

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 17/10/2011, covering the week from the 10th October to the 16th October, 2011

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

General weather patterns

During the week of the 10th October to the 16th October 2011, six weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia. The weather charts of the 10th and the 15th October bulletins are presented in the figures below:

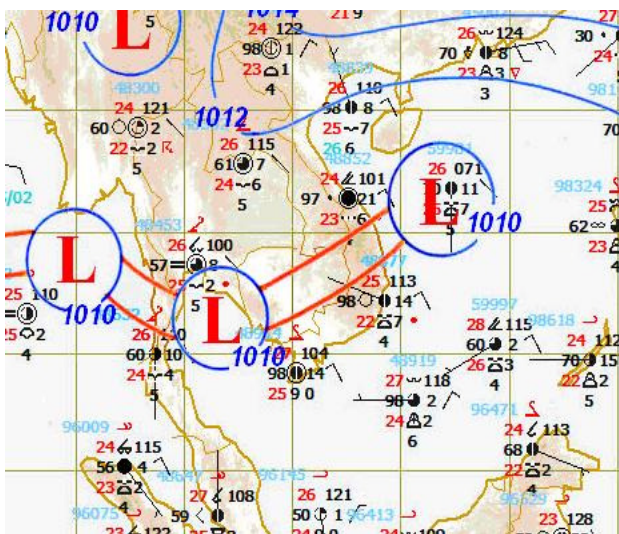


Figure 1: Weather map for 10th October 2011

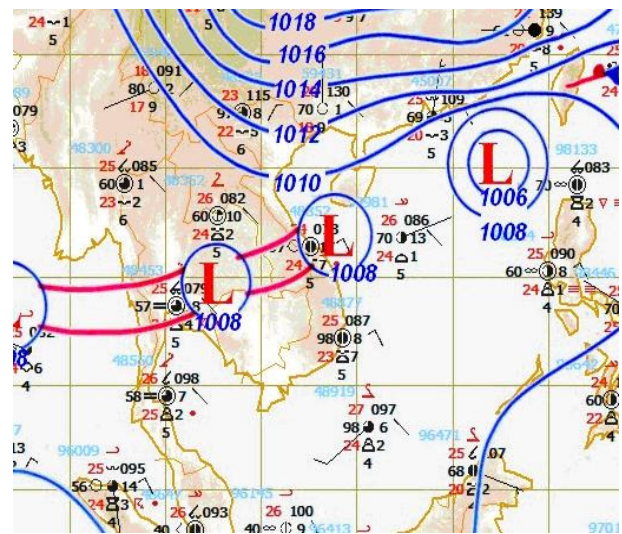


Figure 2: Weather map for 15th October 2011

Moderate South-West (SW) Monsoon

Moderate SW monsoon prevailed over the Gulf of Thailand, Thailand and Cambodia during last week (Figure 1 and 2).

Inter Tropical Convergence Zone (ITCZ)

ITCZ was laid across the middle of Thailand, Viet Nam, lower part of Lao PDR and upper part of Cambodia in the monitoring period.

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

No TD, TS or TY have significant influenced to the LMB in this week.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Over weather situation

A normal weather situation lasted during last week. As the result of SW monsoon activity, appearances of ITCZ in the whole last week and low pressure trough laid across Thailand, Lao PDR,

Cambodia and Viet Nam at the height 1.5 km (850 hPa), isolated heavy rain occurred in the Central and Northeast of Thailand, upper part of Lao PDR, the Northwest and Central of Cambodia, the Northeast of Viet Nam. Figure 3 illustrates rainfall amount distribution over the LMB, covering last week. During last week, heavy rain mostly occurred in the middle and lower parts of LMB from Khong Chiam to Phnom Phenh, especially some areas in the left bank tributaries and Tonle Sap.

