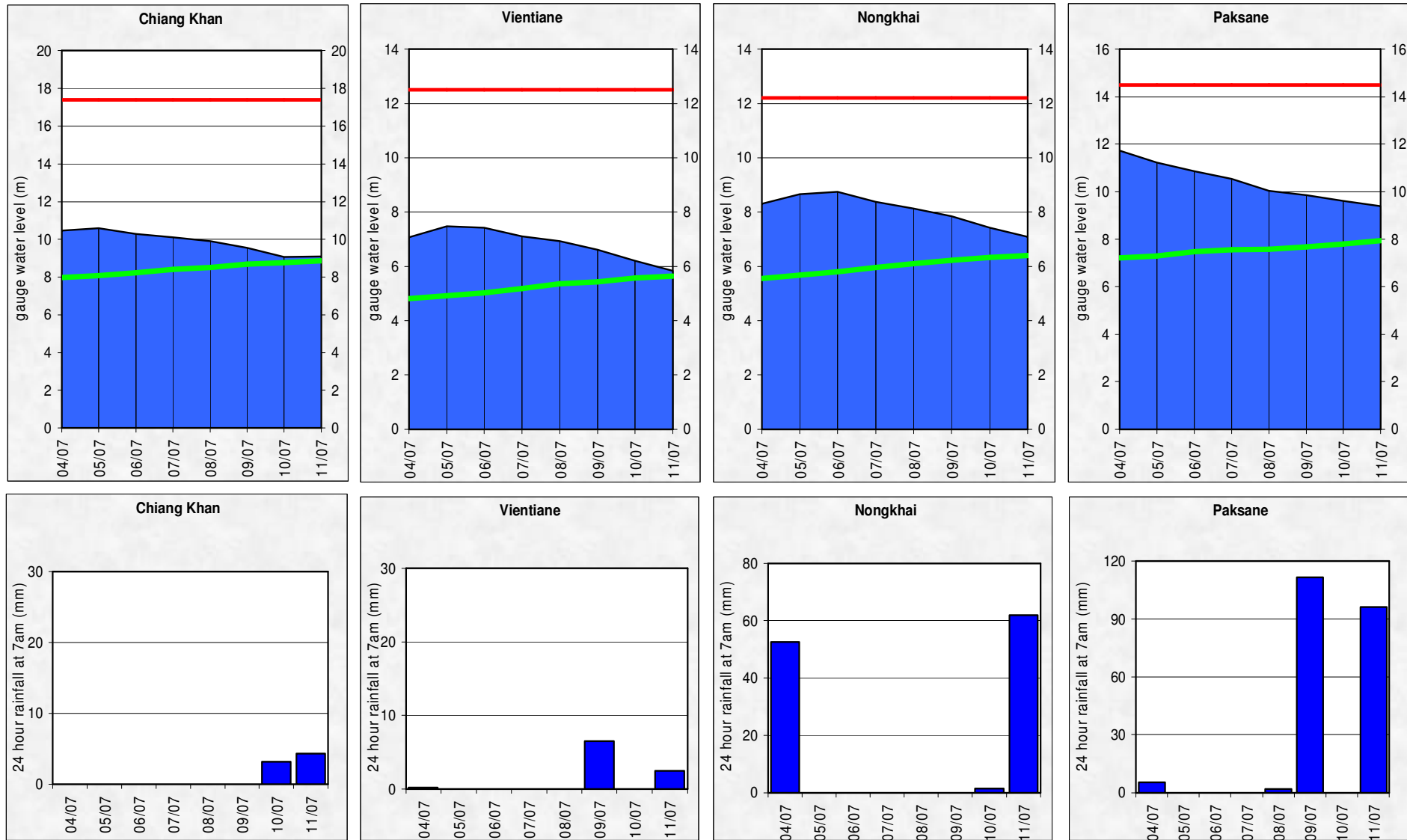


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

