

Weekly Flood Situation Report for the Mekong River Basin

Prepared on: 01/11/2010, covering the week from the 25th October to the 31st October 2010

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

General weather patterns

During the week of the 25th October to the 31st October 2010, four weather bulletins were issued by the Department of Meteorology (DOM) of Cambodia and made available to the MRC-RFMMC. The weather patterns of the 25th to the 29th October bulletins are shown below:

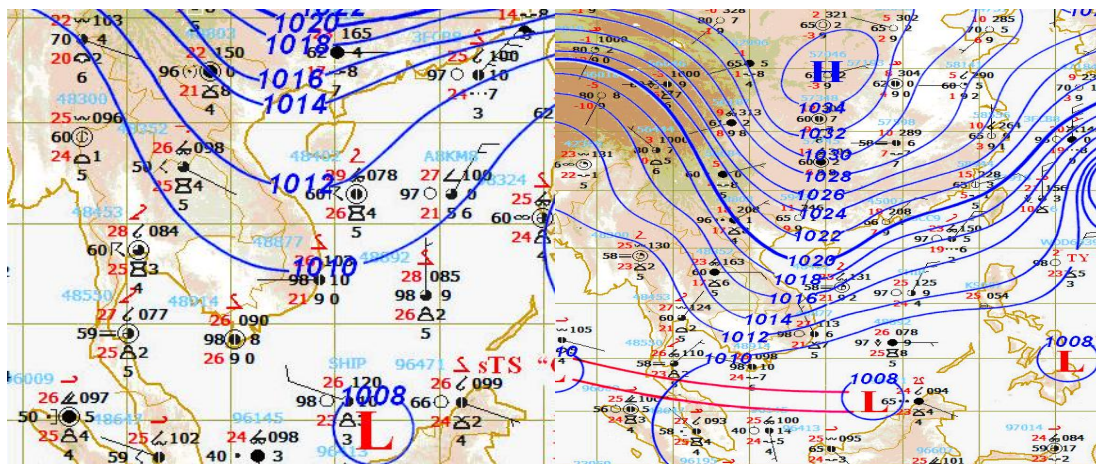


Figure 1: Weather map of 25 October 2010

Figure 2: Weather map of 29 October 2010

South-West (SW) Monsoon

No SW monsoon occurred during last week.

Inter Tropical Convergence Zone (ITCZ)

ITCZ was observed on 29th October and laid across the Gulf of Thailand (figure 2).

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

A Tropical Depression (TD) with its central pressure of 1004 hPa located at latitude 6.5⁰ N and longitude 104⁰ E on 31st October, which was over the Gulf of Thailand, moving slowly to WNW. The TD did not have significant influence on the LMB.

Other weather phenomena that affect the discharge

No other weather phenomena affecting the discharge were observed.

Overall weather situation

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Normal weather situation prevailed during last week. Scattered thundershower occurred in some areas of Myanmar, Thailand, Lao PDR, Cambodia, and Viet Nam particularly in the lower parts of Cambodia, Thailand and Viet Nam.

General behaviour of the Mekong River

Water levels for most stations in upper and middle reaches of the Lower Mekong Basin were somewhat around or above the long-term average while water levels for stations in the lower reach were somewhat below the long-term average for this time of the year. Water levels for most stations in the upper reach of the LMB were more-or-less stable while water levels for stations in the middle and lower reaches were slightly falling during last week. Water levels at Tan Chau and Chau Doc were affected by tide and slightly rising during monitoring period.

For stations from Chiang Saen to Paksane

Water levels at those stations were more-or-less stable during last week. The stations were recording levels that were somewhat around the long-term average for this time of the year.

For stations from Nakon Phanom/Thakhet to Pakse

Water levels were slightly falling during reporting period. The stations were recording levels that were somewhat around and over the long-term average for this time of the year.

For stations from Stung Treng to Kampong Cham

Water levels were slightly falling during last week. The stations were recording levels that were somewhat around and over the long-term average for this time of the year.

For stations from Phnom Penh Bassac/ Phnom Penh Port to Neak Luong/ Koh Khel

Water levels were slightly falling during monitoring period. All stations were recording levels that are somewhat below the long-term average for this time of the year.

Stations Tan Chau and Chau Doc

Water levels for these stations have been significantly affected by sea tide, were more-or-less stable with a little falling during last week. These two 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 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

