

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

Prepared on: 21/06/2010, covering the week from the 14<sup>th</sup> June to the 20<sup>th</sup> June 2010

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

#### General weather patterns

During the week of the 14<sup>th</sup> June to the 20<sup>th</sup> June 2010, seven weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather patterns of the 14<sup>th</sup> June to the 20<sup>th</sup> June bulletins are summarized below:

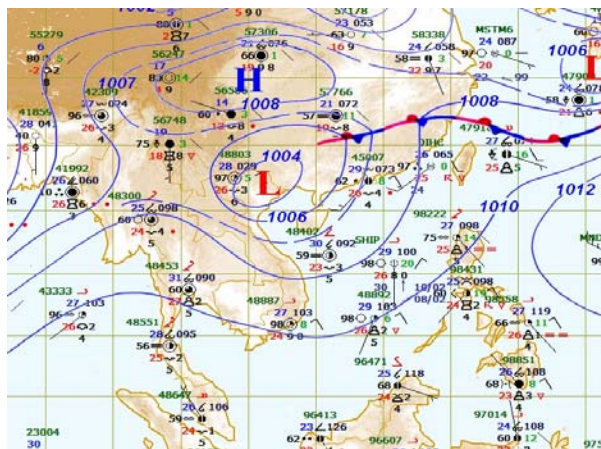


Figure 1: Weather map for 14<sup>th</sup> June 2010

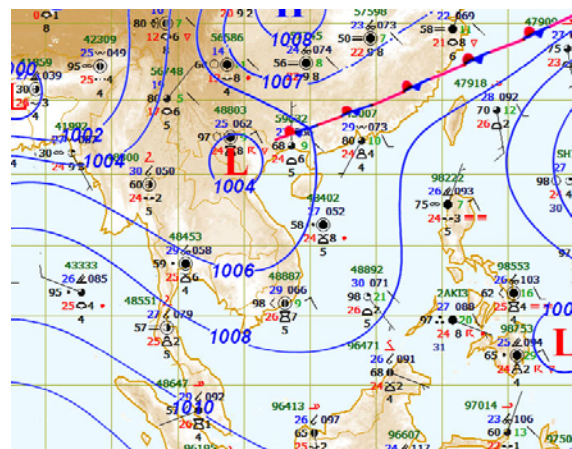


Figure 2: Weather map for 20<sup>th</sup> June 2010

#### South-West (SW) Monsoon

SW monsoon prevailed over Gulf of Thailand and Indochina Peninsular during the week.

#### Low Pressure

The northern part of the LMB was covered by low pressure/ridge of low pressure.

#### Inter Tropical Convergence Zone (ITCZ)

No ITCZ was observed in this week.

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

No Tropical Storm was observed in this week.

#### Other weather phenomena that affect the discharge

Gates of dams in the Mekong basin may be closed at the beginning of wet season to hold back water to fill their reservoirs. Water level at all of forecast stations in the mainstream is extremely lower than many-year averaged level as indicated in Annex C.

### Over weather situation

A normal weather situation lasted during last week. From 14-20 June, the south-westerly wind prevails over Andaman Sea, Myanmar, Thailand and Indochina Peninsula at the surface map and high level of 1.5 km(850hPa). And a low cell covered upper Vietnam and Laos PDR while the southwest monsoon prevailed over the Andaman Sea Thailand and Indochina Peninsula. The trough of low pressure lies across LMB, Myanmar, Thailand, Lao PDR, Viet Nam and Cambodia.

### General behaviour of the Mekong River

Water levels along Lower Mekong River were generally low and most stations were recording levels that are somewhat below long-term average and show a rising and dropping trend in upper and middle reaches of LMB during this week. Water levels at stations in lower reach of LMB from Kratie are more or less stable, with a slightly rising trend in the middle and dropping trend towards the end of the week in which water levels in downstream at Tan Chau and Chau Doc monitoring stations were fluctuated by tidal.

**Water levels at all of the forecasting stations in the mainstream (upper, middle and lower reaches) are below long-term average, for some stations by up to around 3 m, at this time of the year.**

#### ***For stations from Chiang Saen to Luang Prabang***

Water levels were slightly rising toward the end of the week. Both stations were recording levels that were below long-term average for this time of the year.

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

Water levels were falling from the beginning to the end of the week. All of the stations were recording levels which are below long-term average level for this time of the year.

#### ***For stations from Nakhon Phanom to Paksé***

Water levels were somehow stabilised by the middle of the week and then falling toward the end of the week. All of the stations were recording levels which are below long-term average level for this time of the year.

#### ***For stations from Stung Treng to Kampong Cham***

Water levels were slightly rising at the beginning of the week and then were stabilised toward the end of the week. All of the stations were recording levels which are below long-term average level for this time of the year.

#### ***For stations from Phnom Penh to Koh Khel/Neak Luong***

Water levels were more-or-less stable, slightly rising from the beginning to the middle of the week, and then falling towards 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.

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

Water levels at the two stations which are significantly affected by tidal effects, were rising toward to end of the week. Both 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 Mekong River during the past week. Water levels are still significant below flood levels (as defined by the national agency) at all forecast stations.

