

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: Monday, 20/07/2009, covering the week from 13rd July to 20th July 2009

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

General weather patterns

During the week of Monday 13th – Monday 20th July, six weather bulletins (14th – 18th) were issued by the Department of Meteorology (DOM) of Cambodia upon the request by the RFMMC. The weather chart of the July 20th bulletin is presented in the figure below.

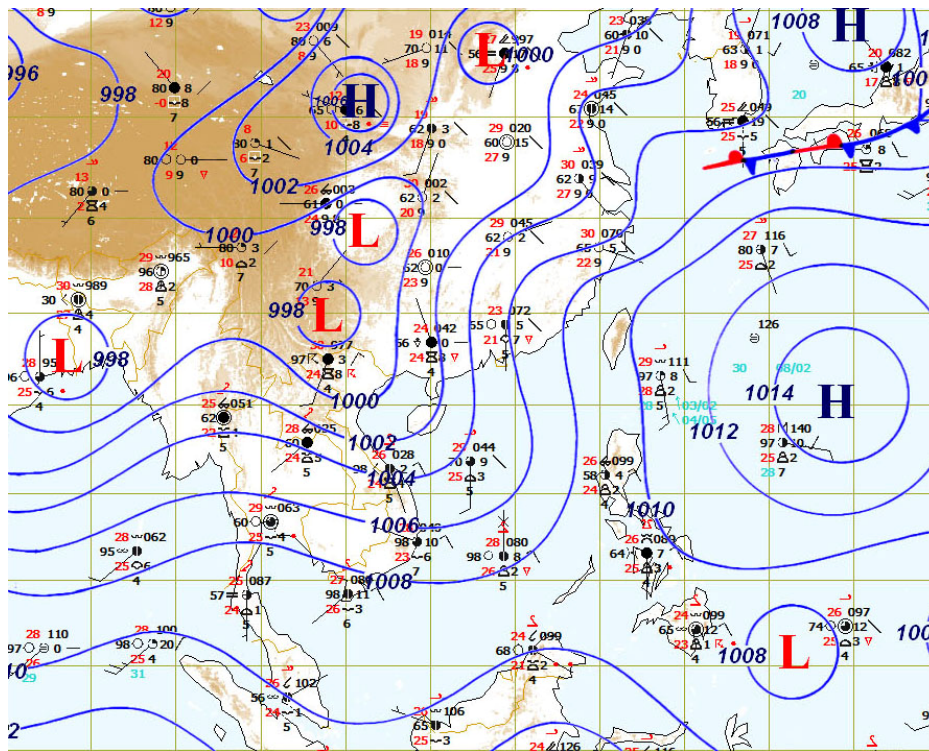


Figure 1: Weather map for 20th July 2009

Active and strong South-West (SW) monsoon

The rather strong SW monsoon prevailed over the Bay of Bengal and Gulf of Thailand; it was active in Indochina Peninsula. During July 20-21, 2009, the low pressure trough moved to west and lied across Lao PDR, Thailand, Viet Nam and Cambodia.

ITCZ (Inter Tropical Convergence Zone)

No ITCZ was observed in this week.

Tropical depressions, tropical storms or typhoons

No Tropical depression or storm / typhoon were observed.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed

Overall weather situation

Normal weather situation. Big thunderstorms in Thailand and Cambodia; and scattered heavy rain occurred in Lao PDR and Northern Viet Nam during July 20-21, 2009.

General behavior of the Mekong River

- The water levels in the Mekong River were generally above the long-term average. A falling trend is observed over the last whole week. At this stage the water levels are still moderately below flood levels everywhere in the Mekong River Basin

For stations from Chiang Saen to Paksane

Water levels were slowly falling and tend to continue falling towards the next week. Most are somewhat close to the long-term average for this time of the year.

For stations from Nakhon Phanom to Pakse

Water levels were more or less stable, with a slightly rising trend towards the end of the week. Most are somewhat above the long-term average for this time of the year.

For stations from Stung Treng to Phnom Penh

Water levels were rising, with a steady trend towards the next week. Most are somewhat above the long-term average for this time of the year.

Downstream from Phnom Penh

Water levels were rising, with a steady trend towards the next week. Most are somewhat slightly above 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 in the Mekong River Basin during the past week. Water levels are still significantly below flood levels (as defined by the national agencies) at all forecast stations.

- Damage or victims:

No damage and no loss of life due to river flooding was recorded anywhere in the Mekong River Basin 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