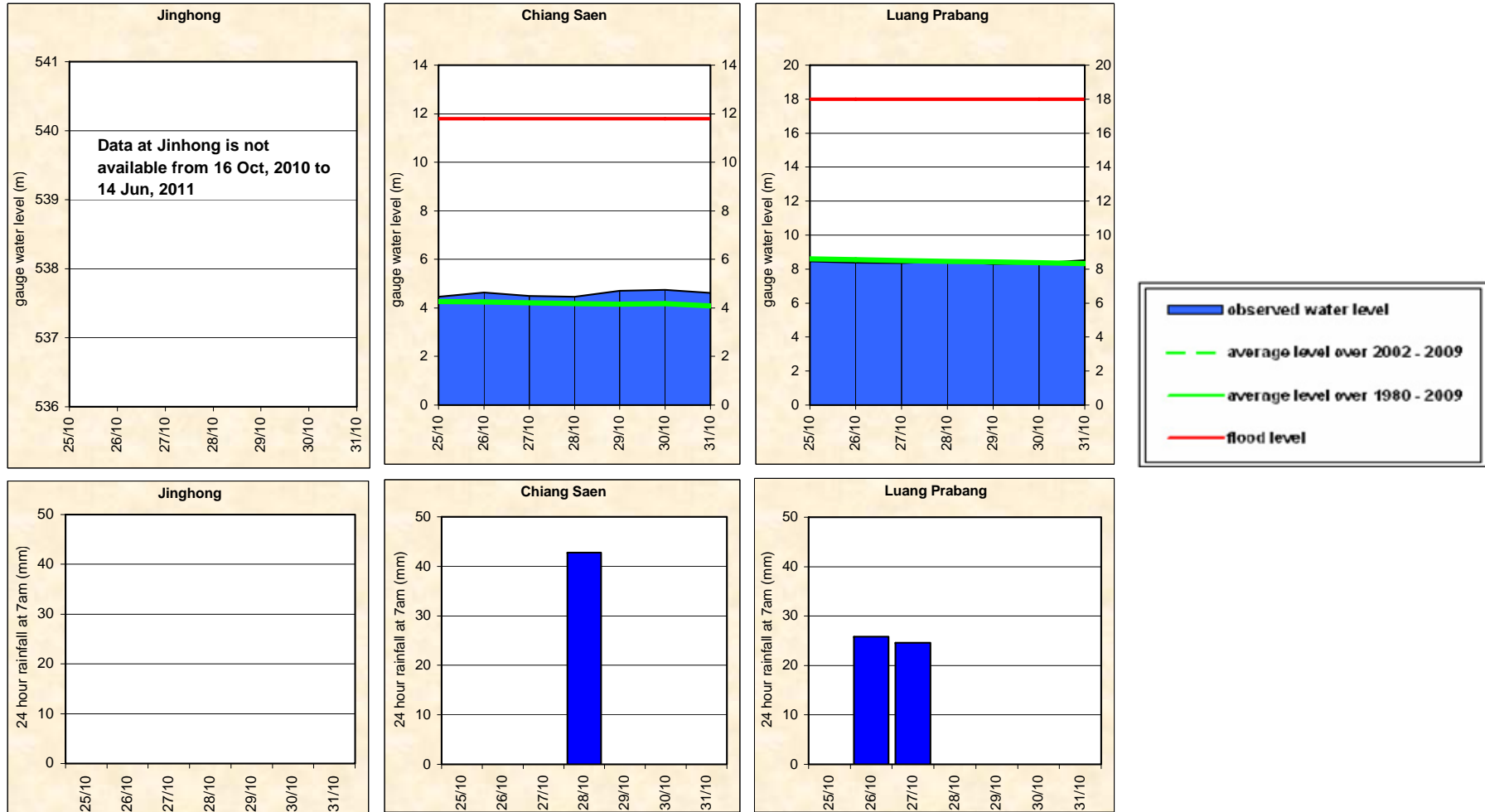
| 2010 | Jinghong | Chiang Saen | Luang Prabang | Chiang Khan | Vientiane | Nongkhai | Paksane | Nakhon Phanom | Thakhek | Mukdahan | Savannakhet | Khong Chiam | Pakse | Stung Treng | Kratie | Kompong Cham | Phnom Penh (Bassac) | Phnom Penh Port | Koh Khel | Neak Luong | Prek Kdam | Tan Chau | Chau Doc |
|-------------|----------|-------------|---------------|-------------|-----------|----------|---------|---------------|---------|----------|-------------|-------------|-------|-------------|--------|--------------|---------------------|-----------------|----------|------------|-----------|----------|----------|
| 25/10 | | 4.46 | 8.46 | 8.24 | 5.00 | 5.72 | 7.14 | 5.63 | 6.80 | 5.82 | 4.45 | 7.92 | 6.40 | 6.20 | 15.54 | 11.01 | 8.40 | 7.49 | 6.84 | 5.89 | 7.49 | 3.13 | 2.69 |
| 26/10 | | 4.64 | 8.38 | 8.30 | 5.17 | 5.79 | 6.90 | 5.27 | 6.45 | 5.48 | 4.32 | 7.53 | 6.06 | 5.95 | 15.01 | 10.69 | 8.25 | 7.32 | 6.79 | 5.85 | 7.43 | 3.10 | 2.66 |
| 27/10 | | 4.50 | 8.36 | 8.51 | 5.38 | 6.20 | 6.97 | 5.01 | 6.20 | 5.17 | 4.20 | 7.17 | 5.73 | 5.71 | 14.51 | 10.37 | 8.08 | 7.21 | 6.75 | 5.79 | 7.37 | 3.08 | 2.66 |
| 28/10 | | 4.46 | 8.44 | 8.50 | 5.42 | 6.16 | 7.18 | 4.91 | 6.10 | 4.97 | 3.93 | 6.83 | 5.42 | 5.55 | 14.13 | 10.01 | 7.99 | 7.13 | 6.69 | 5.75 | 7.32 | 3.07 | 2.67 |
| 29/10 | | 4.71 | 8.30 | 8.35 | 5.35 | 6.15 | 7.25 | 4.95 | 6.15 | 4.92 | 3.55 | 6.60 | 5.16 | 5.36 | 13.76 | 9.75 | 7.85 | 7.02 | 6.61 | 5.65 | 7.24 | 3.01 | 2.64 |
| 30/10 | | 4.74 | 8.34 | 8.29 | 5.18 | 5.94 | 7.21 | 5.00 | 6.19 | 4.95 | 3.37 | 6.47 | 5.01 | 5.21 | 13.36 | 9.46 | 7.70 | 6.90 | 6.55 | 5.56 | 7.16 | 2.96 | 2.60 |
| 31/10 | | 4.62 | 8.52 | 8.14 | 5.06 | 5.81 | 7.04 | 4.98 | 6.16 | 4.96 | 3.20 | 6.44 | 4.96 | 5.18 | 13.09 | 9.21 | 7.55 | 6.77 | 6.46 | 5.47 | 7.07 | 2.89 | 2.55 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| 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