Monday, 21<sup>st</sup> June 2010

▪ 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
14/06	535.75	2.48	4.70	5.37	2.62	3.47	4.80	2.89	4.14	3.13	2.24	3.50	2.35	3.20	8.20	3.54	2.17	1.22	2.17	1.26	1.27	0.09	0.06
15/06	535.92	2.46	4.56	5.12	2.46	3.30	4.76	2.88	4.12	3.04	2.30	3.41	2.33	3.30	8.53	3.73	2.27	1.36	2.27	1.38	1.39	0.01	-0.14
16/06	535.92	2.59	4.39	4.84	2.27	3.12	4.69	2.93	4.13	3.05	2.26	3.32	2.24	3.29	8.68	3.96	2.37	1.46	2.38	1.48	1.51	0.07	-0.09
17/06	535.95	2.78	4.26	4.64	2.07	2.93	4.49	2.99	4.15	3.10	2.10	3.28	2.33	3.26	8.71	4.07	2.44	1.54	2.45	1.58	1.47	0.16	0.02
18/06	536.09	2.80	4.27	4.42	1.92	2.76	4.39	2.83	4.20	3.11	2.05	3.30	2.32	3.22	8.64	4.08	2.45	1.53	2.42	1.53	1.57	0.18	0.03
19/06	536.09	2.78	4.40	4.06	1.72	2.45	4.10	2.57	4.23	2.95	1.94	3.30	2.32	3.18	8.58	4.07	2.40	1.48	2.34	1.52	1.51	0.14	-0.01
20/06	536.21	2.87	4.48	4.20	1.60	2.60	3.90	2.35	4.06	2.78	1.73	3.22	2.30	3.17	8.50	3.97	2.36	1.44	2.26	1.54	1.45	0.23	0.11
21/06	536.22	2.85	4.46	4.06	1.64	2.32	3.80	2.17	3.43	2.60	1.62	3.07	2.16	3.19	8.48	3.92	2.32	1.39	2.22	1.64	1.39	0.39	0.31
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
14/06	1.0	0.0	0.0	0.0	0.6	0.0	53.3	0.0	0.0	0.0	0.0	37.7	0.0	18.0	2.6	0.0	0.0	0.0	10.5	0.0	0.0	0.0	20.0
15/06	2.0	0.0	0.0	0.0	0.0	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.7	11.4	0.0	1.5	2.5	9.2	2.0	0.0
16/06	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0
17/06	0.0	0.0	0.0	0.0	0.0	1.3	0.0	1.8	8.5	0.0	0.0	6.2	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18/06	3.0	0.0	0.0	3.1	0.0	0.0	0.0	14.8	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0
19/06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	23.4	21.1	0.0	4.0	9.3	9.4	0.0	0.0
20/06	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	45.9	0.0	10.1	6.4	4.2	1.0	0.0
21/06	32.0	0.0	0.0	0.0	10.20	24.4	37.6	0.0	0.4	0.0	0.0	0.00	0.0	0.0	0.0	45.0	0.0	0.0	0.0	0.0	0.0	3.5	0.10