2009	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
13/07	536.54	4.59	9.99	10.27	7.50	8.62	10.70	8.81	9.93	8.59	7.67	9.47	7.68	6.66	14.85	9.08	5.18	4.29	4.65	3.46	4.16	1.19	0.79
14/07	536.85	4.60	10.32	10.04	7.22	8.39	10.62	8.75	9.85	8.41	7.50	9.39	7.73	6.84	15.35	9.68	5.33	4.46	4.96	3.70	4.47	1.34	0.90
15/07	536.53	4.48	10.13	10.10	7.12	8.24	10.26	8.69	9.80	8.42	7.50	9.23	7.69	7.20	15.86	10.14	5.64	4.81	5.21	3.92	4.74	1.49	1.02
16/07	536.56	4.90	10.14	9.96	7.12	8.22	10.34	8.62	9.73	8.37	7.45	9.41	7.93	7.87	16.75	10.75	6.07	5.14	5.47	4.16	5.01	1.64	1.14
17/07	535.93	4.59	10.25	9.72	6.94	8.06	10.26	8.56	9.67	8.28	7.27	9.80	8.56	8.60	17.95	11.62	6.55	5.58	5.82	4.48	5.41	1.83	1.28
18/07	535.42	4.48	10.23	9.71	6.76	7.91	11.72	8.70	9.80	8.32	7.41	9.95	8.44	8.85	18.70	12.42	6.78	5.82	6.26	4.91	5.86	2.13	1.54
19/07	536.90	4.45	10.12	9.82	6.77	7.90	10.89	9.23	10.26	8.66	7.70	9.82	8.23	8.75	18.86	12.74	7.29	6.38	6.48	5.14	6.09	2.35	1.74
20/07	536.51	4.38	9.81	9.80	6.83	7.97	10.66	9.31	10.21	8.97	8.10	9.90	8.20	8.46	18.63	12.73	7.40	6.51	6.50	5.18	6.14	2.41	1.87
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

2009	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
13/07	69.4	5.8	24.0	7.2	31.6	24.2	75.6	19.4	41.9	0.0	0.0	3.2	6.6	0.0	14.4	9.5	10.6	0.0	0.0	0.0	0.0	38.0	9.0
14/07	21.3	9.6	1.4	16.0	19.8	31.8	12.8	30.8	51.8	1.5	5.8	40.1	27.5	0.0	14.0	0.0	0.2	0.0	19.5	15.8	0.0	13.0	18.0
15/07	0.2	4.1	7.6	0.8	0.0	7.2	28.4	6.1	6.8	1.5	3.1	9.5	27.7	0.0	16.6	34.8	1.3	0.0	0.5	0.7	2.3	2.0	0.2
16/07	0.0	0.0	0.0	0.0	0.0	0.0	1.1	7.3	3.4	22.2	24.0	25.0	30.8	0.0	1.2	2.3	7.2	0.0	2.7	13.4	3.2	1.0	0.0
17/07	4.1	5.2	26.0	10.0	0.8	16.7	204.8	2.2	33.6	6.7	0.0	58.1	21.5	0.0	4.8	0.0	0.0	0.0	16.2	10.6	5.3	6.0	26.0
18/07	2.5	7.5	3.2	5.8	15.6	1.6	63.2	16.7	17.6	0.0	0.0	13.1	11.3	0.0	7.6	3.0	0.2	0.0	0.2	0.1	6.0	0.0	0.8
19/07	0.0	12.5	0.0	0.0	0.0	0.0	7.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
20/07	7.9	1.0	2.4	0.0	0.0	0.0	0.0	35.2	22.7	7.8	4.0	134.7	89.8	0.0	1.0	1.9	0.0	0.0	0.0	0.0	0.0	2.0	7.0