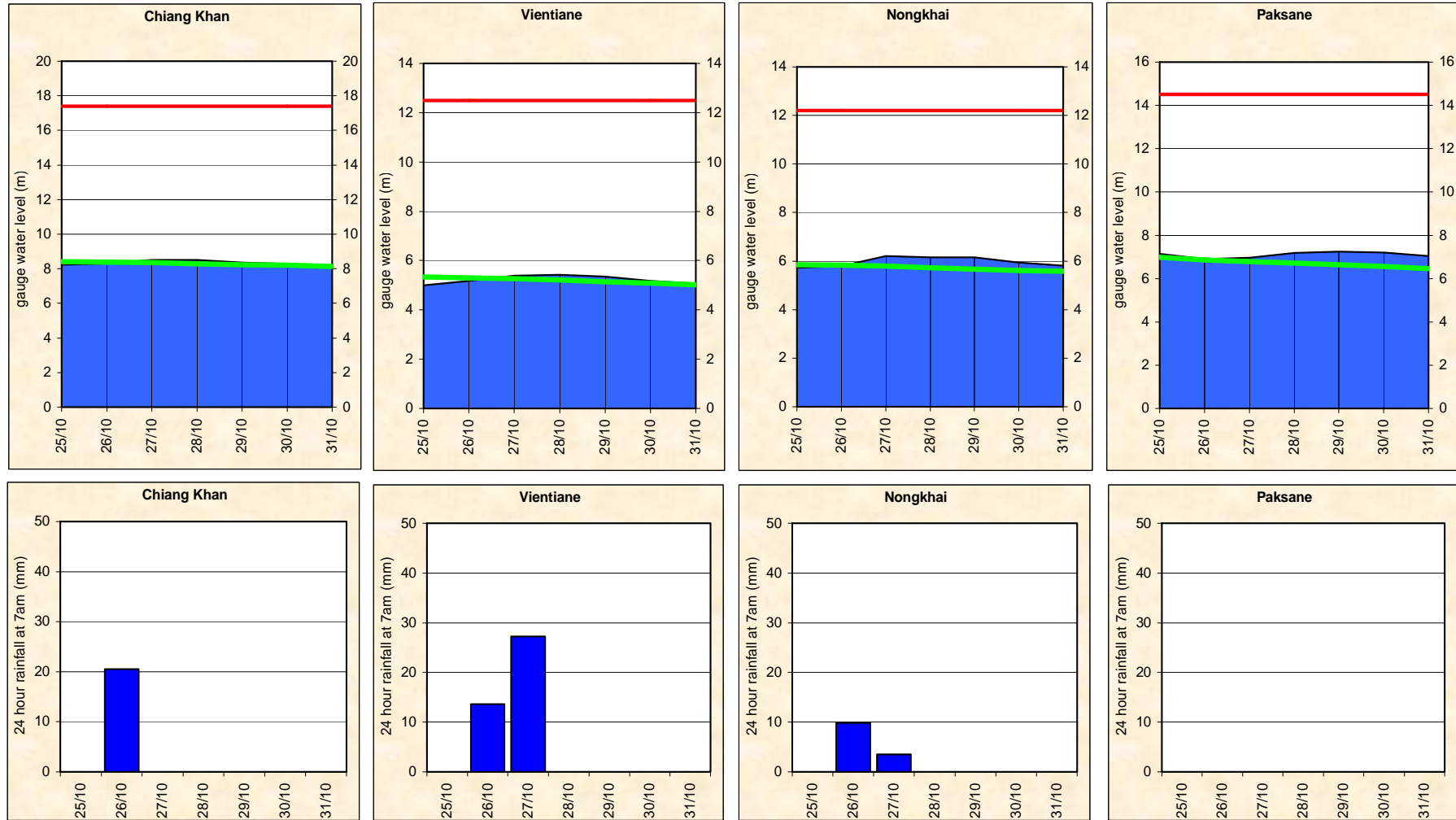
| 2010 | Jinghong | Chiang Saen | Luang Prabang | Chiang Khan | Vientiane | Nongkhai | Paksane | Nakhon Phanom | Thakhek | Mukdahan | Savannakhet | Khong Chiam | Pakse | Stung Treng | Kratie | Kompong Cham | Phnom Penh (Bassac) | Phnom Penh Port | Koh Khel | Neak Luong | Prek Kdam | Tan Chau | Chau Doc |
|-------|----------|-------------|---------------|-------------|-----------|----------|---------|---------------|---------|----------|-------------|-------------|-------|-------------|--------|--------------|---------------------|-----------------|----------|------------|-----------|----------|----------|
| 25/10 | | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | 2.5 | 0.0 | nr | 5.3 | |
| 26/10 | | nr | 25.8 | 20.5 | 13.6 | 9.8 | nr | nr | nr | nr | nr | nr | nr | nr | 18.4 | nr | 44.5 | | 2.1 | 5.2 | 9.3 | 0.0 | |
| 27/10 | | nr | 24.6 | nr | 27.2 | 3.5 | nr | nr | nr | nr | nr | nr | nr | 1.8 | nr | 1.0 | 1.4 | | 26.9 | 22.2 | 19.5 | 19.8 | |
| 28/10 | | 42.8 | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | | nr | 0.0 | nr | 54.1 | 40.1 |
| 29/10 | | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | 0.2 | | 0.0 | nr | nr | 0.0 | |
| 30/10 | | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | | nr | nr | nr | nr | |
| 31/10 | | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | nr | 4.6 | 2.4 | 0.2 | | 0.9 | 0.0 | nr | 0.0 | |
| | | | | | | | | | | | | | | | | | | | | | | | |