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

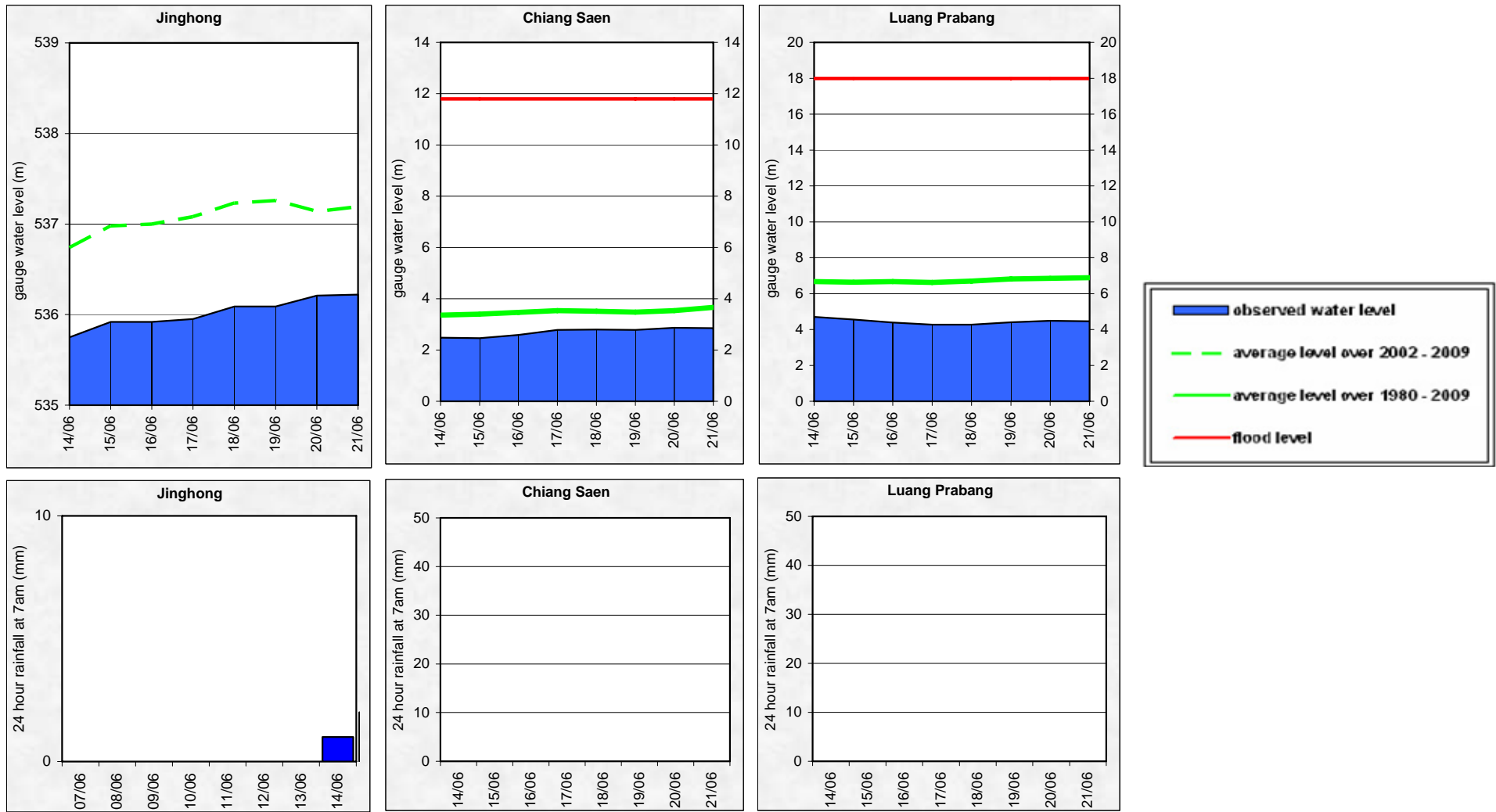


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