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

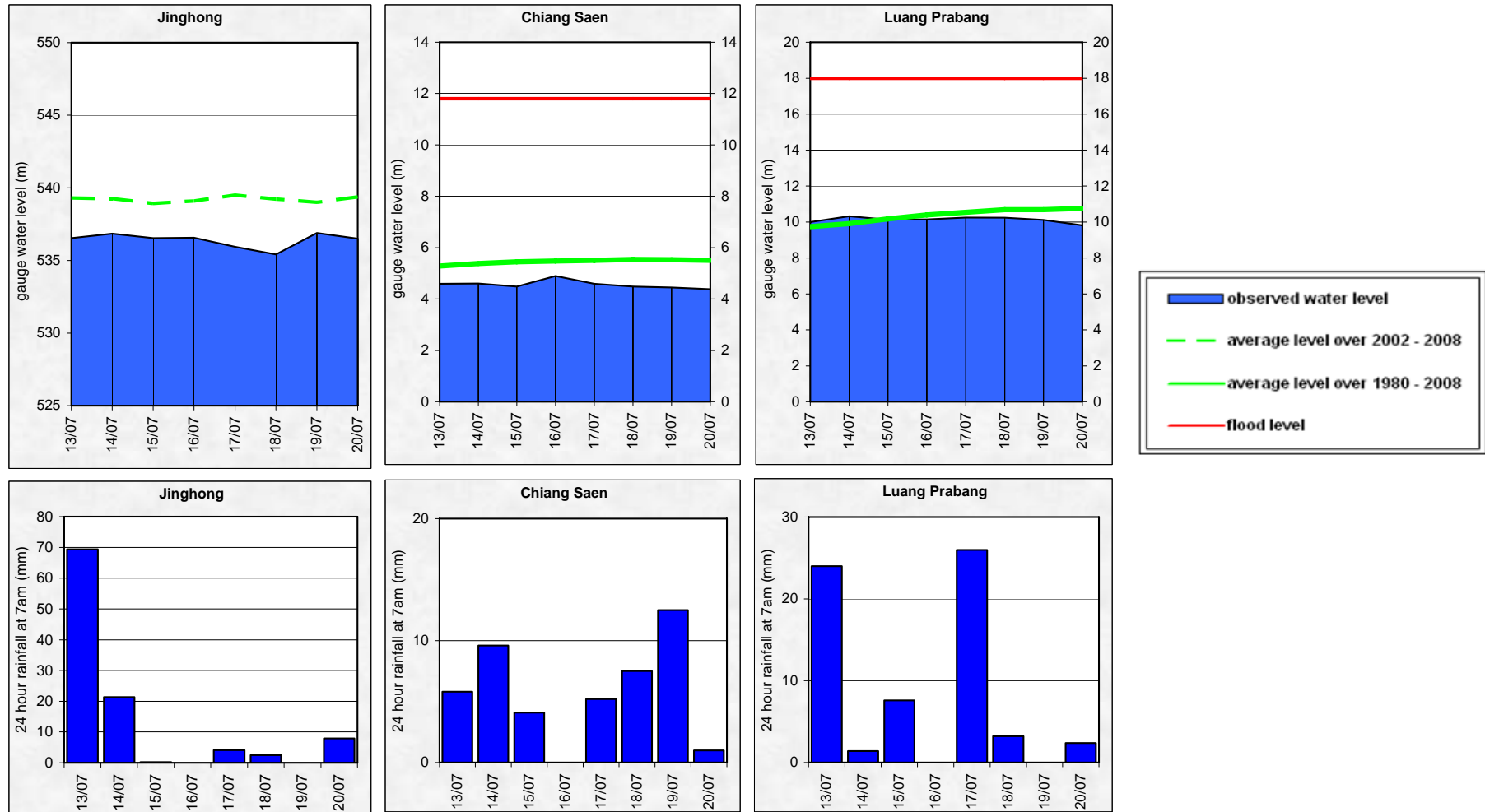
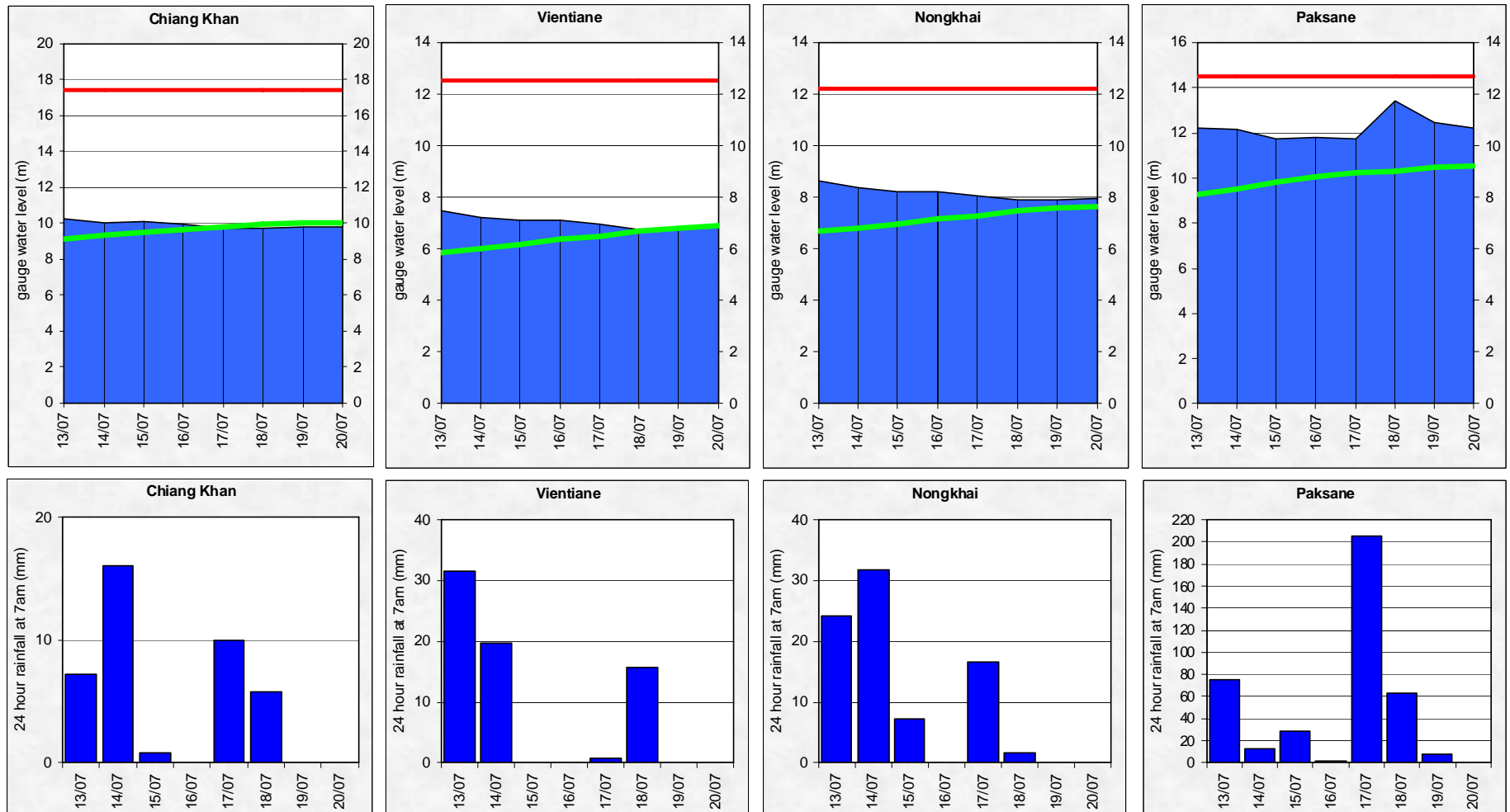