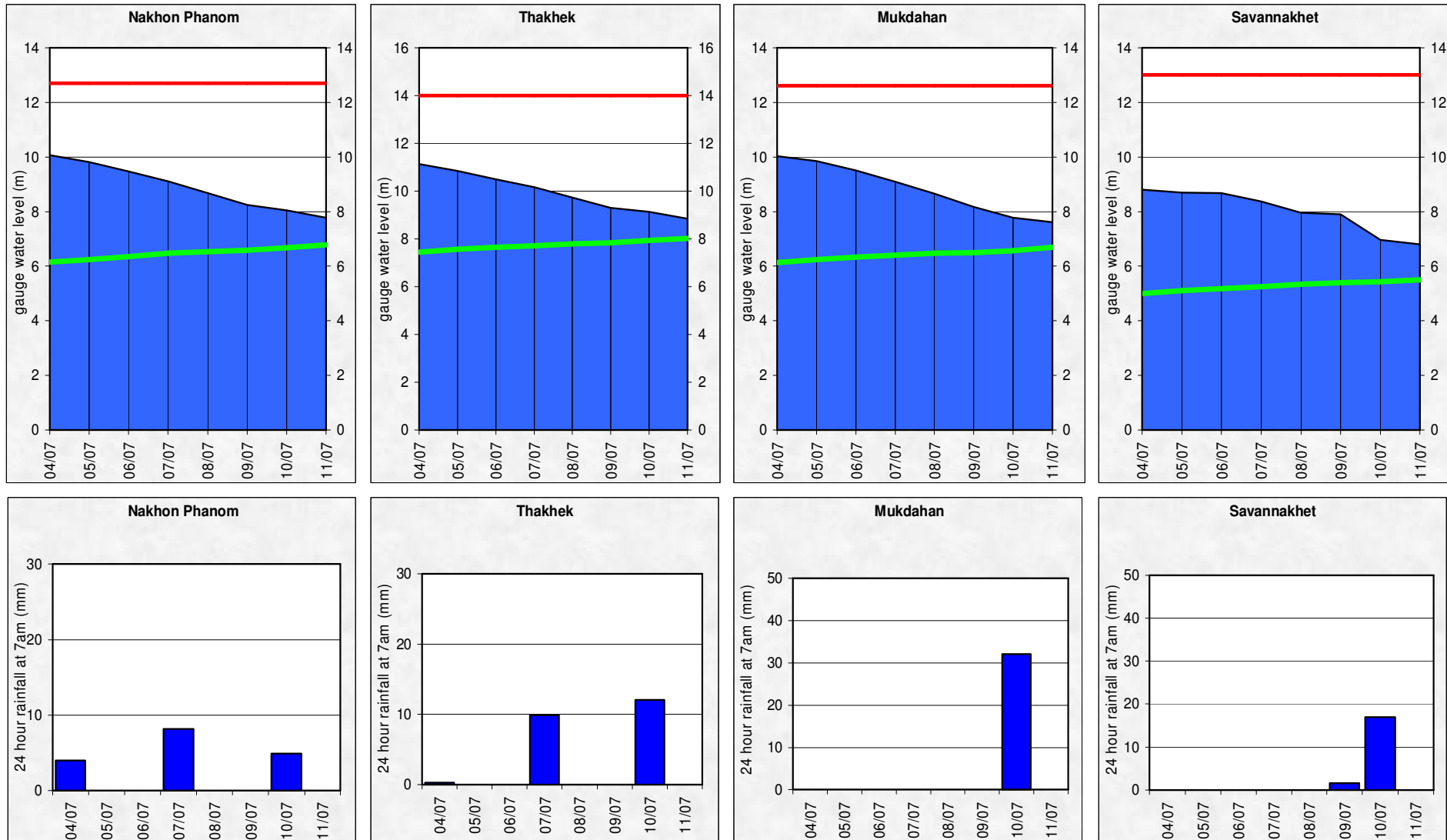


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