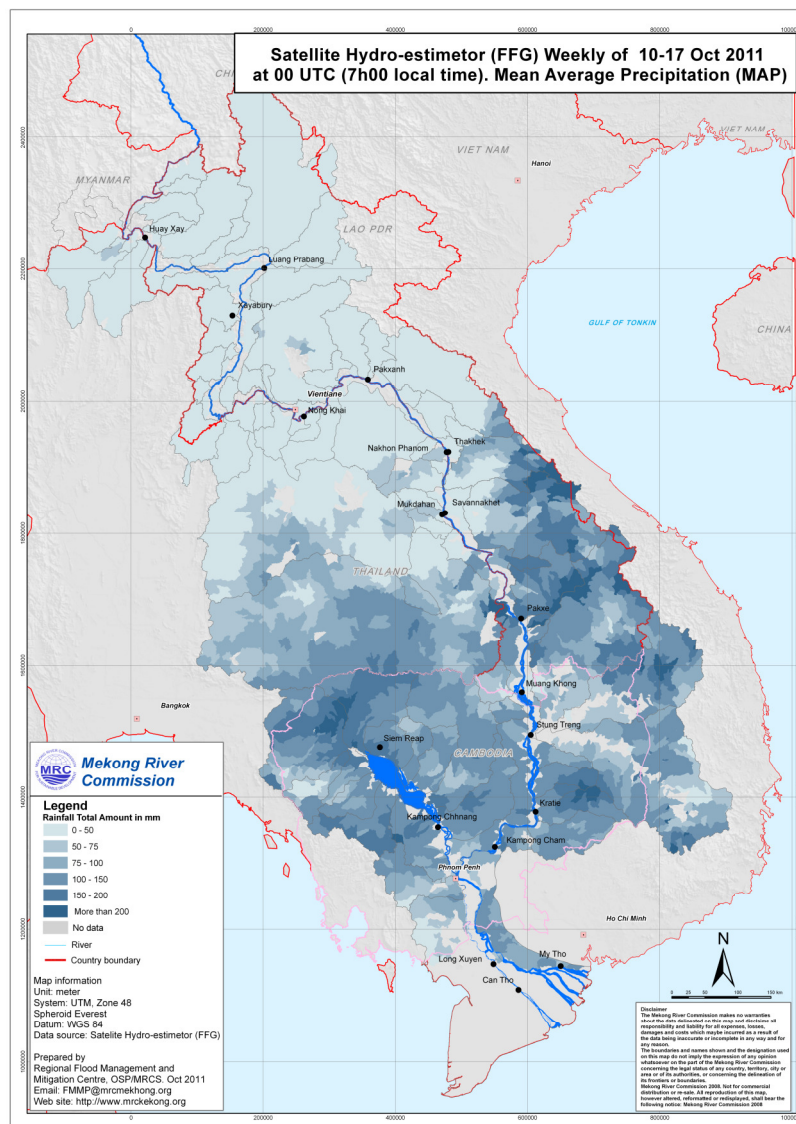


Figure 3: Rainfall distribution over the LMB, covering the week 10 - 16 October, 2011

General behaviour of the Mekong River

While most stations in the middle and lower reaches of Lower Mekong Basin were recording levels that are above the long-term average, water levels at stations in the upper reach were somewhat below the long-term average for this time of the year. Water level of the Mekong river in the upper and middle parts showed a slightly falling trend and water level in the lower part were more-or-less stable during the reporting period. Regarding to two stations in downstream at Tan Chau and Chau Doc, water levels at those two stations were fluctuated by tidal with slightly decreasing trend till the end of the week.

For stations from Chiang Saen to Vientiane/ Nong Khai

Water levels at stations from Chiang Saen to Chiang Khan were more-or-less stable while water levels at Vientiane and Nong Khai showed a slightly decreasing trend during the reporting period and these stations were recording levels that are somewhat below the long-term average for this time of the year.

For stations Paksane to Pakse

Water levels decreased from the beginning to the mid of the week and were more-or-less stable at the end of the week. These stations were recording levels that are above the long-term average for this time of the year.

For stations Strung Treng to Kompong Cham

Water levels were more-or-less stable with slightly falling trend at Kompong Cham in last week. These stations were recording levels are above the long-term average for this time of the year.

For stations from Phnom Penh Port/ Phnom Penh Bassac to Prek Dam

Water levels at these stations were more-or-less stable during reporting period and above the long-term average for this time of the year.

Tan Chau and Chau Doc

Water levels more-or-less stable with slightly decreasing trend in the week. Both stations were recording levels that are 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:
 - The Mekong has reached flood stage at Prek Dam, Tan Chau and Chau Doc monitoring stations.
 - The Mekong has reached alarm situation at Phnom Penh Bassac, Phom Penh Port and Koh Khel and Neak Luong monitoring stations.

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
10/10	535.93	3.81	8.62	8.89	6.25	7.50	10.06	8.97	10.07	8.89	8.45	11.46	9.52	9.00	20.61	15.03	10.86	9.98	7.88	7.96	10.14	4.78	4.23
11/10	535.72	3.85	8.56	8.66	5.95	7.14	9.70	8.53	9.63	8.42	7.70	10.91	9.07	8.87	20.41	14.90	10.84	10.00	7.88	7.95	10.15	4.77	4.24
12/10	535.91	3.74	8.64	8.48	5.71	6.77	9.20	8.27	9.36	8.16	7.50	10.45	8.59	8.81	20.20	14.72	10.81	9.97	7.87	7.93	10.15	4.76	4.24
13/10	536.02	3.65	8.60	8.42	5.50	6.55	8.70	7.88	8.95	7.81	7.25	10.23	8.40	8.77	20.05	14.62	10.78	9.94	7.86	7.92	10.14	4.74	4.24
14/10	535.62	3.64	8.48	8.51	5.45	6.42	8.70	7.65	8.76	7.53	6.90	10.26	8.42	8.70	19.96	14.54	10.75	9.92	7.86	7.88	10.14	4.71	4.22
15/10	536.35	3.65	8.32	8.41	5.50	6.46	8.92	7.41	8.55	7.40	6.70	10.24	8.63	8.83	19.94	14.49	10.73	9.91	7.85	7.86	10.15	4.68	4.19
16/10		3.65	8.18	8.47	5.40	6.36	8.86	7.27	8.41	7.24	6.50	10.40	8.75	8.90	20.11	14.49	10.73	9.91	7.85	7.84	10.15	4.67	4.19
17/10		3.76	8.17	8.33	5.38	6.35	8.84	7.29	8.41	7.29	6.30	10.35	8.69	8.99	20.18	14.51	10.70	9.88	7.84	7.82	10.14	4.66	4.17
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
10/10	0.0	0.0	nr	0.4	nr	0.0	nr	0.0	nr	0.0	nr	30.1	nr	18.0	11.6	9.7	nr	-	2.3	0.2	nr	0.0	-
11/10	0.0	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	11.1	12.5	nr	0.0	nr	21.8	-	0.4	0.0	9.3	nr	0.8
12/10	0.0	nr	nr	nr	nr	nr	0.1	nr	nr	1.3	1.0	nr	nr	nr	4.5	nr	1.5	-	18.3	0.4	13.2	nr	-
13/10	0.0	nr	nr	2.3	nr	8.9	nr	14.6	4.0	11.6	18.6	17.6	9.3	nr	6.4	nr	21.1	-	0.0	0.0	8.2	0.0	-
14/10	0.0	nr	nr	nr	nr	0.3	nr	nr	2.8	27.6	6.4	49.7	122.5	26.5	31.2	7.2	nr	-	3.8	1.0	nr	nr	-
15/10	-	nr	nr	nr	8.0	nr	nr	31.6	32.8	39.1	24.4	40.2	3.5	19.0	26.0	0.8	0.5	-	0.0	nr	nr	nr	-
16/10	-	nr	nr	13.4	nr	nr	0.3	8.5	17.1	2.2	9.3	nr	nr	21.0	7.6	1.4	1.6	-	23.1	4.2	nr	3.1	-
17/10	-	nr	nr	2.0	1.0	1.5	0.4	0.4	0.4	15.3	14.6	nr	nr	1.0	12.4	nr	nr	-	nr	nr	nr	nr	-