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



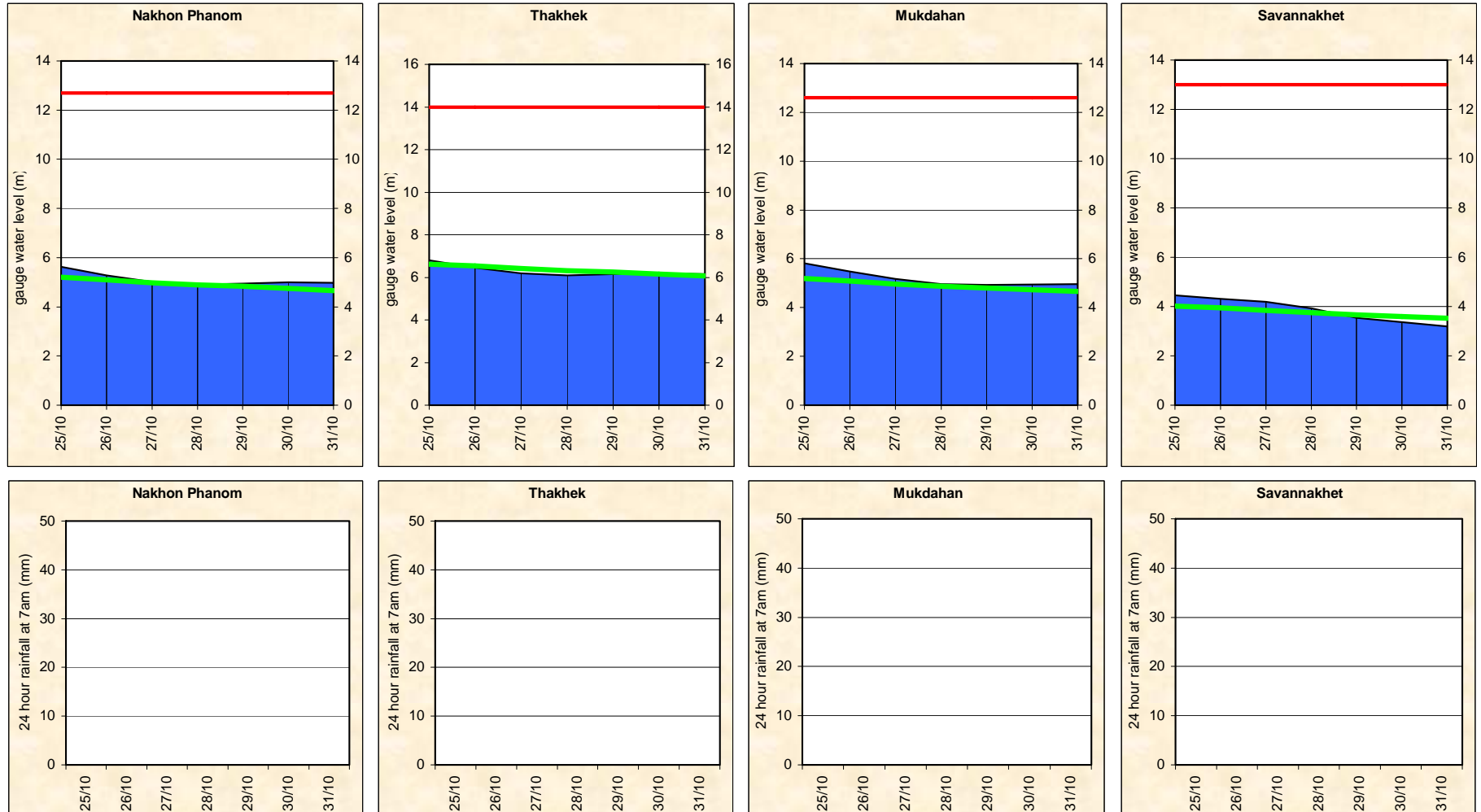
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Figure A2: Water level and rainfall for Chiang Khan, Vientiane, Nongkhai, and Paksane