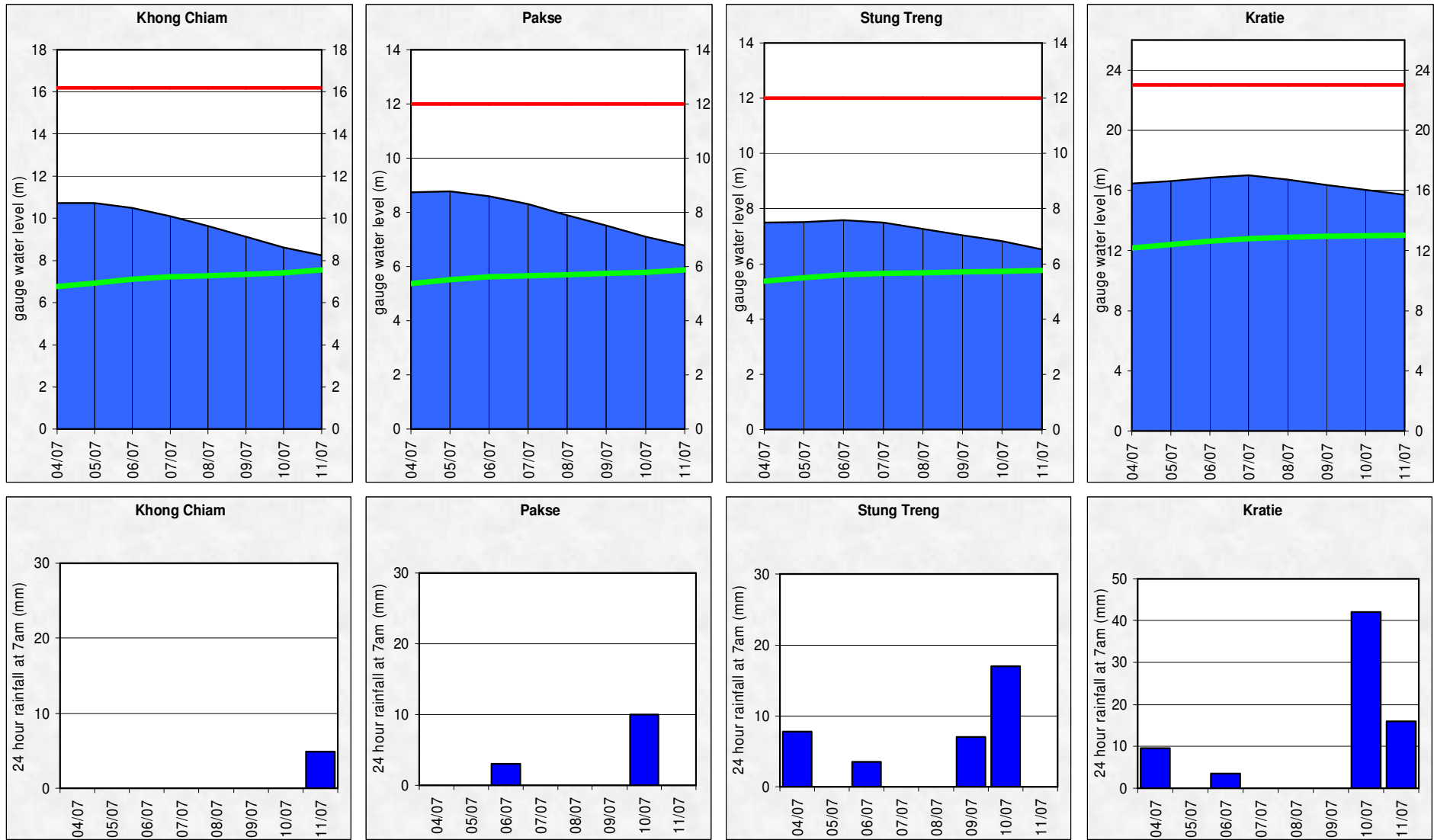


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