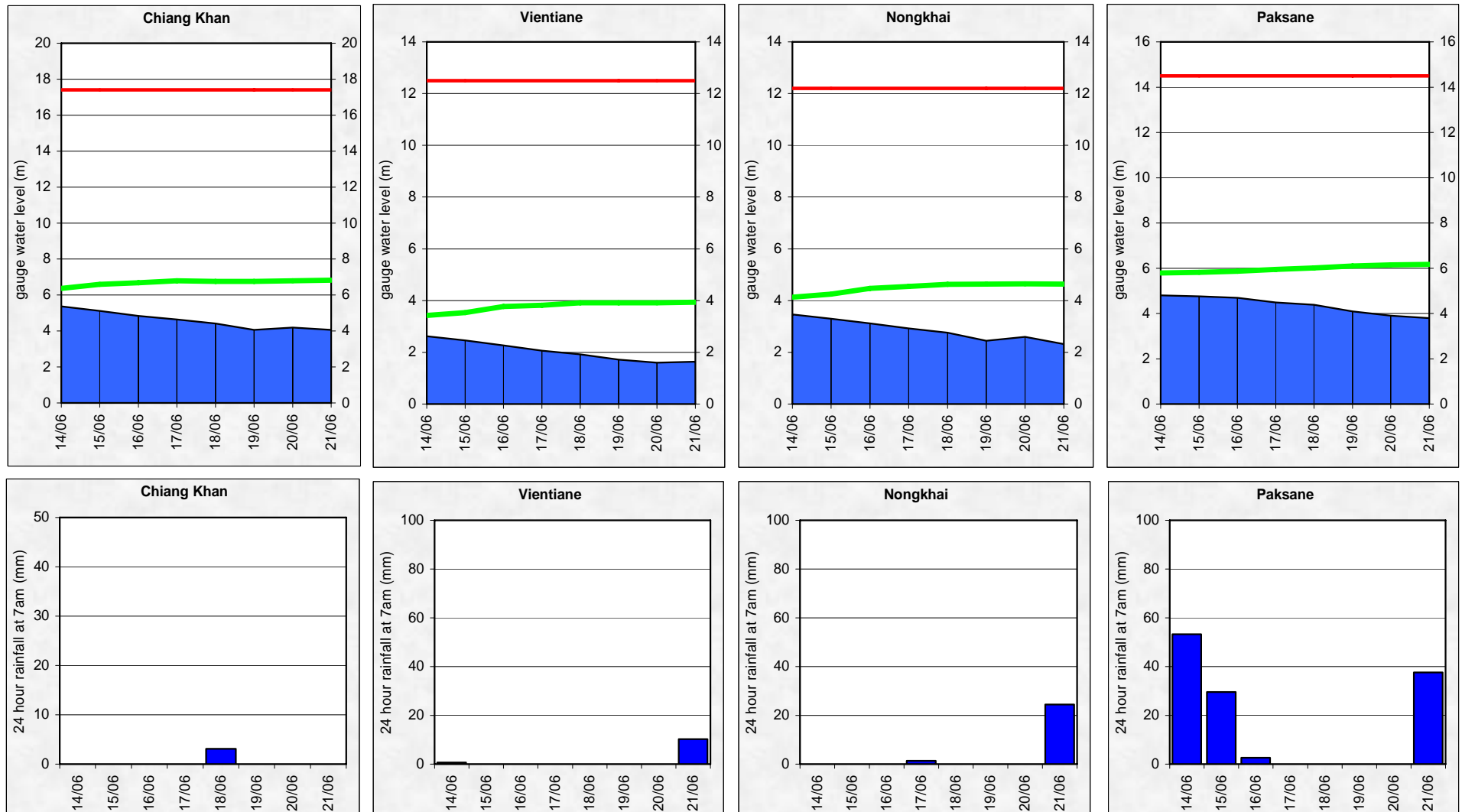


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

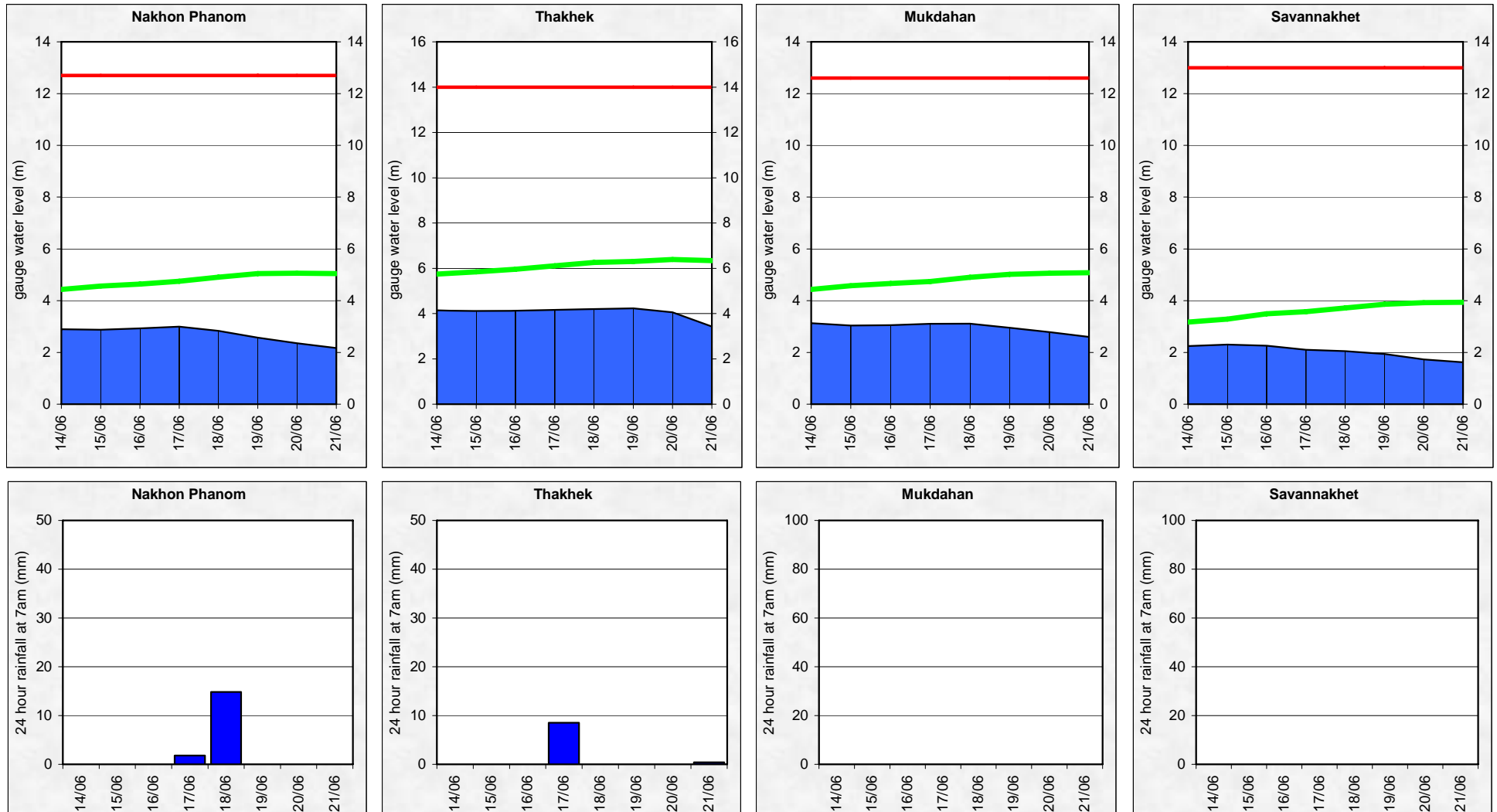