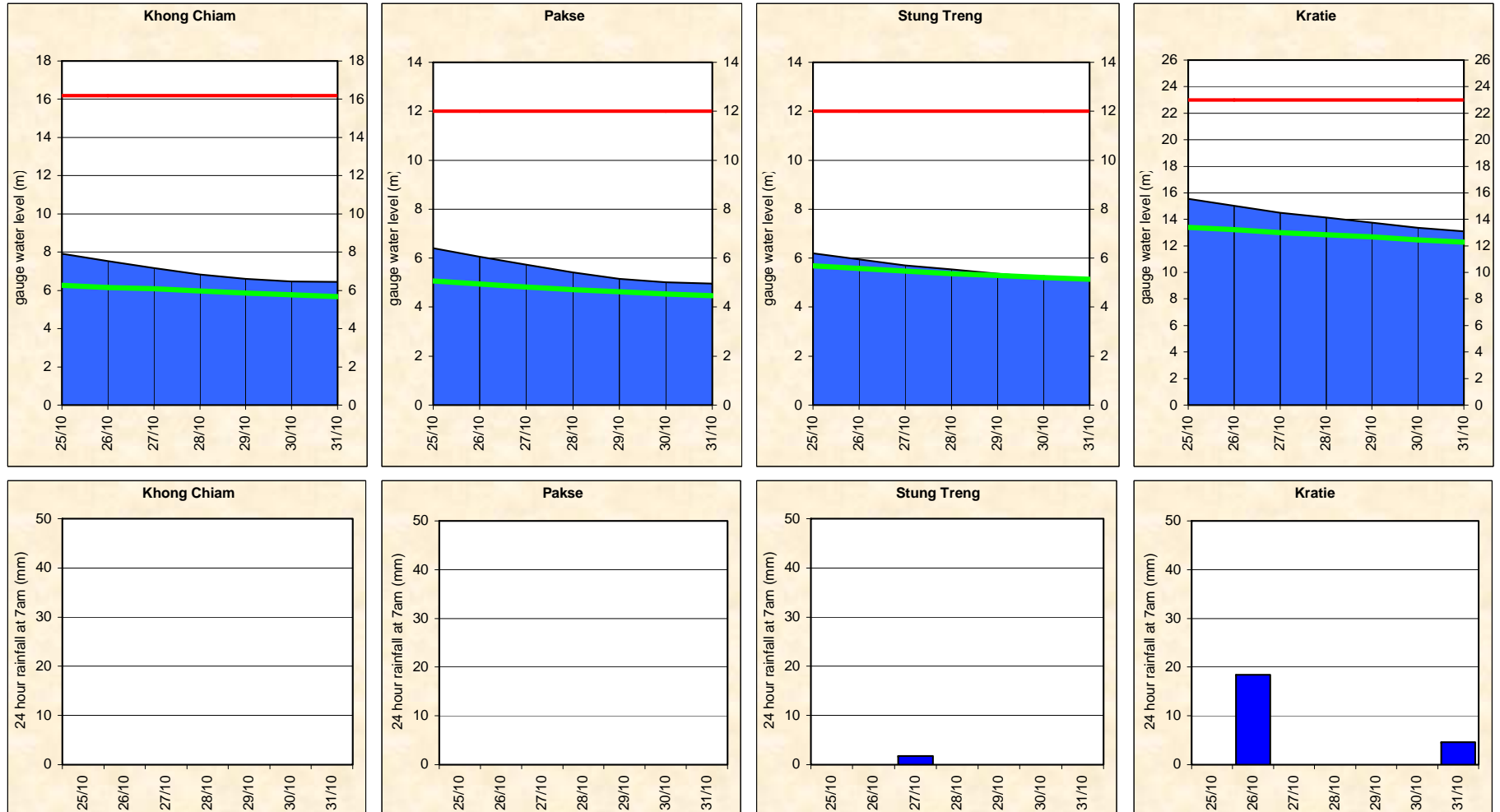
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Figure A3: Water level and rainfall for Nakhon Phanom, Thakhek, Mukdahan and Savannakhet