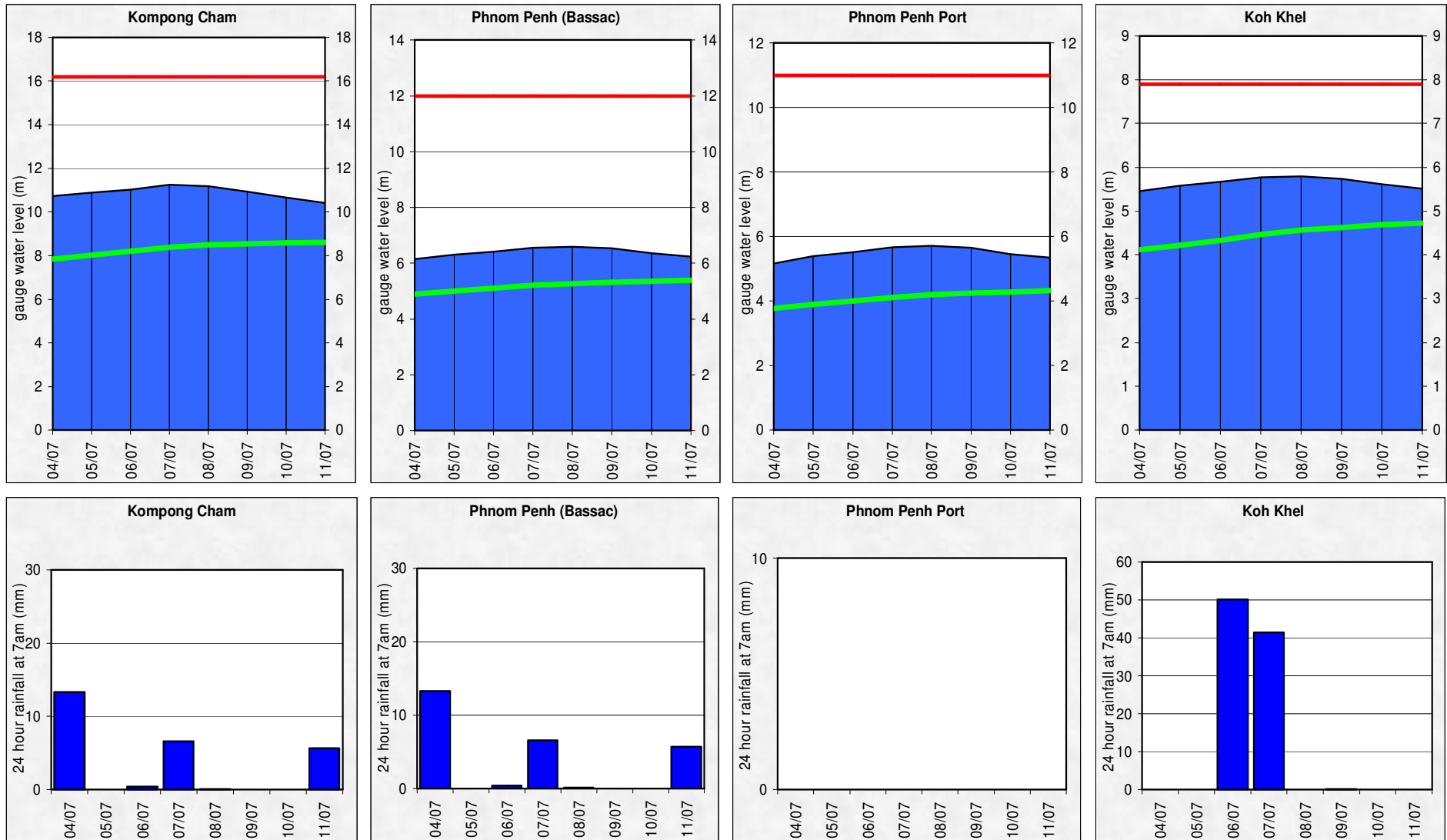
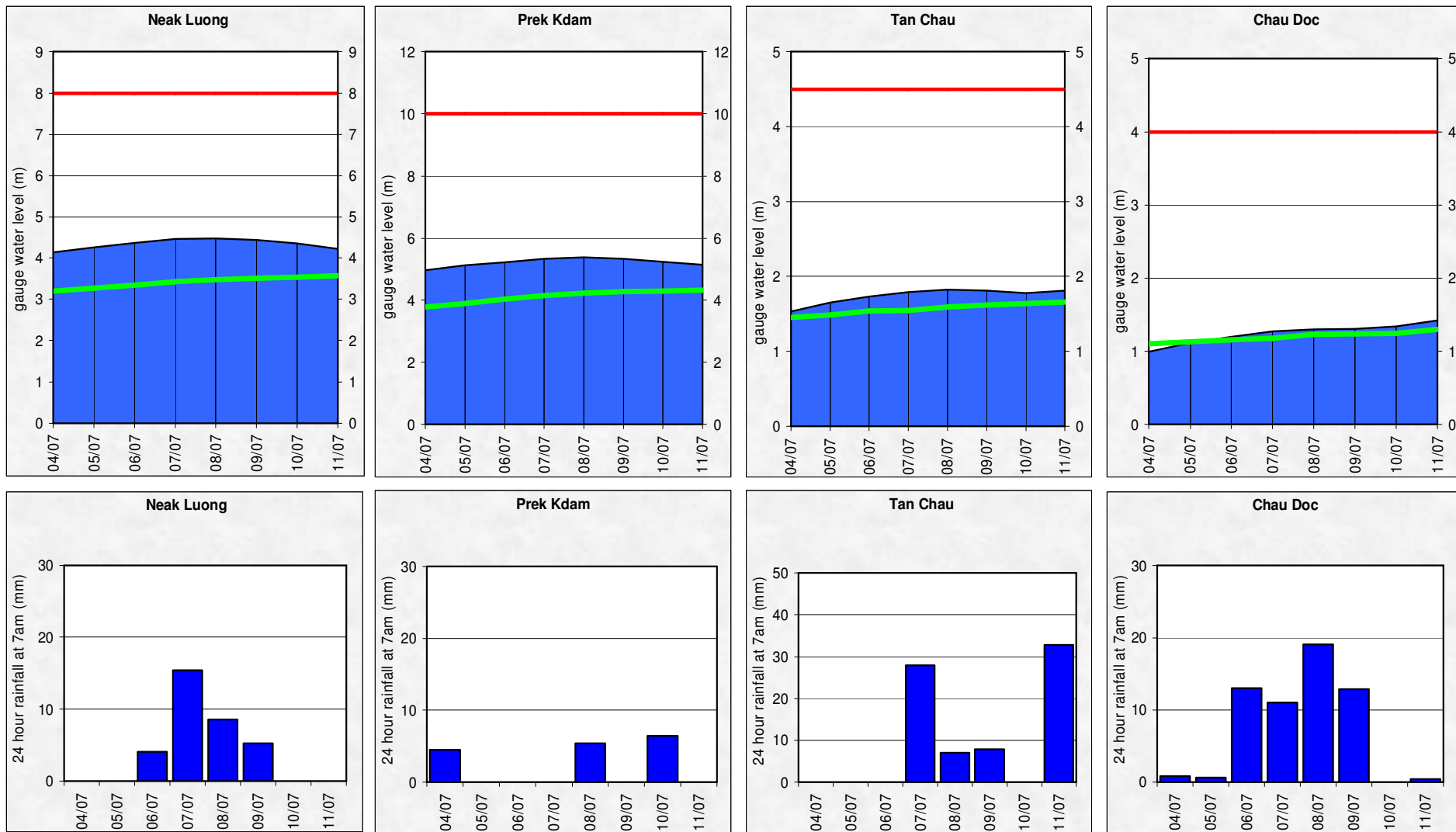




Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



## Annex B: Accuracy and performance

### Accuracy

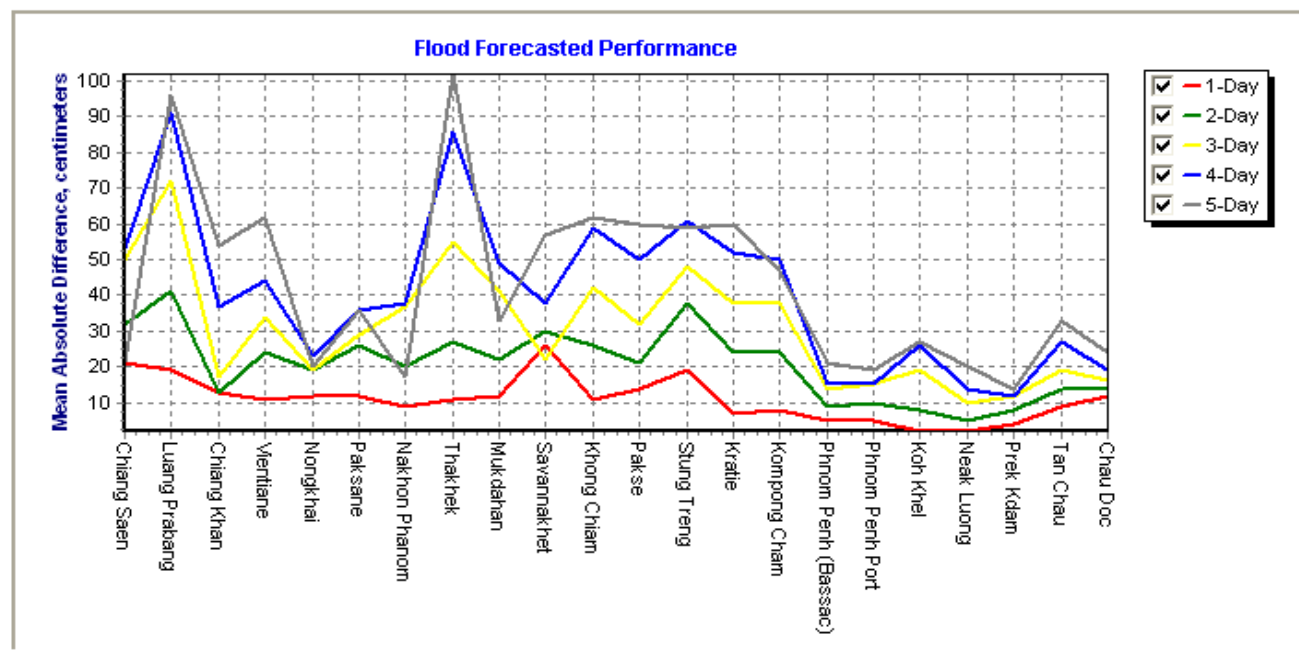
“Accuracy” describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster in Charge taking into consideration known biases in input data and his/her knowledge of the response of the model 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 time is shorter; the forecast for 4 - 5 days ahead is less accurate than the forecast for 1 - 3 days ahead.