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane



Monday, 20th July 2009

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

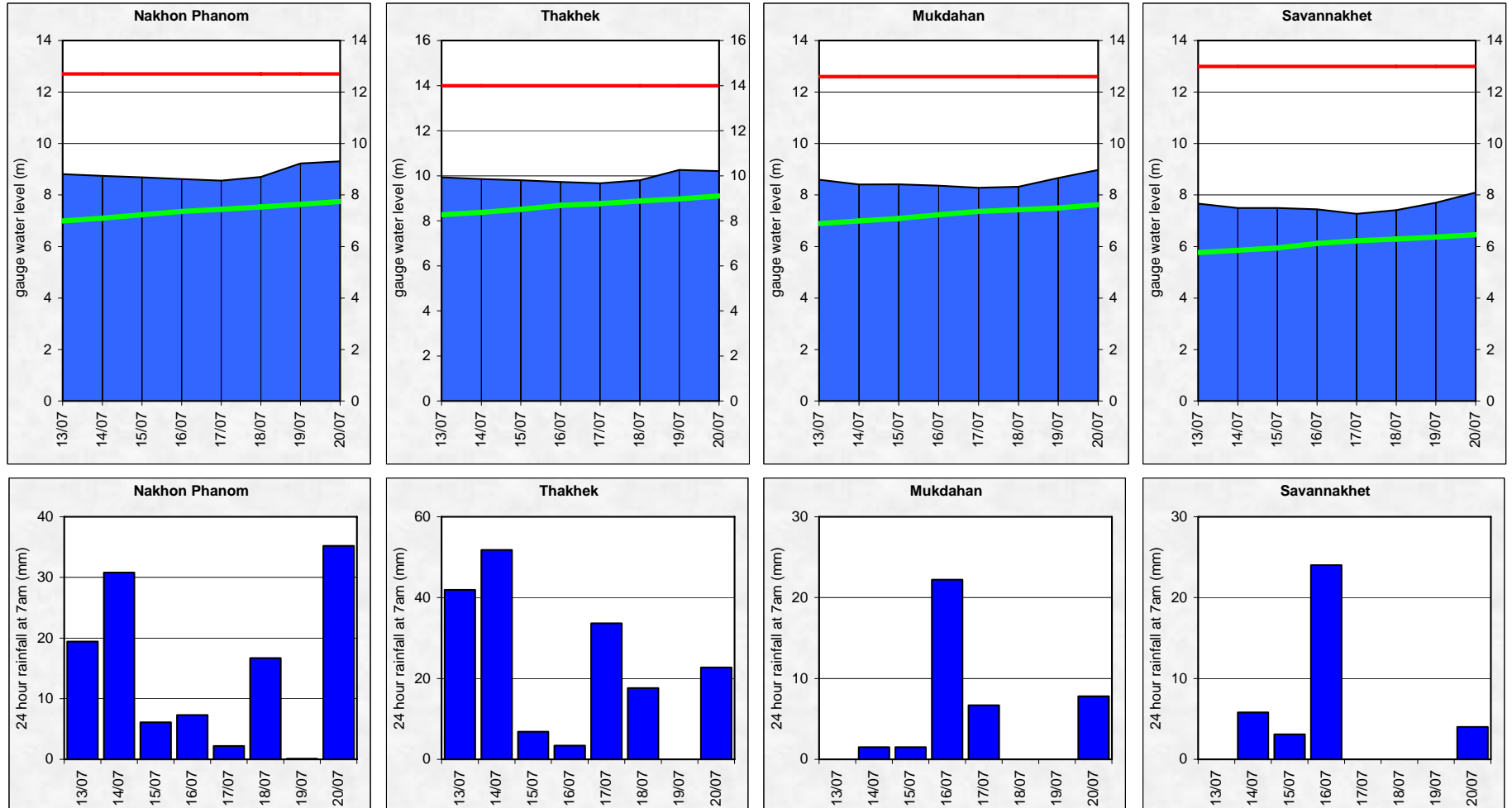
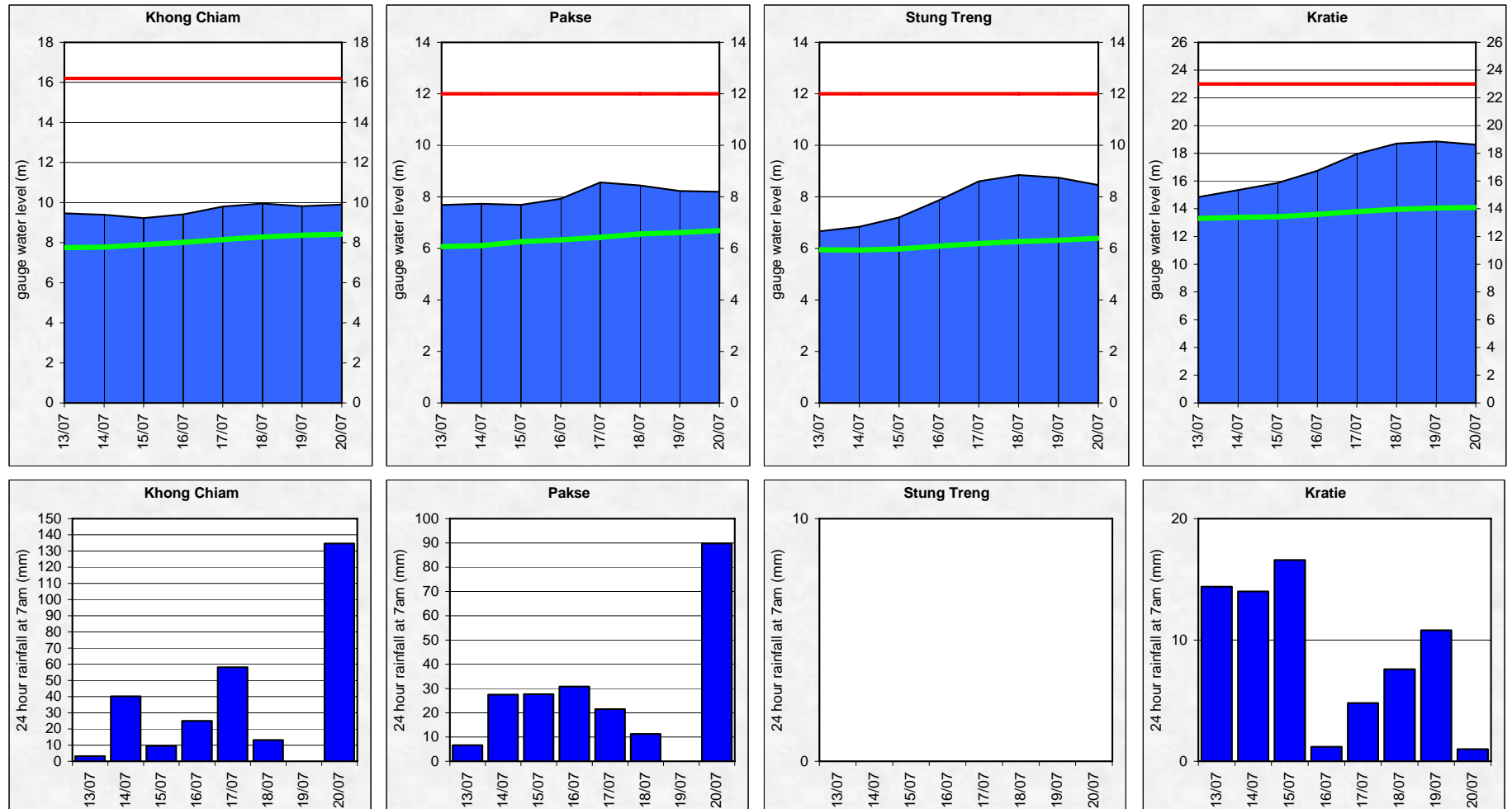