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



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

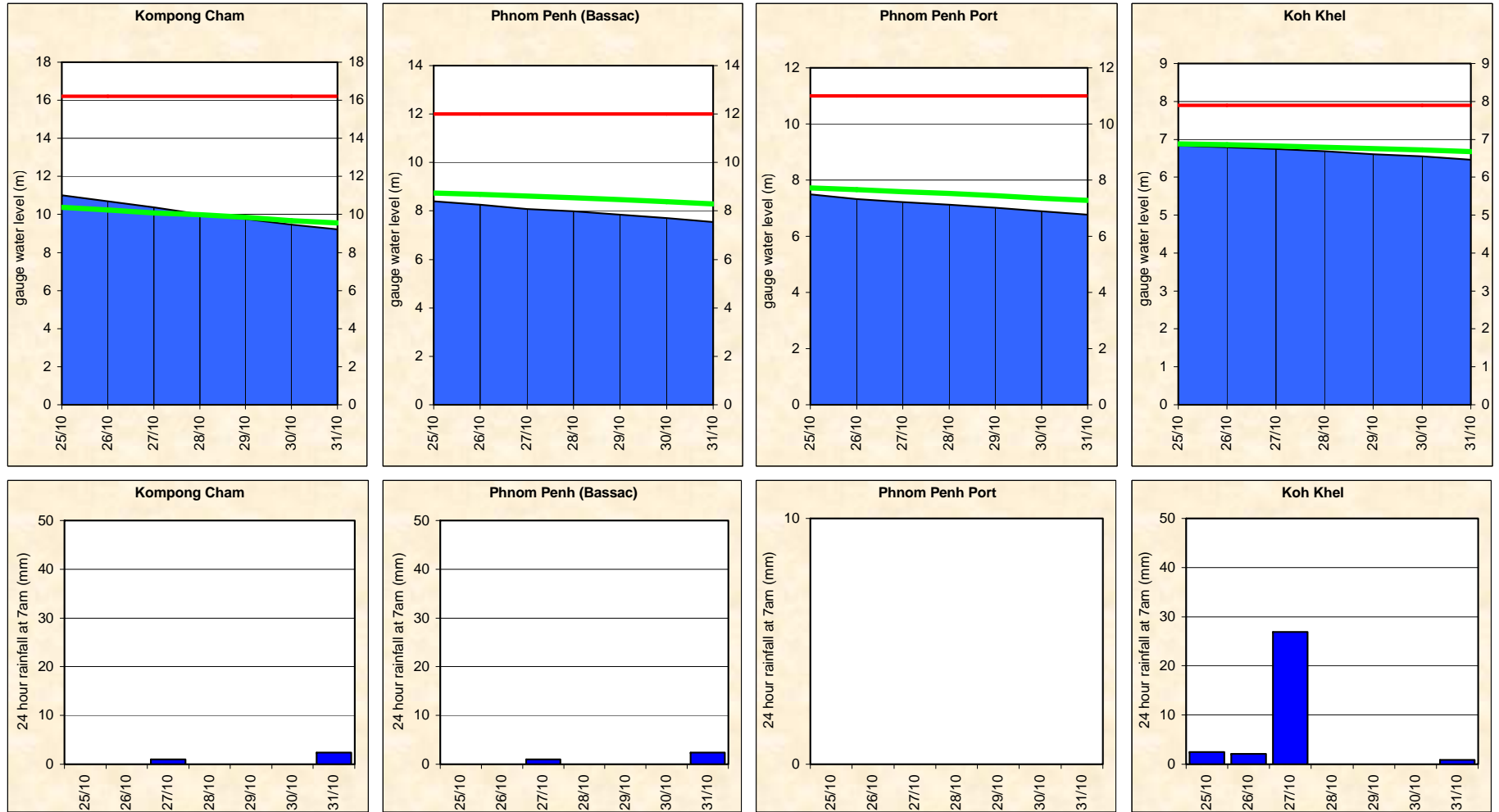
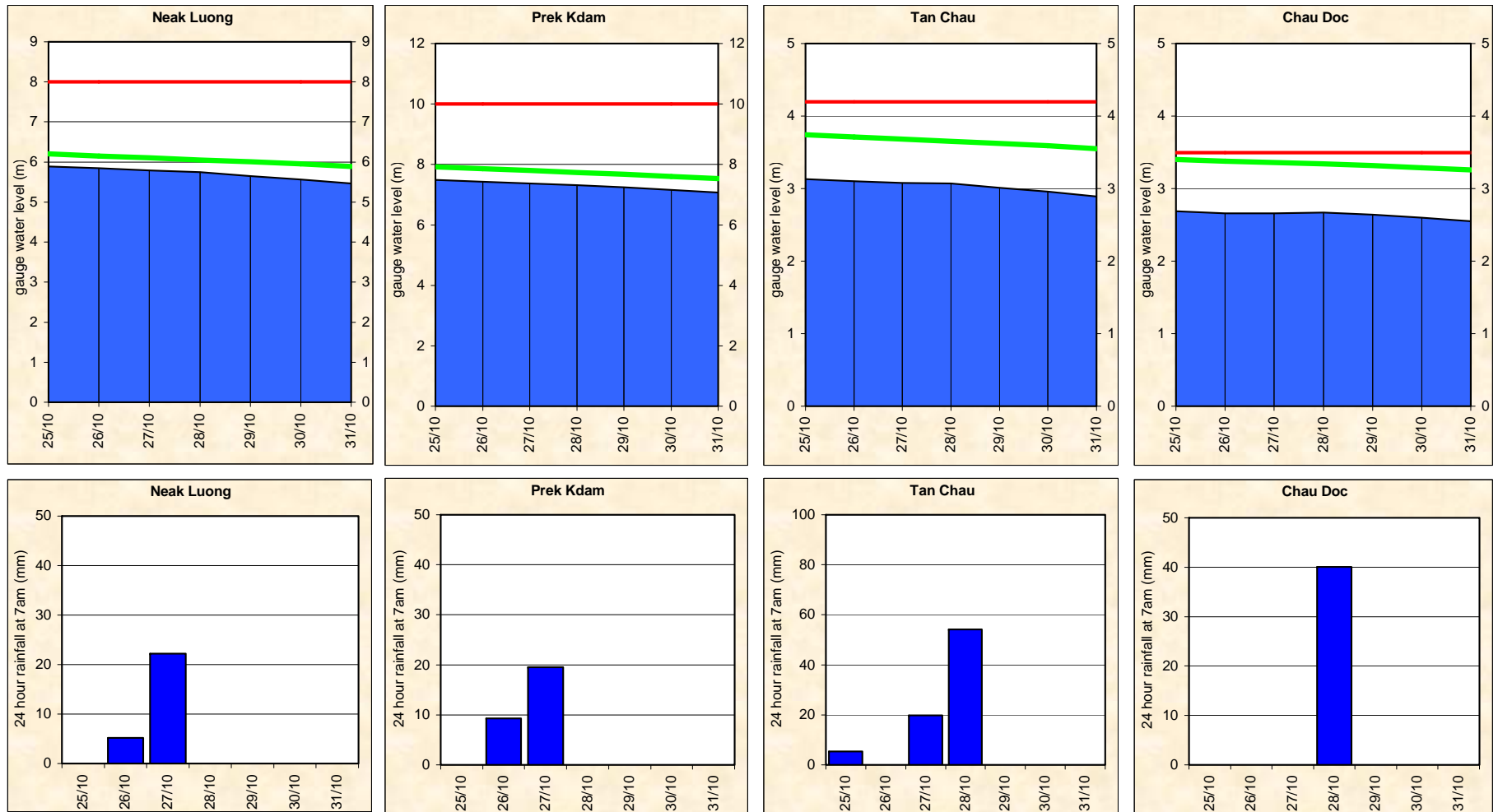