In general, the overall accuracy is fairly good for 1-day to 3-day forecast lead time; however accuracies at Luang Prabang and Thakhek for 4-day and 5-day forecast were less than expected.

The peaks for 4-5 day lead time at Luang Prabang and Thakhek perhaps caused by internal model functionality in forecasting especially at those stations.

Figure B1: Average flood forecast accuracy along the Mekong mainstream



**Forecast Achievement**

The forecast achievement indicates the % of days that the forecast at a particular station for a lead-time is successful against a respective benchmark (Table B2).

Table B1: Achievement of daily forecast against benchmarks

unit in %

	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc	Average
1-day	71.4	71.4	85.7	57.1	42.9	42.9	57.1	57.1	42.9	28.6	42.9	57.1	42.9	71.4	57.1	85.7	85.7	100.0	100.0	100.0	71.4	71.4	<b>65.6</b>
2-day	66.7	50.0	100.0	66.7	83.3	50.0	66.7	50.0	50.0	66.7	50.0	66.7	33.3	50.0	50.0	50.0	50.0	66.7	83.3	83.3	66.7	50.0	<b>61.4</b>
3-day	20.0	20.0	100.0	0.0	80.0	60.0	40.0	40.0	20.0	40.0	20.0	40.0	20.0	40.0	40.0	60.0	60.0	40.0	40.0	40.0	40.0	60.0	<b>41.8</b>
4-day	100.0	50.0	100.0	50.0	100.0	75.0	75.0	50.0	50.0	75.0	25.0	50.0	0.0	50.0	50.0	50.0	75.0	0.0	75.0	100.0	25.0	50.0	<b>58.0</b>
5-day	100.0	33.3	33.3	33.3	100.0	100.0	100.0	0.0	100.0	66.7	33.3	66.7	33.3	33.3	66.7	33.3	66.7	66.7	66.7	100.0	33.3	33.3	<b>59.1</b>

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
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
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
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
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

**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://fw.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)						
	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
<b>2011</b>																		
<i>week</i>	10:24	0	-	4	08:12	07:07	07:23	07:14	09:02	07:36	07:06	1	0	2	115	132	0	52
<i>month</i>	10:21	0	-	22	08:12	08:42	07:28	06:07	09:08	07:49	07:11	1	4	13	318	525	5	160
<i>season</i>	10:18	1	-	33	08:12	08:42	07:29	06:10	09:05	07:54	07:14	1	4	34	584	806	12	255

*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.