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

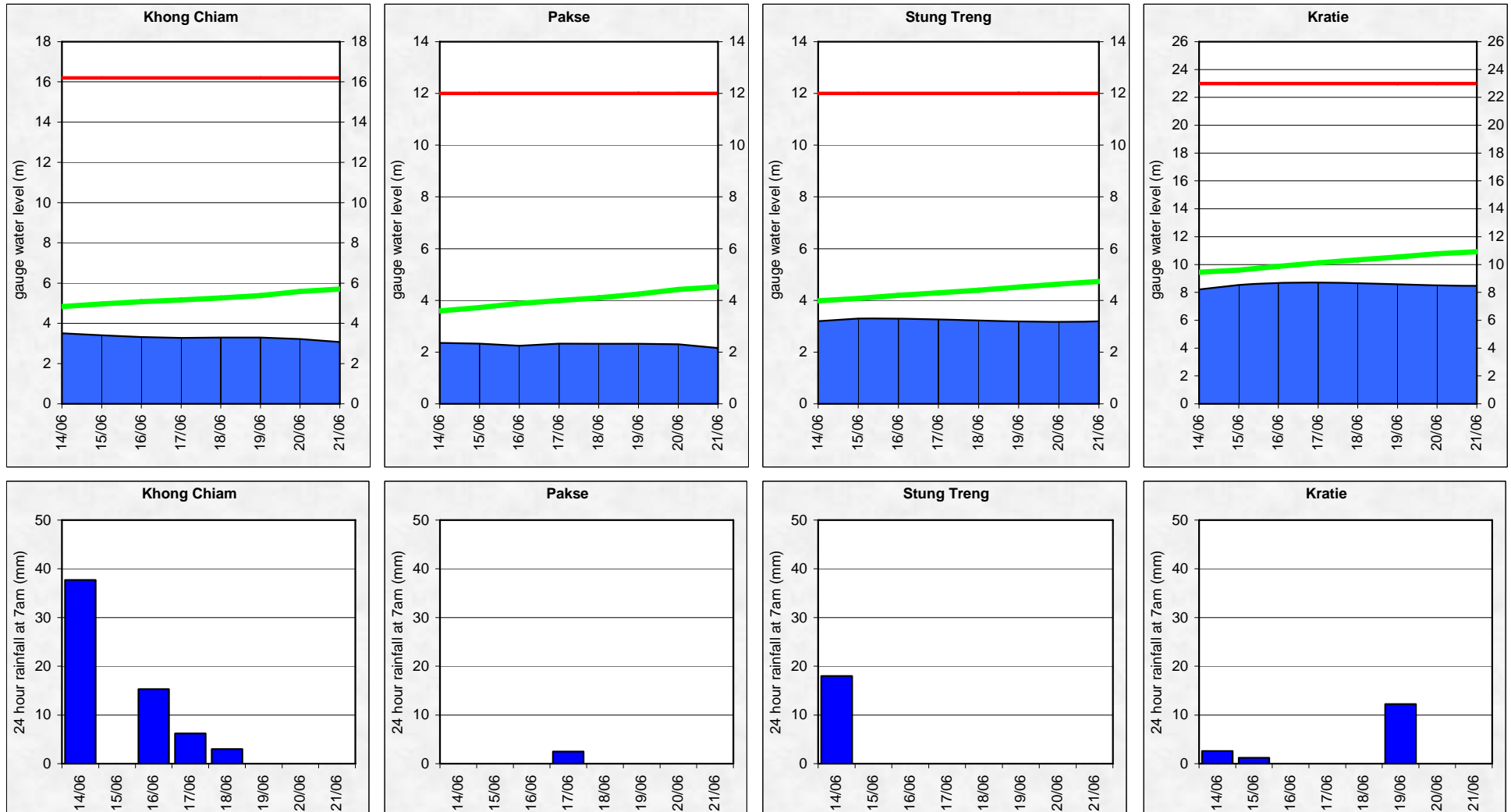




Figure A5: Water level and rainfall