Figure A6: Water level and rainfall for Neak Luong, Prek Kdam, Tan Chau and Chau Doc



Annex B: Accuracy and performance

Accuracy

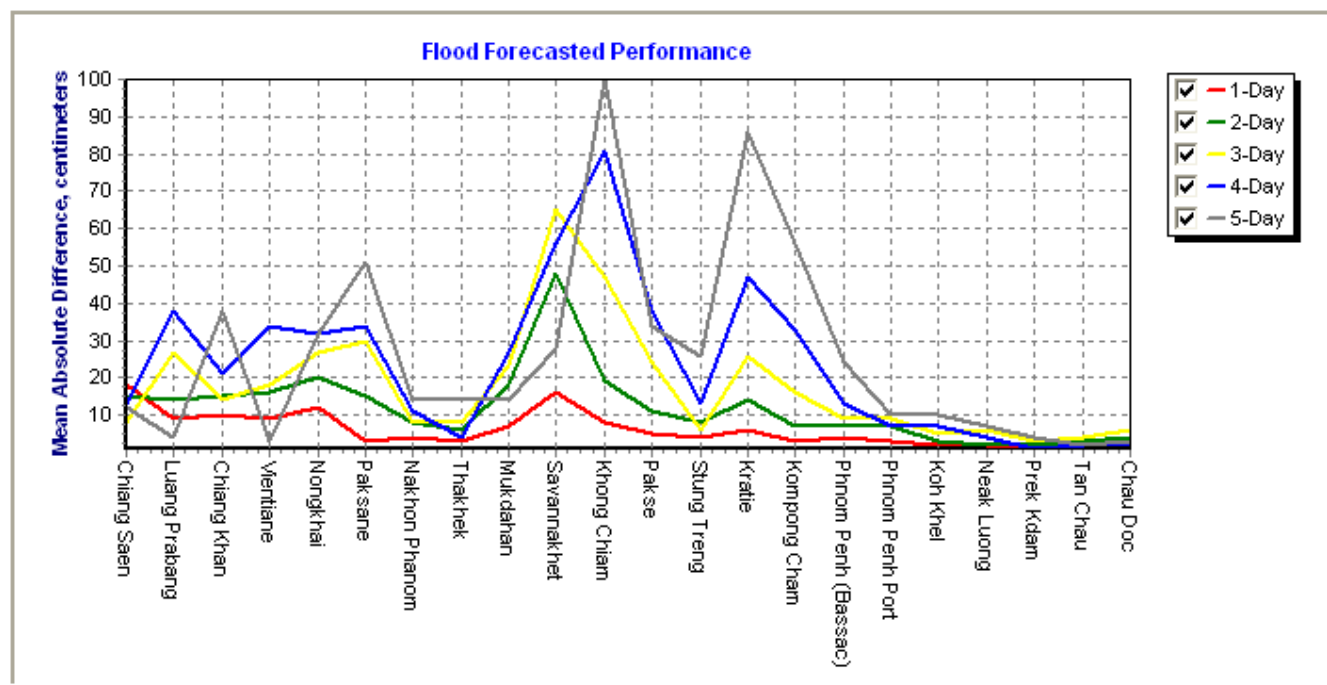
“Accuracy” describes the accuracy of the adjusted and published forecast, based on the results of the MRC Mekong Flood Forecasting System, which are then adjusted by the Flood Forecaster-In-Charge taking into consideration the known biases in input data, the knowledge of model response and the experience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

In overall, the accuracy is fairly good for 1-day to 3-day forecasts lead-time at most stations along the Mekong River; however, the accuracies for 5-day forecast at Khong Chiam and Kratie were less than expected.

The above differences perhaps caused by high variability of Satellite Rainfall Estimates (SRE) and rainfall forecast of Numerical Weather Prediction (NWP) as well as internal model functionality in forecasting for those stations for which the parameters adjustment is impossible.