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

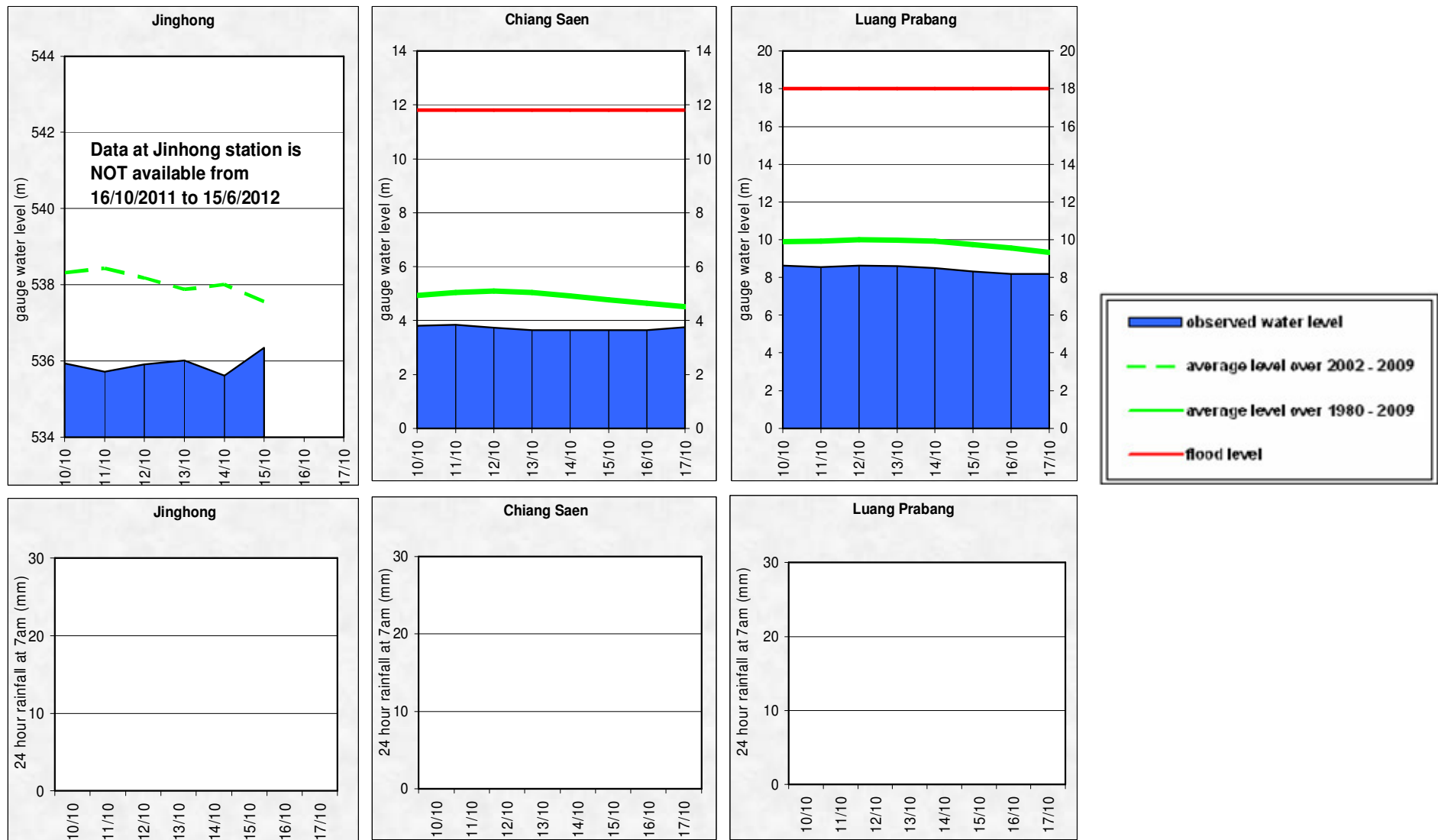


Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane

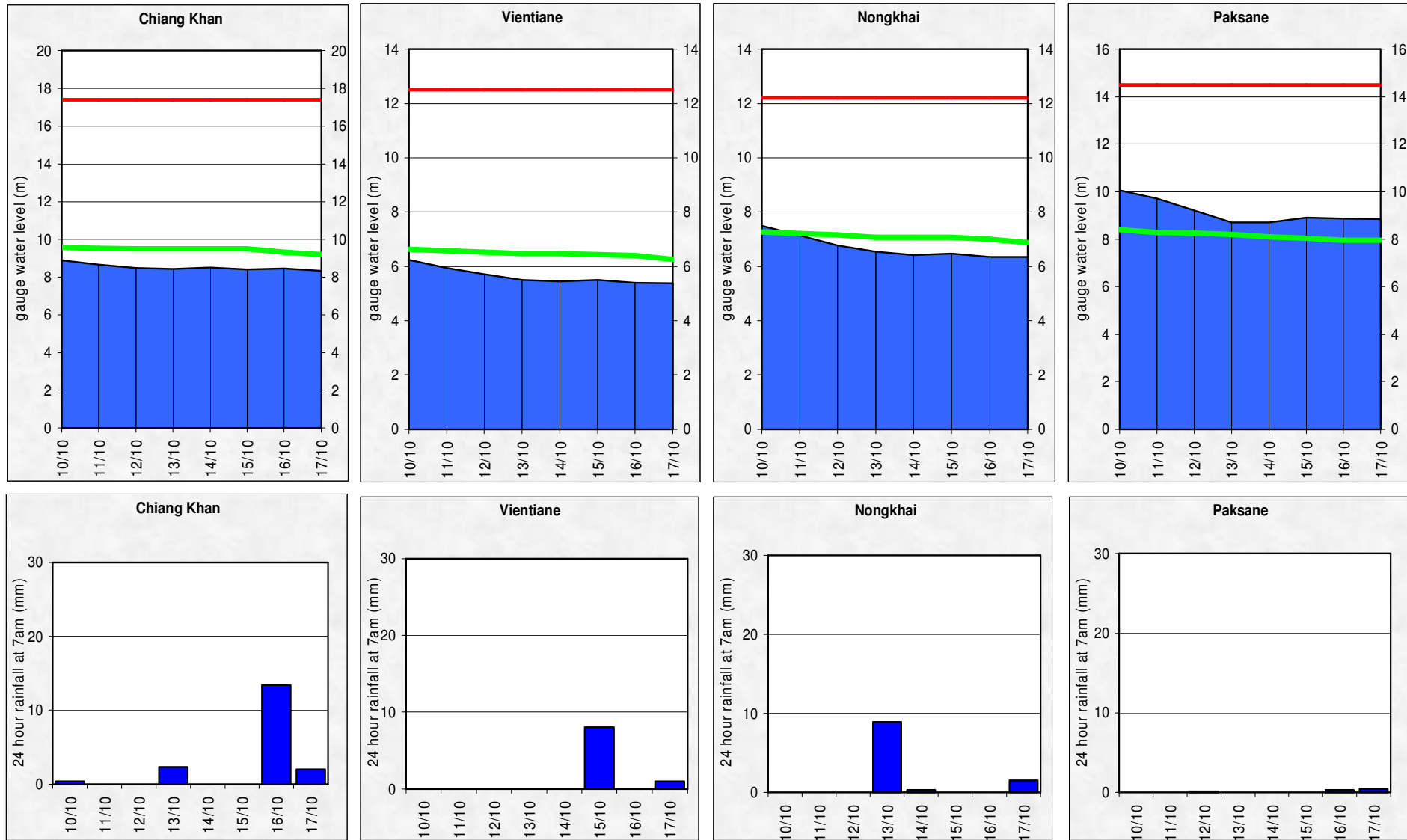


Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet

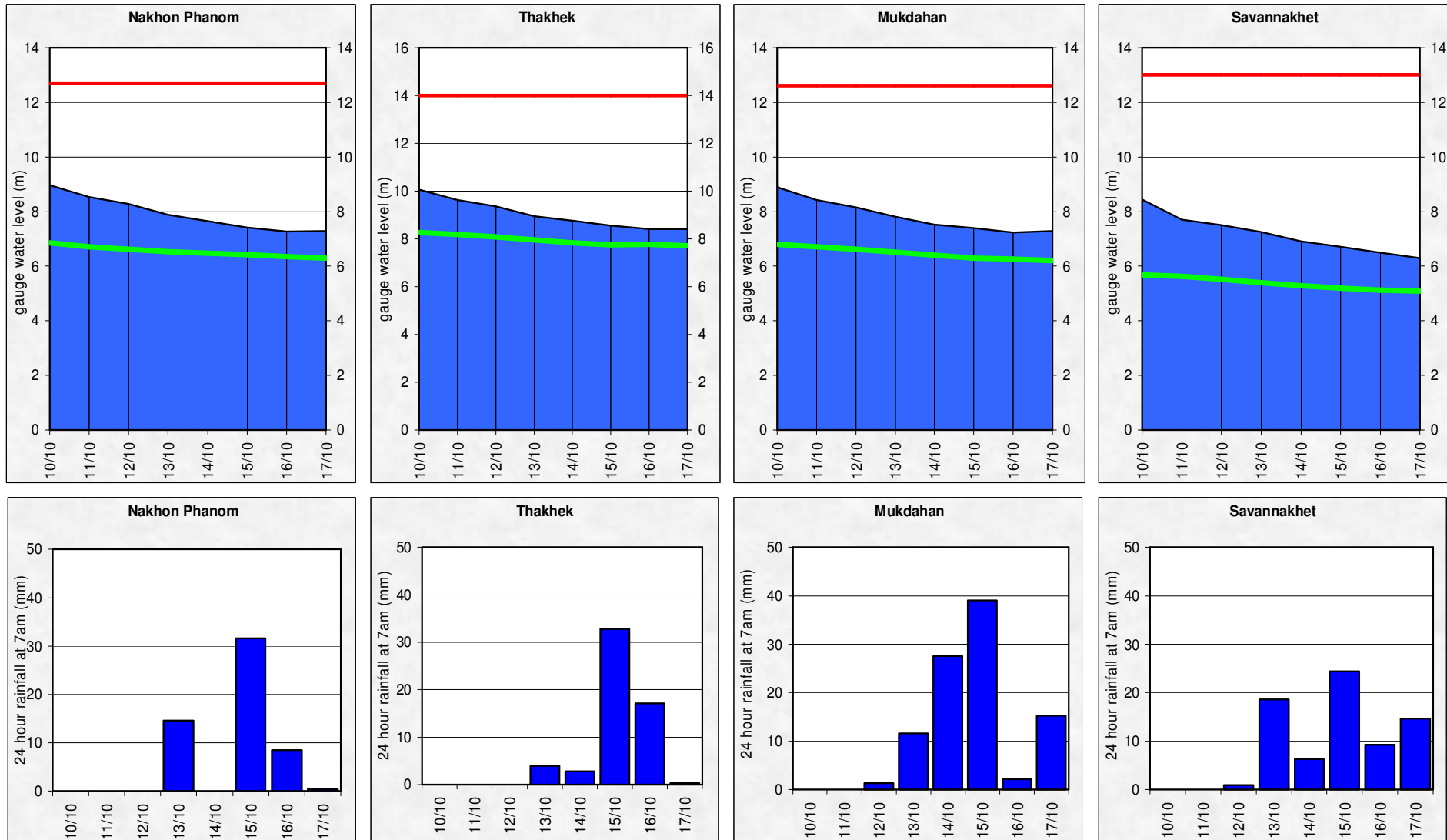


Figure A4: Water level and rainfall for Khong Chiam, Pakse, Stung Treng, and Kratie