for Kampong Cham, Phnom Penh (Bassac and Port), and Koh Khel

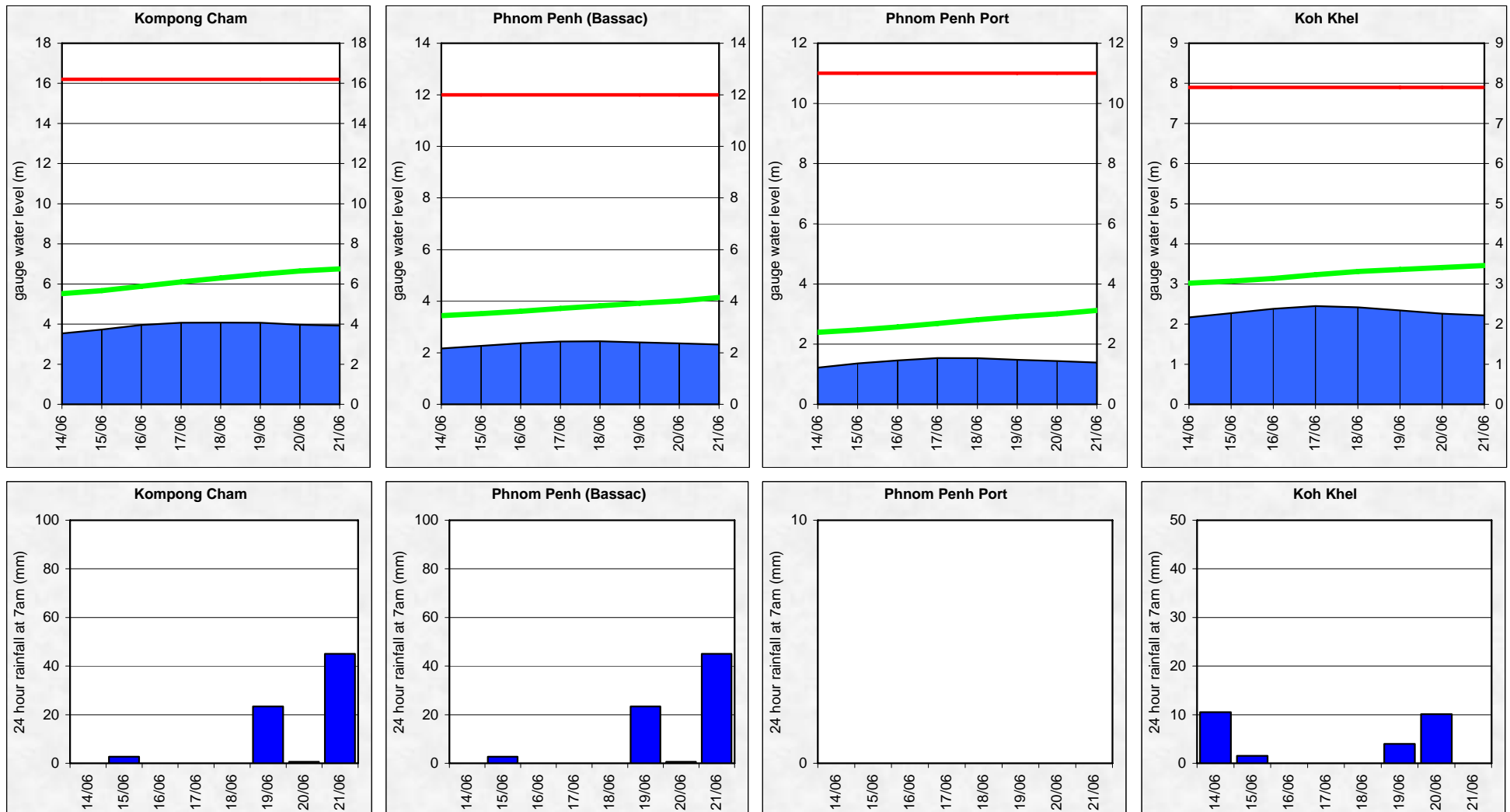
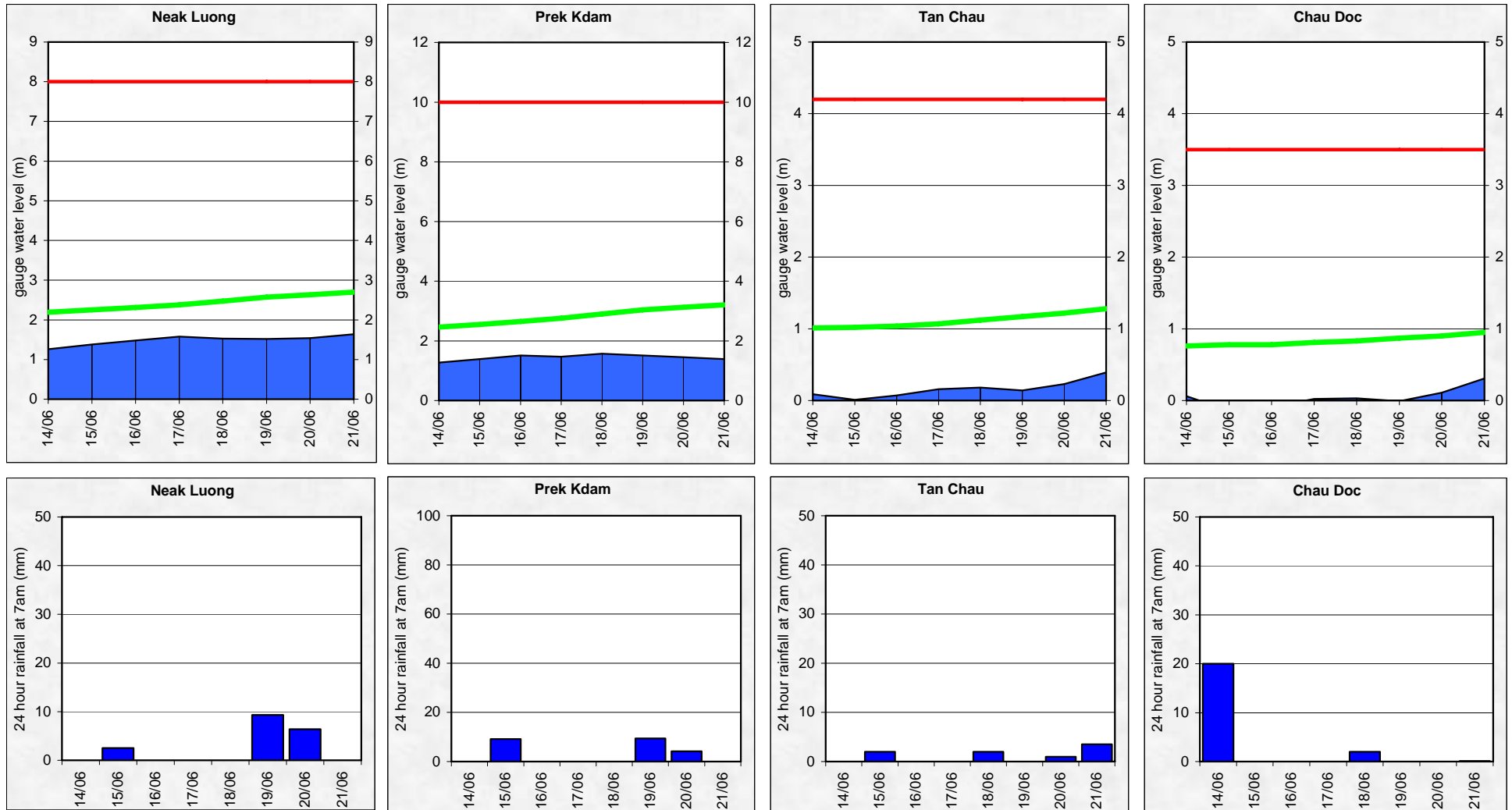