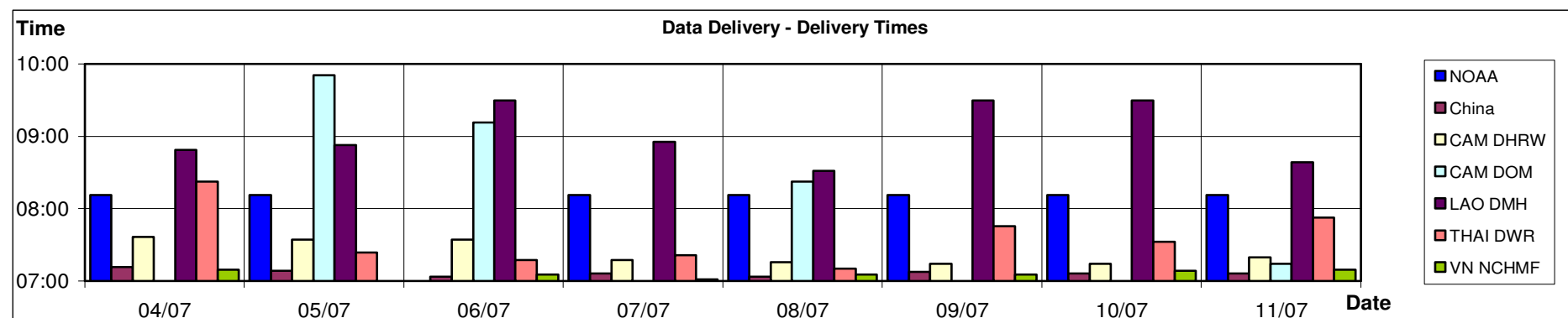


Figure B2: Data delivery times for the past 8 days including the current report date