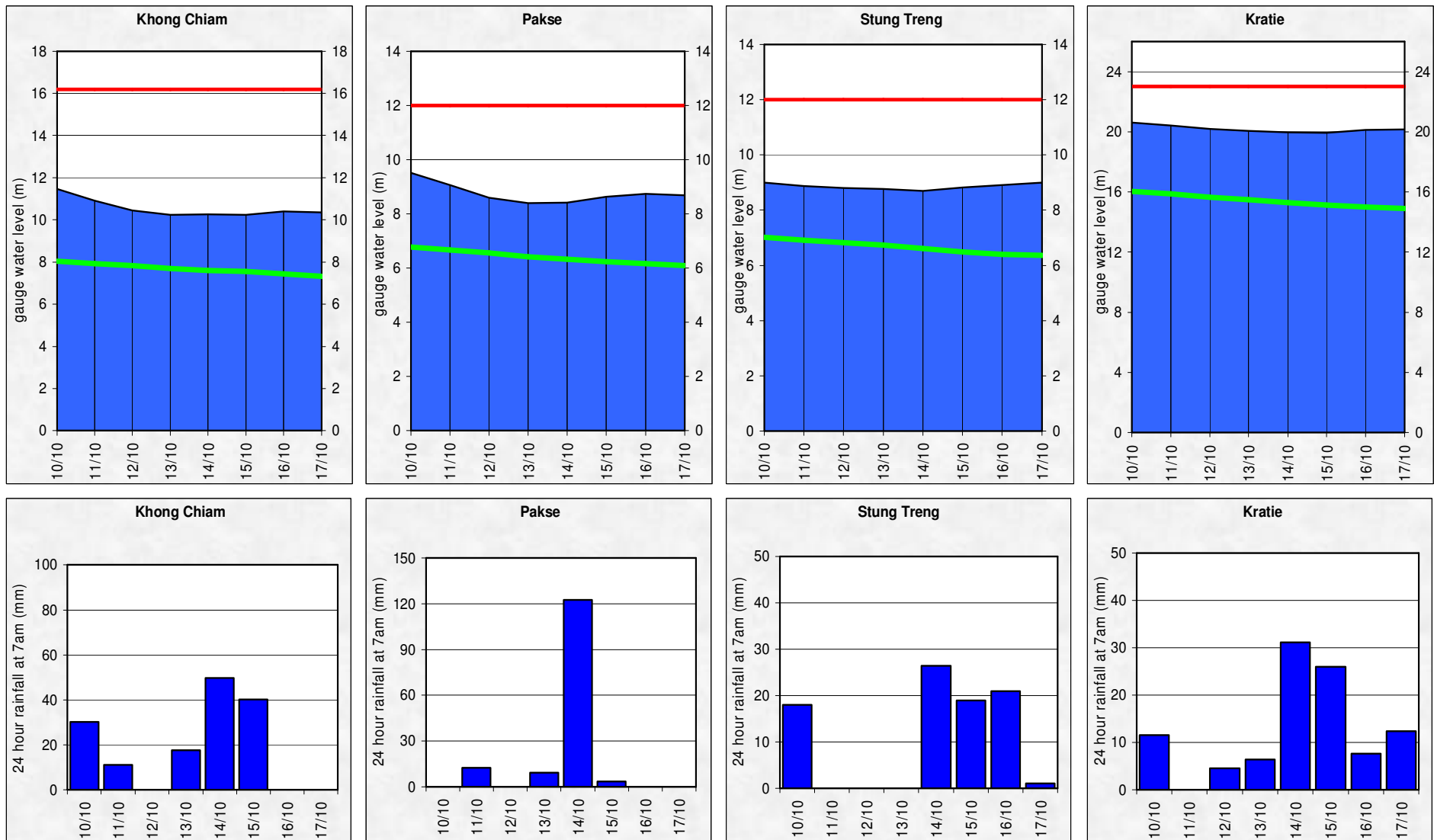


Figure A5: Water level and rainfall for Kompong Cham, Phnom Penh (Bassac and Port), and Koh Khel