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



## Annex B: Accuracy and performance

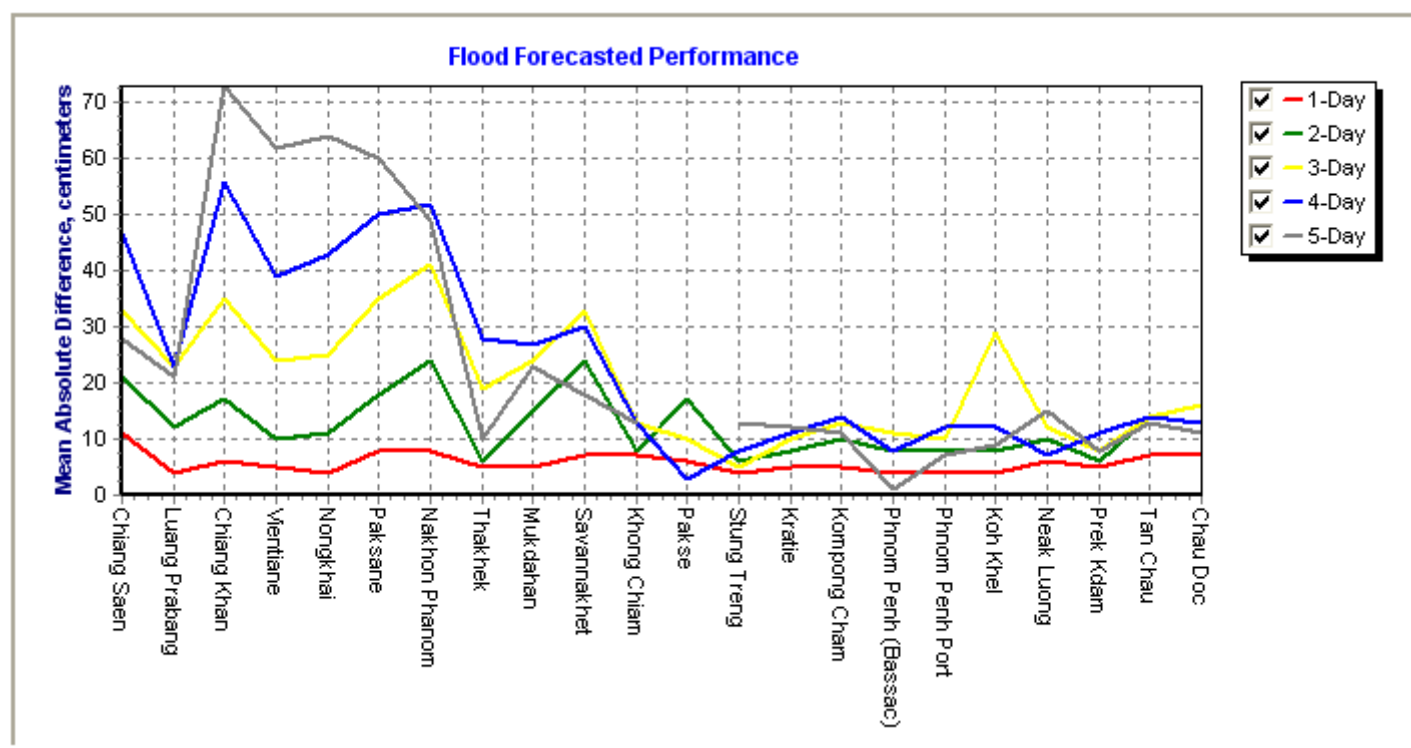
### Accuracy

“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 general the overall accuracy is pretty good for 1-day to 2-day forecasts at all of the forecast stations. However, 3-4-5-day forecast accuracy is better for a number of stations from Khong Chiam to Tan Chau/Chau Doc than that from Chiang Saen to Savannakhet.

The above differences are due to 2 main factors: (1) uncertainty of rainfall forecast from Numerical Weather Prediction (NWP), and (2) internal model functionality in forecasting system due to parameter adjustment in the model is yet 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	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	83.3	100.0	100.0	100.0	100.0	83.3	100.0	66.7	66.7	66.7	95.5
2-day	100.0	100.0	80.0	100.0	100.0	80.0	80.0	100.0	100.0	80.0	100.0	100.0	100.0	80.0	80.0	60.0	40.0	60.0	80.0	60.0	40.0	60.0	60.0	80.9
3-day	75.0	100.0	100.0	100.0	100.0	100.0	75.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.0	75.0	50.0	50.0	50.0	75.0	50.0	50.0	25.0	81.8
4-day	100.0	100.0	100.0	66.7	66.7	33.3	66.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	66.7	100.0	33.3	66.7	66.7	86.4
5-day	100.0	100.0	0.0	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	100.0	0.0	50.0	50.0	86.4

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	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	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	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	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	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			Weather information available (number)	Arrival time of input data (average)							Missing data (number)						
	FF completed and sent (time)	stations without forecast	FF2 completed and sent (time)		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>2010</b>																		
<i>week</i>	10:36	0	-	8	08:14	-	08:00	08:11	08:41	08:19	07:19	0	0	8	209	177	2	61
<i>month</i>	10:42	0	-	21	08:14	-	08:18	08:20	08:47	08:23	07:38	0	0	21	596	435	13	189
<i>season</i>	10:42	0	-	21	08:14	-	08:18	08:20	08:47	08:23	07:38	0	0	21	596	435	13	189

*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.

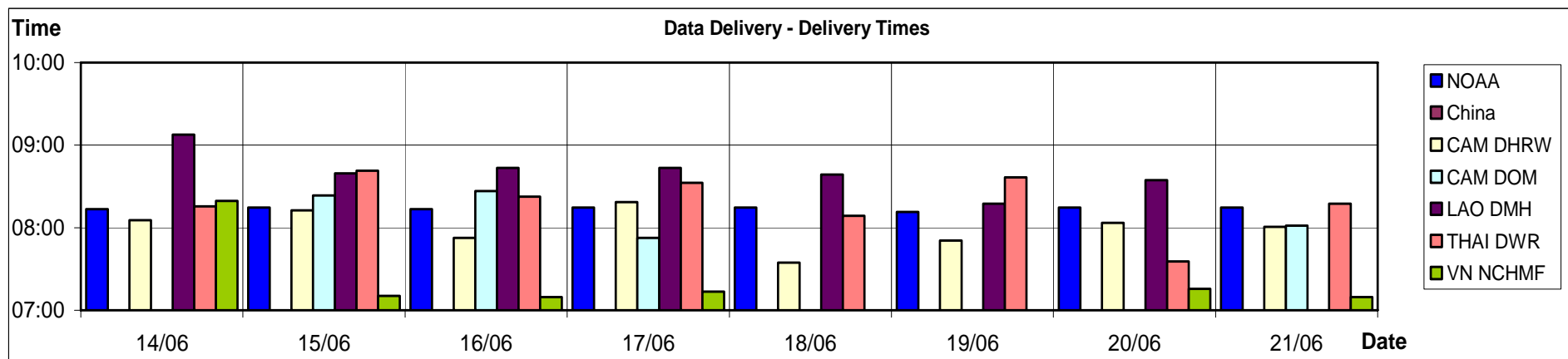


Figure B2: Data delivery times for the past 8 days including the current report date