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie



Monday, 20th July 2009

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

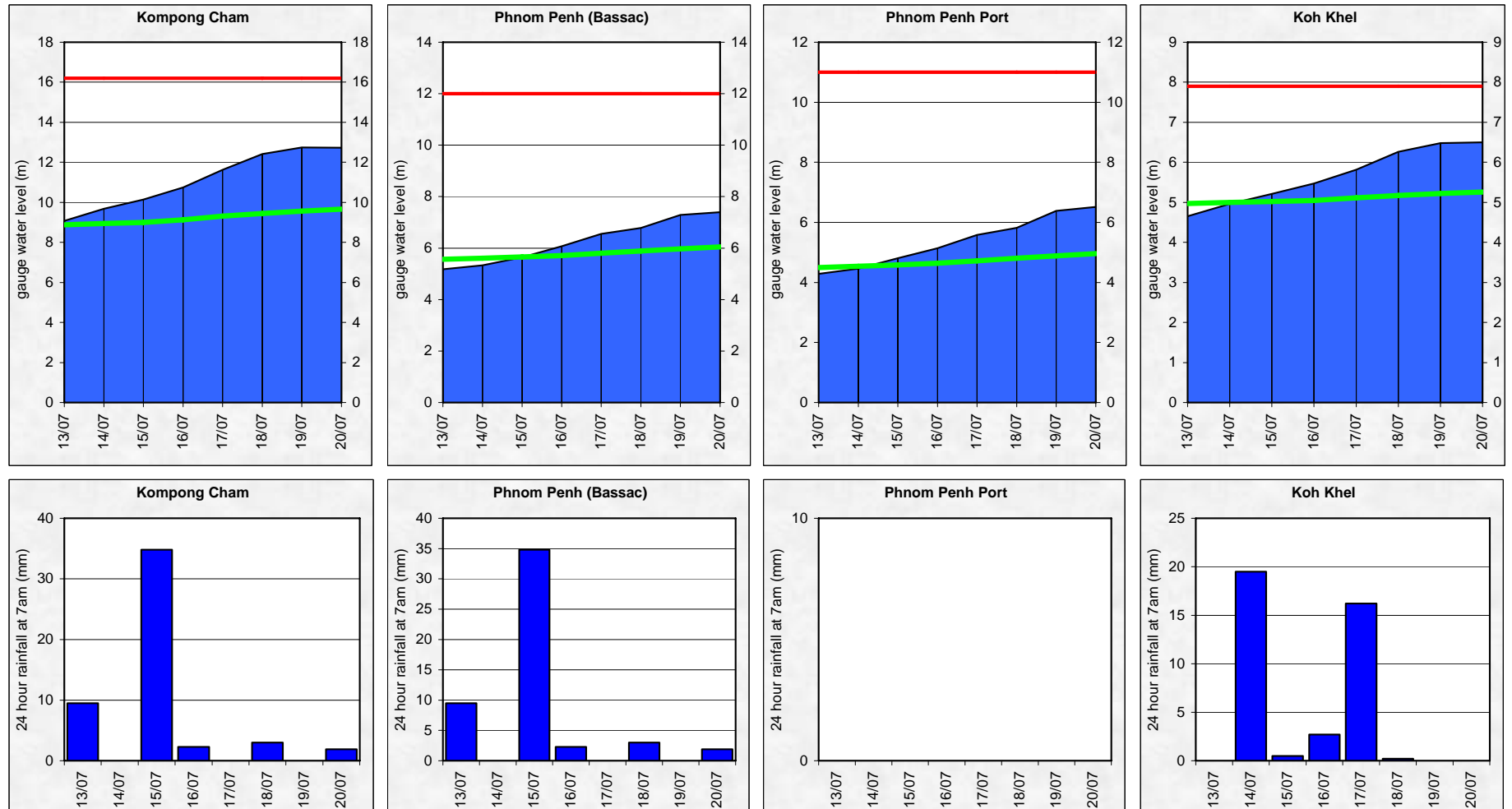
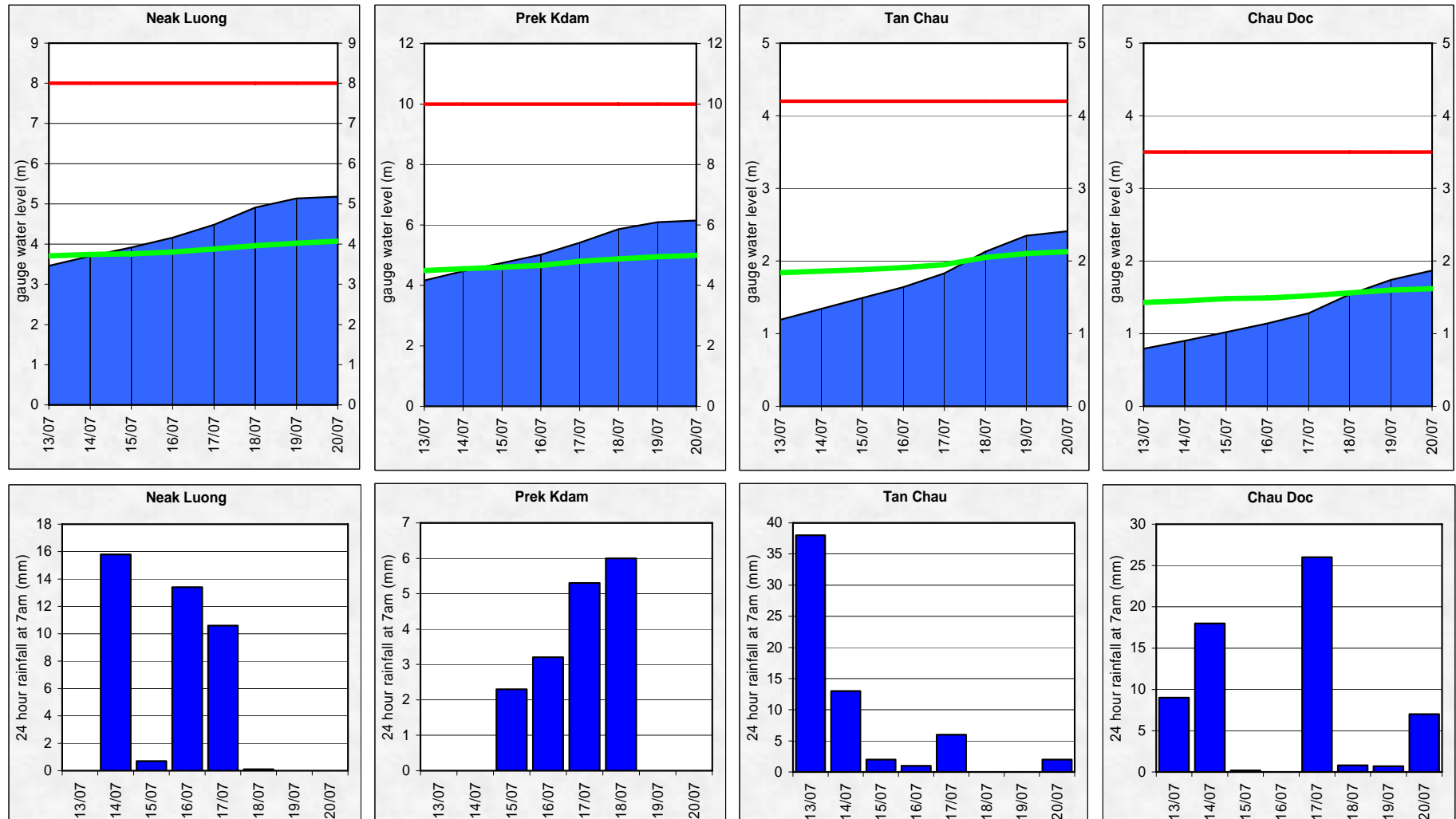


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



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 levels for the past week clearly shows the normal pattern, in which the accuracy is better if the forecast time is shorter; the forecast for 5 days ahead is always less accurate as the forecast 1 day ahead. It also shows that accuracy is higher in the downstream part. In general the accuracy is less than expected.