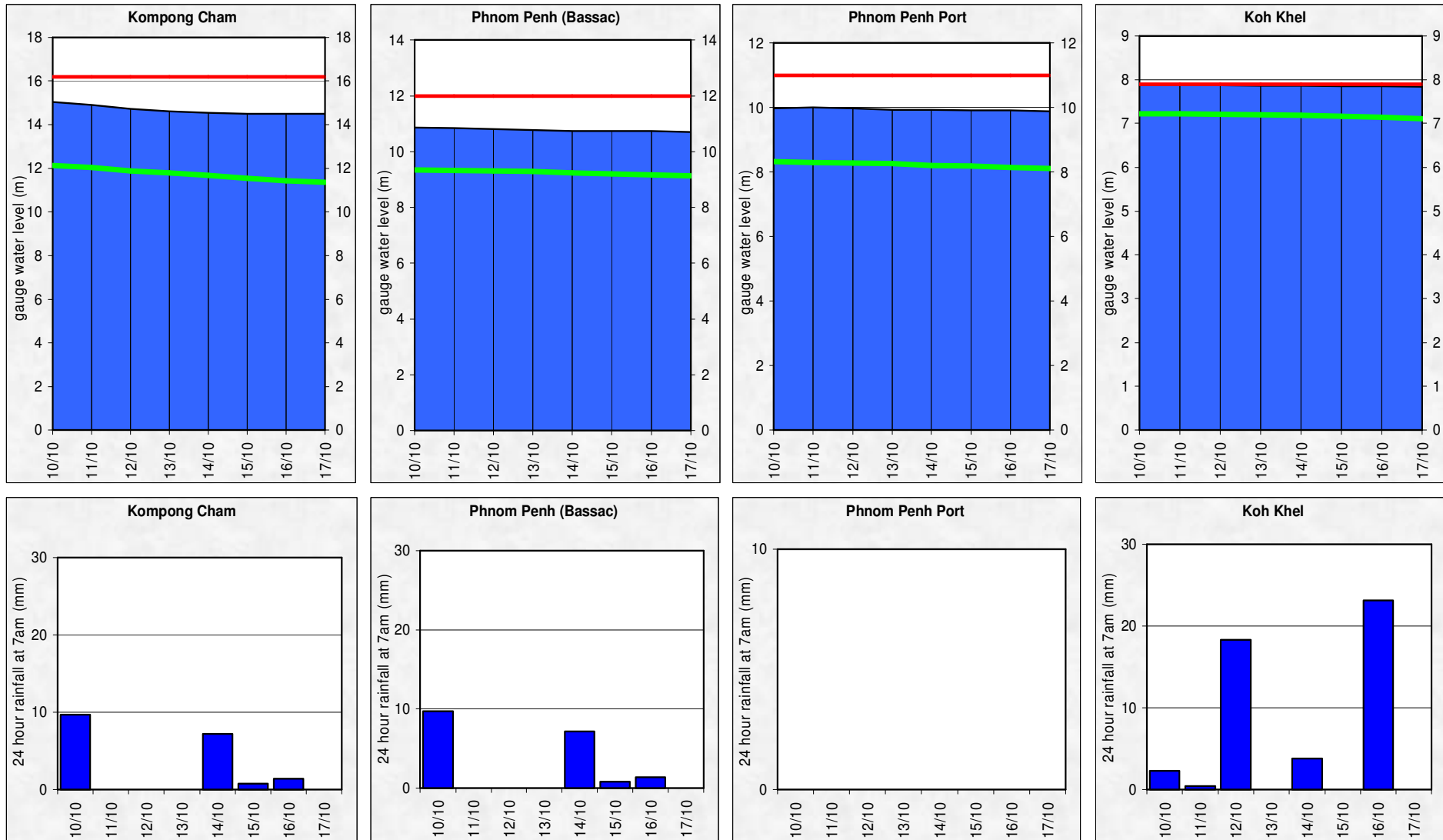
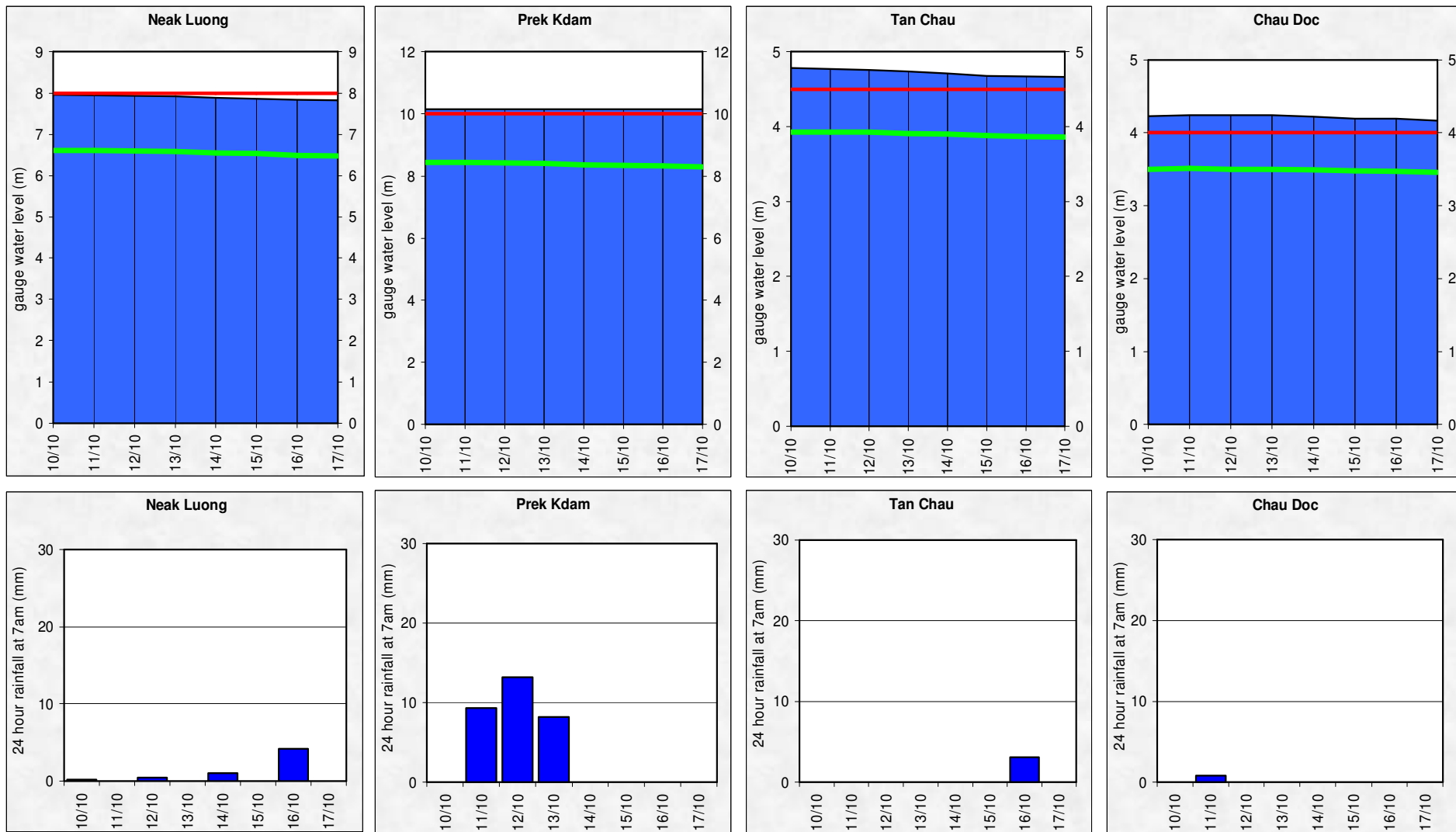