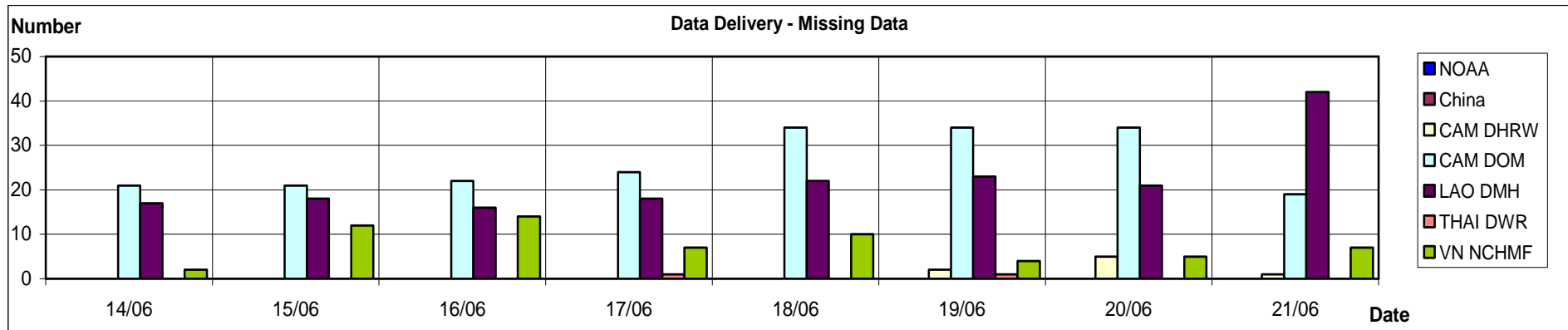


Figure B3: Missing data for the past 8 days including the current report date

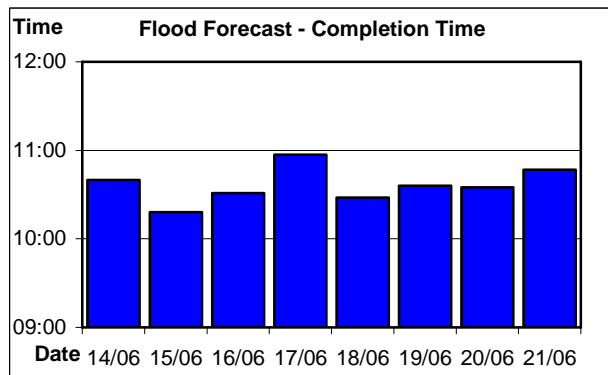


Figure B4: Flood forecast completion time

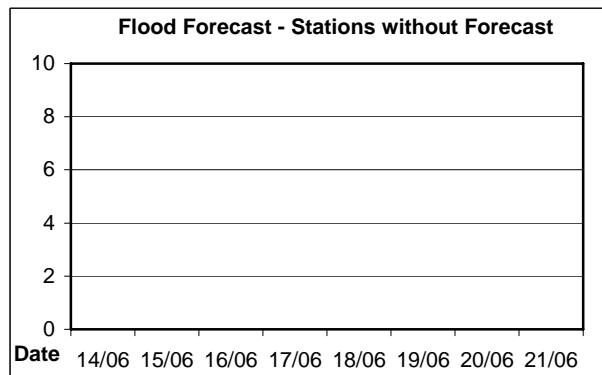


Figure B5: Flood forecast stations without forecast

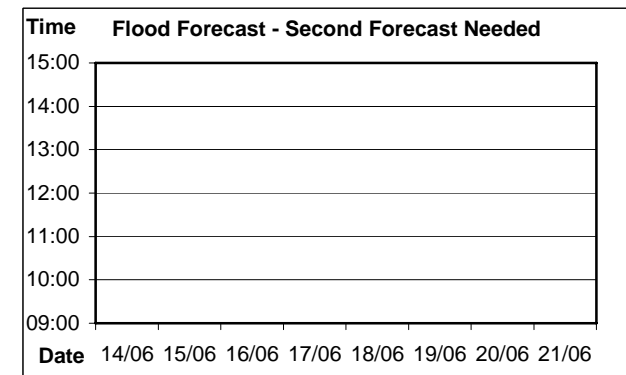


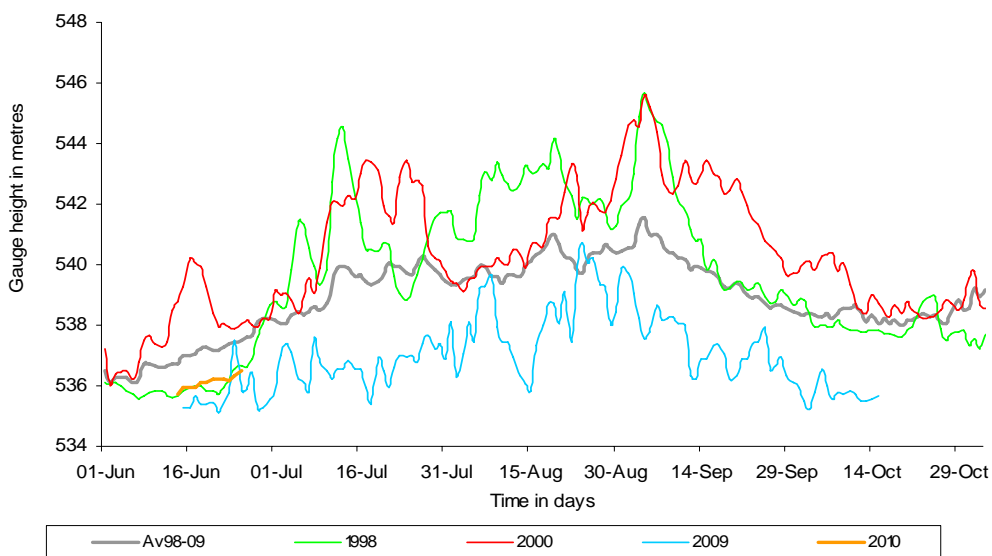
Figure B6: Second forecast needed

## 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 Jing Hong**



**Water level at 7am of Mekong at Chiang Saen**