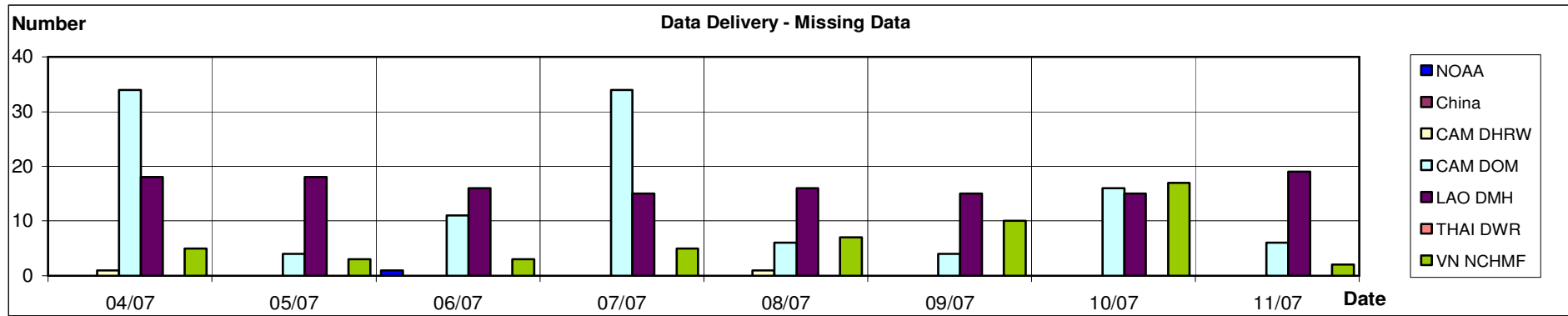


Figure B3: Missing data for the past 8 days including the current report date

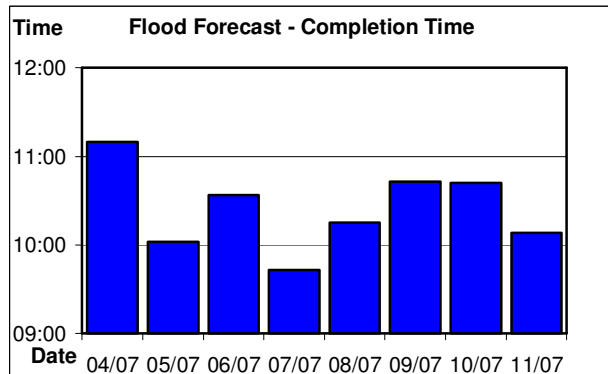


Figure B4: Flood forecast completion time

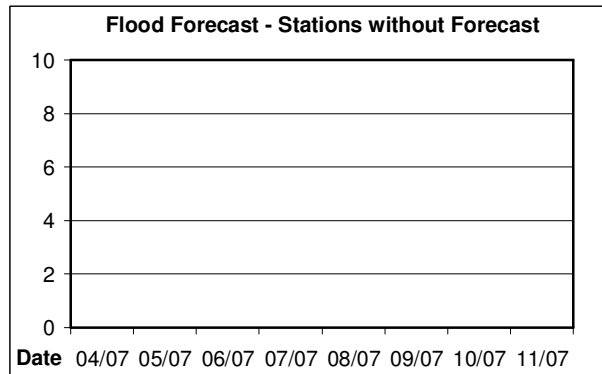


Figure B5: Flood forecast stations without forecast

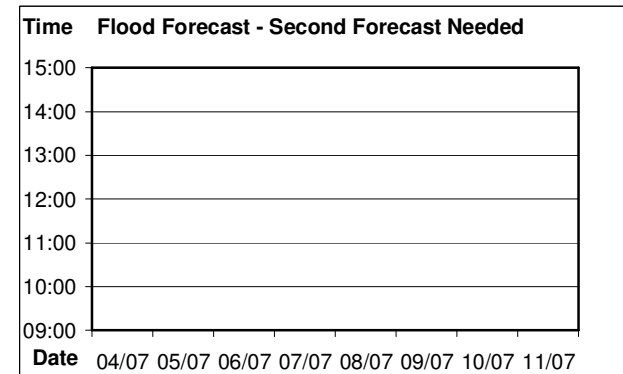


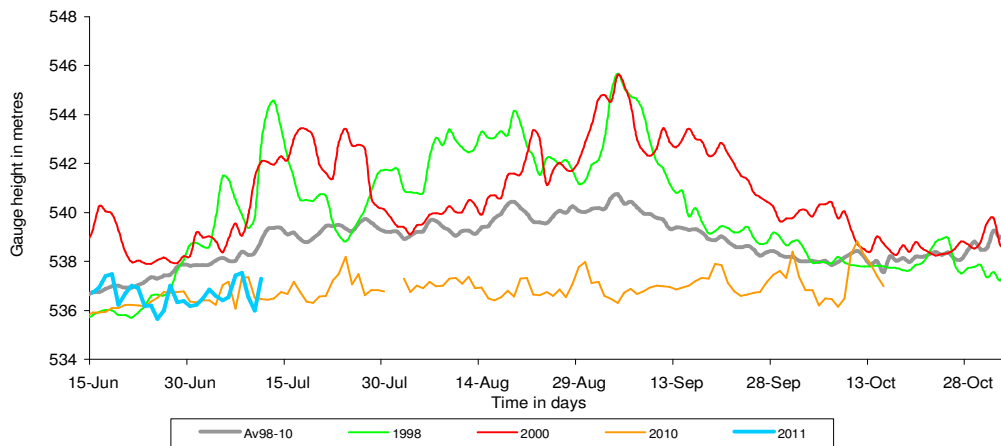
Figure B6: Second forecast needed

## Annex C: Season Water Level Graphs

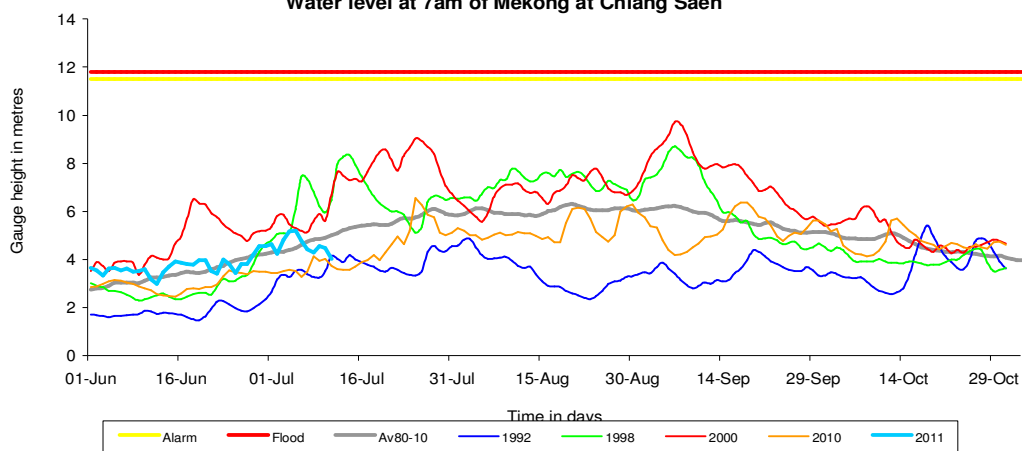
This Annex has the water level graphs of the report date. These graphs are distributed daily by email together with the Flood Bulletins.

### HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS IN FLOOD SEASON FROM 1 JUNE TO 31 OCTOBER

Water level at 7am of Mekong at Jing Hong



Water level at 7am of Mekong at Chiang Saen



Water level at 7am of Mekong at Luang Prabang