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

Accuracy

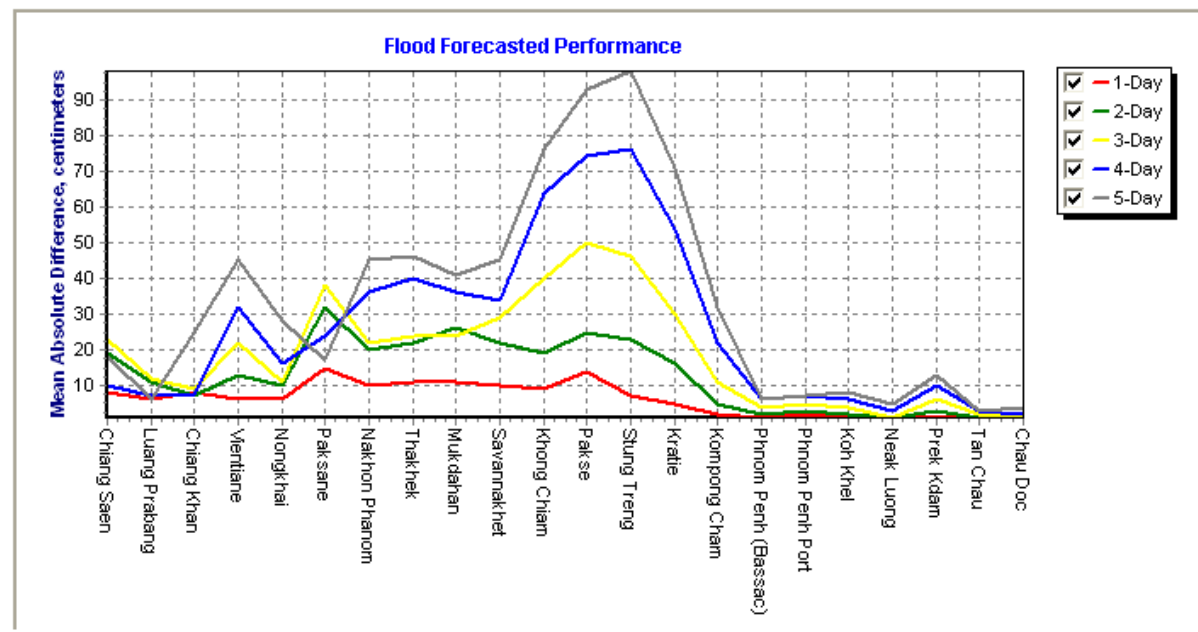
“Accuracy” describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster in Charge taking into consideration known biases in input data and his/her knowledge of the response of the model 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 abnormal pattern in which the accuracies at stations in the upper reach were much better than that in the middle reach.

In general, the overall accuracy is good for all forecast lead time at most stations; however accuracies at stations Khong Chiam, Pakse and Strung Treng for 4-day to 5-day forecast were less than expected.

The above differences due to 2 main factors: (1) high variability of SRE and NWP when critical weather condition as ITCZ appeared during last week; (2) internal model functionality in forecasting for middle reach of the LMB in taking into account flow contribution from tributaries, 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	100.0	100.0	100.0	85.7	85.7	28.6	57.1	71.4	42.9	71.4	57.1	28.6	71.4	85.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.2
2-day	100.0	100.0	100.0	100.0	100.0	50.0	83.3	83.3	50.0	50.0	83.3	50.0	66.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.1
3-day	80.0	100.0	100.0	80.0	100.0	40.0	60.0	60.0	60.0	60.0	20.0	0.0	0.0	40.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	72.7
4-day	100.0	100.0	100.0	75.0	100.0	75.0	75.0	75.0	50.0	75.0	50.0	0.0	0.0	50.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	78.4
5-day	100.0	100.0	100.0	66.7	66.7	100.0	66.7	66.7	33.3	66.7	33.3	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	72.7

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://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

2011	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>	10:55	0	-	7	08:11	08:09	07:31	-	09:05	07:38	07:17	0	0	18	272	173	2	80
<i>month</i>	10:33	0	-	24	08:08	08:11	07:30	06:32	09:09	07:34	07:05	0	0	52	816	554	12	149
<i>season</i>	10:30	1	-	87	08:10	08:18	07:31	06:08	09:05	07:44	07:08	1	16	99	1724	2432	36	782

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.