The peak observed between Stung Treng and Kampong Cham seems to be the cause of internal model functionality which is due to limited parameters for model calibration as well as poor satellite rainfall estimates. A need for better data coverage especially in the left bank tributaries of Sekong, Se San, and Sre Pok is indicated.

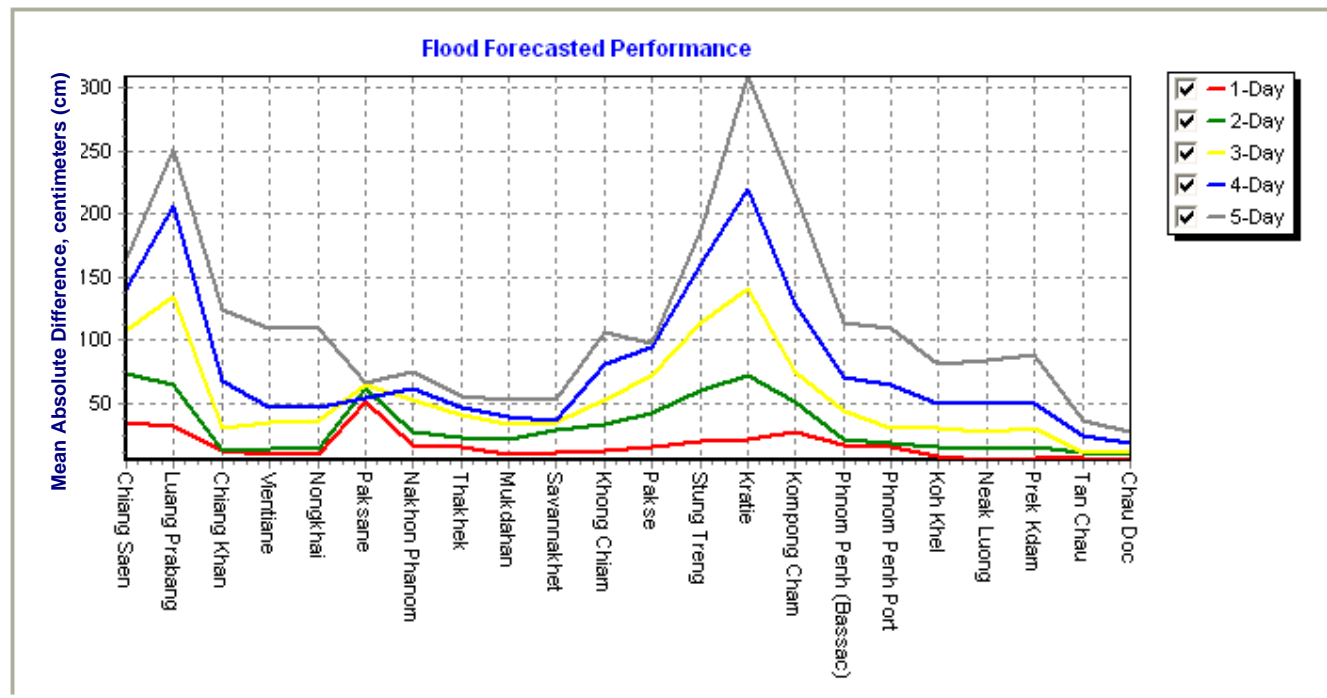


Figure B1: Average flood forecast accuracy along the Mekong mainstream.

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 Khei	Neak Luong	Prek Kdam	Tan Chau	Chau Doc	Average
1-day	71.4	85.7	100.0	100.0	100.0	57.1	85.7	85.7	100.0	100.0	100.0	85.7	14.3	14.3	28.6	14.3	42.9	85.7	71.4	71.4	85.7	100.0	72.7
2-day	66.7	66.7	83.3	83.3	83.3	50.0	83.3	83.3	100.0	83.3	83.3	83.3	16.7	16.7	16.7	33.3	50.0	50.0	33.3	33.3	50.0	66.7	59.8
3-day	20.0	40.0	80.0	80.0	80.0	60.0	40.0	60.0	80.0	80.0	40.0	40.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	80.0	60.0	40.9
4-day	0.0	0.0	75.0	75.0	75.0	50.0	25.0	75.0	100.0	100.0	50.0	50.0	0.0	0.0	25.0	0.0	0.0	25.0	25.0	25.0	0.0	25.0	36.4
5-day	0.0	0.0	0.0	66.7	66.7	66.7	66.7	66.7	66.7	66.7	0.0	66.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.2

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 Khei	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

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>).

In the future these indicators will be adjusted against a set of performance indicators that is established by combining international standards and the specific circumstances in the Mekong River Basin. An expert mission to establish these performance indicators is planned for the fourth quarter of 2009.

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	
2009																			
<i>week</i>	11:24	0	-	7	08:23	08:22	08:15	08:14	08:51	08:30	08:27	0	0	32	88	88	11	46	
<i>month</i>	10:54	13	14:43	11	08:23	08:26	08:15	08:04	08:40	08:30	08:00	0	0	123	339	256	50	209	
<i>season</i>	10:41	26	12:39	44	08:23	08:25	08:09	08:20	08:44	08:25	07:50	0	2	228	1049	667	83	464	

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.