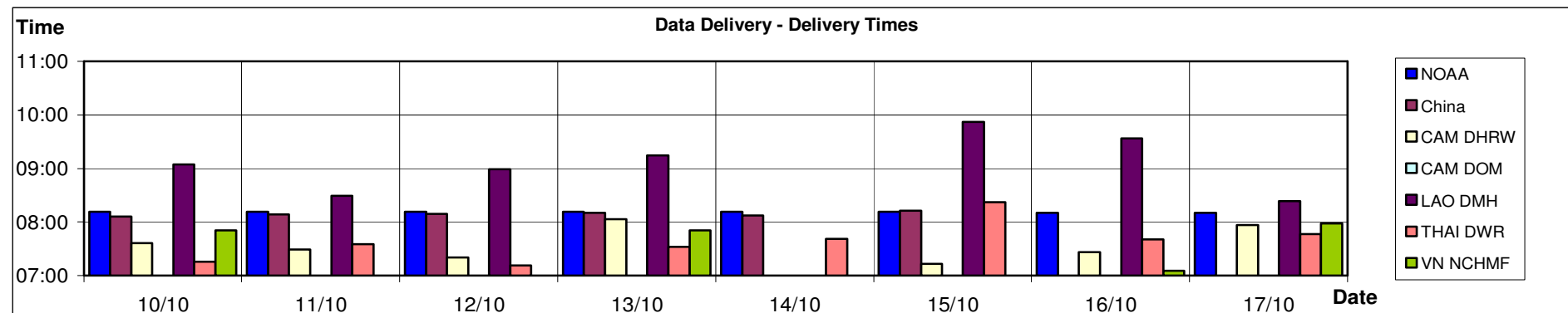


Figure B2: Data delivery times for the past 8 days including the current report date

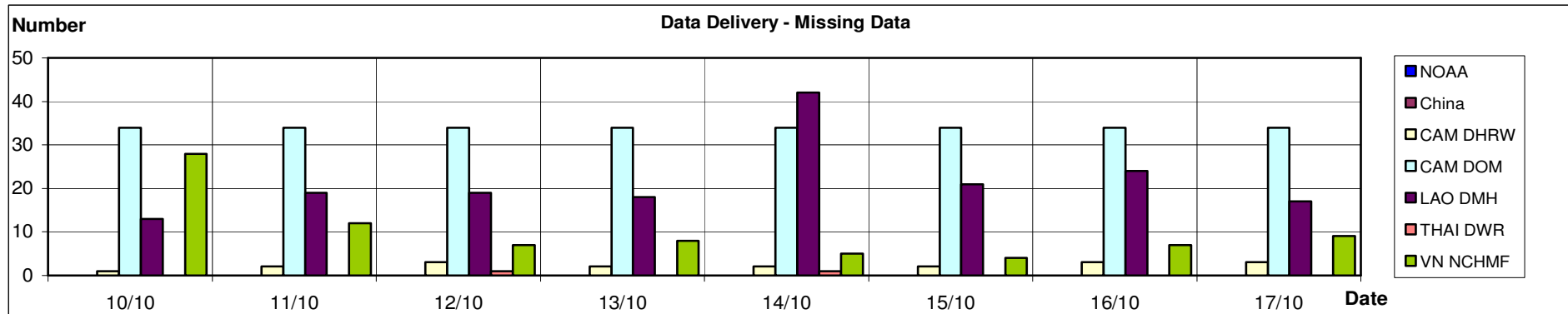


Figure B3: Missing data for the past 8 days including the current report date

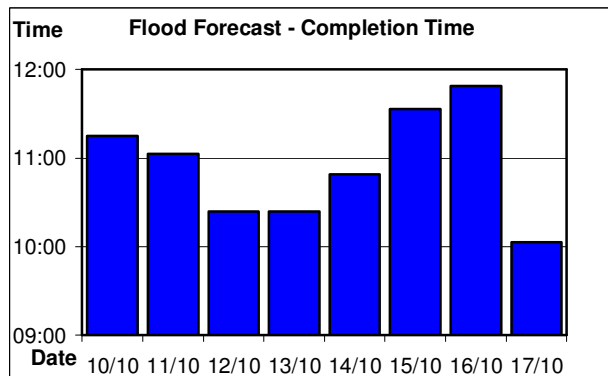


Figure B4: Flood forecast completion time

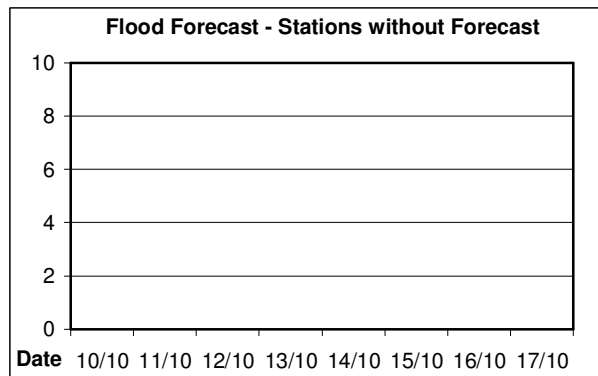


Figure B5: Flood forecast stations without forecast

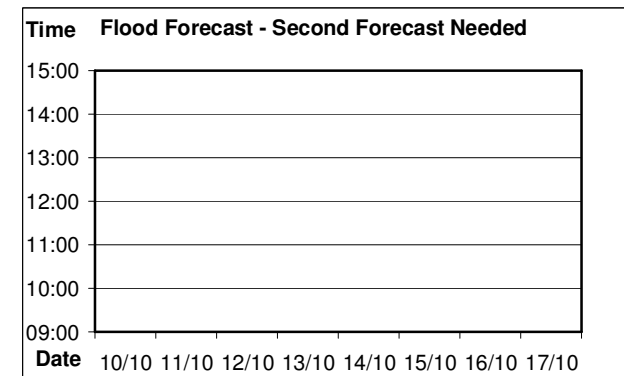


Figure B6: Second forecast needed

Performance indicators of bulletin delivery (Table B3 and Figure B4) shows that the time of flood bulletin dissemination in 5 days during last week to the registered national Line Agencies, and other interested users were later than 10h30 AM which is a prescribed time in the Operational Manual. This was due to 2 main factors: (1) the late transfer and incomplete of data from LA's (Figure B2 and B3), especially data from DMH of Lao PDR caused by internet problem; (2) the too careful adjustment of flood forecaster-in-charge in flood forecast operation.

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