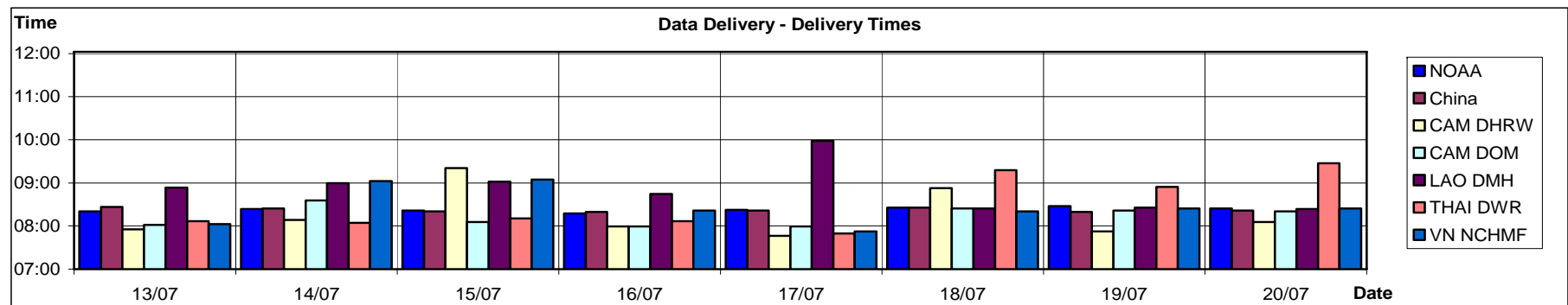


Figure B2: Data delivery times for the past 8 days including the current report date

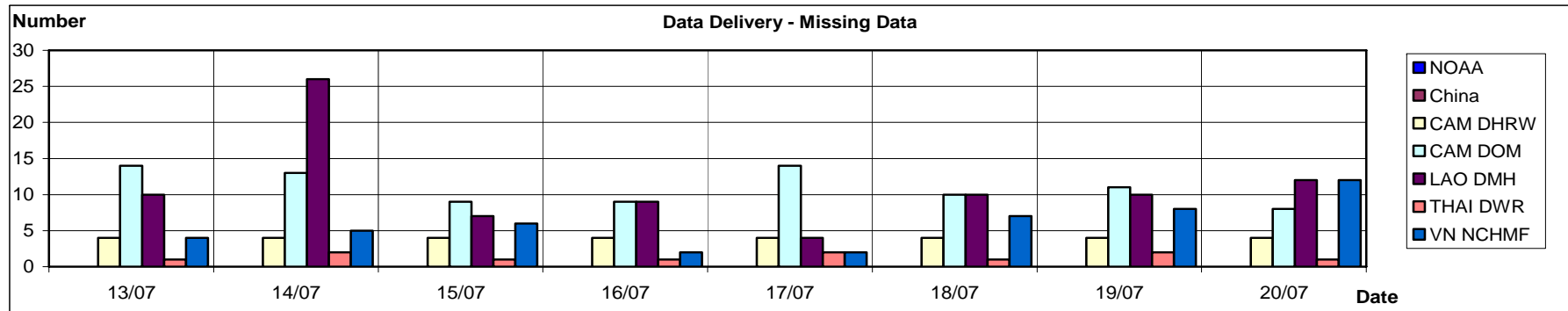


Figure B3: Missing data for the past 8 days including the current report date

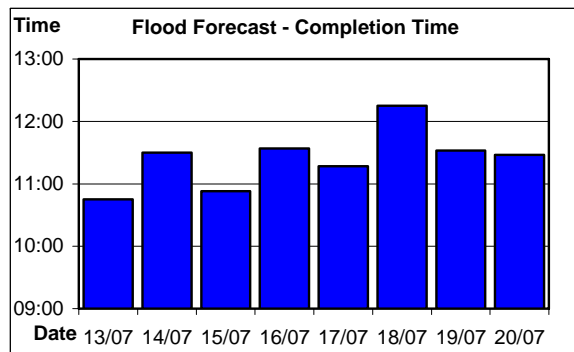


Figure B4: Flood forecast completion time

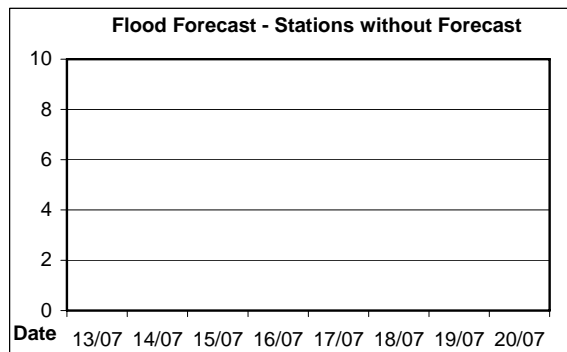


Figure B5: Flood forecast stations without forecast

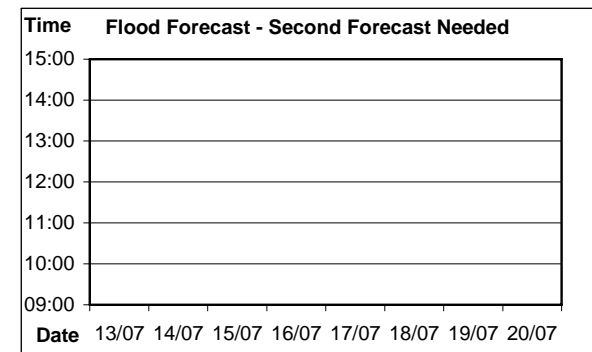


Figure B6: Second forecast needed

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