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 | 83.3 | 100.0 | 100.0 | 100.0 | 100.0 | 83.3 | 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 | 98.5 | |
| 2-day | 100.0 | 100.0 | 80.0 | 80.0 | 80.0 | 80.0 | 100.0 | 100.0 | 100.0 | 60.0 | 100.0 | 100.0 | 100.0 | 80.0 | 100.0 | 60.0 | 80.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 90.9 |
| 3-day | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 75.0 | 100.0 | 100.0 | 100.0 | 50.0 | 100.0 | 100.0 | 100.0 | 75.0 | 75.0 | 50.0 | 50.0 | 75.0 | 75.0 | 100.0 | 100.0 | 75.0 | 100.0 | 100.0 | 86.4 |
| 4-day | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 66.7 | 100.0 | 100.0 | 100.0 | 66.7 | 33.3 | 100.0 | 100.0 | 66.7 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 92.4 |
| 5-day | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 | 50.0 | 50.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 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 | 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 | 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 | 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 | 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 | 10 |

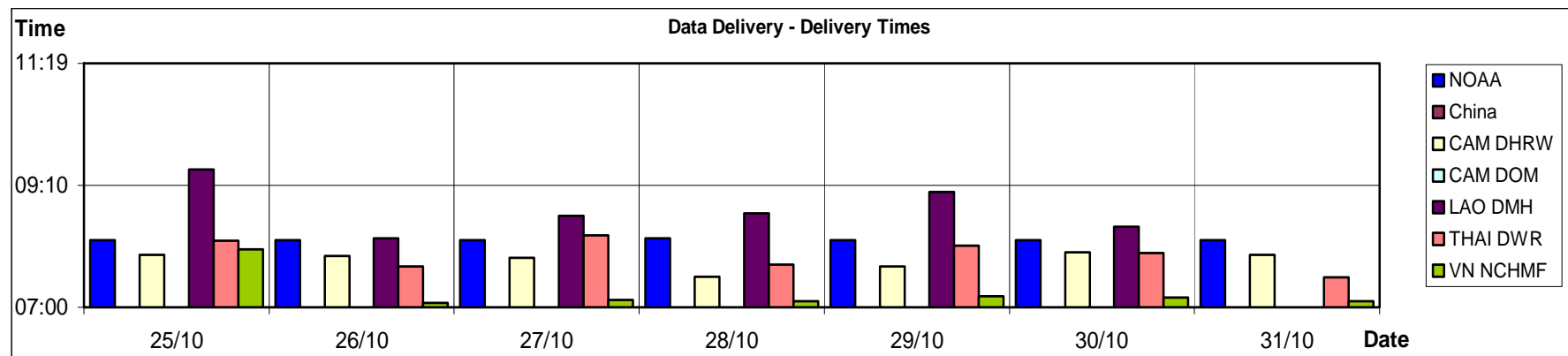
Performance

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 |
| 2010 | | | | | | | | | | | | | | | | | | |
| <i>week</i> | 10:01 | 0 | - | 5 | 08:12 | - | 07:50 | 05:49 | 08:44 | 07:56 | 07:16 | 0 | 0 | 2 | 51 | 135 | 5 | 52 |
| <i>month</i> | 10:19 | 4 | - | 29 | 08:16 | 08:18 | 07:53 | 06:01 | 08:40 | 08:08 | 07:25 | 0 | 8 | 13 | 255 | 631 | 15 | 207 |
| <i>season</i> | 10:33 | 6 | - | 148 | 15:33 | 08:53 | 07:59 | 06:27 | 08:37 | 08:15 | 07:28 | 0 | 34 | 74 | 2343 | 2929 | 79 | 1097 |

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.



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

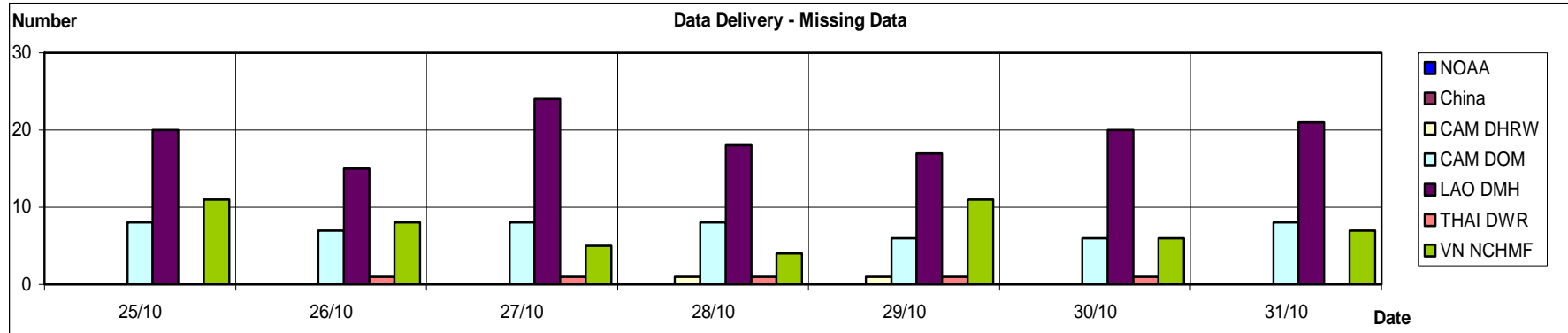


Figure B3: Missing data for the past 8 days including the current report date

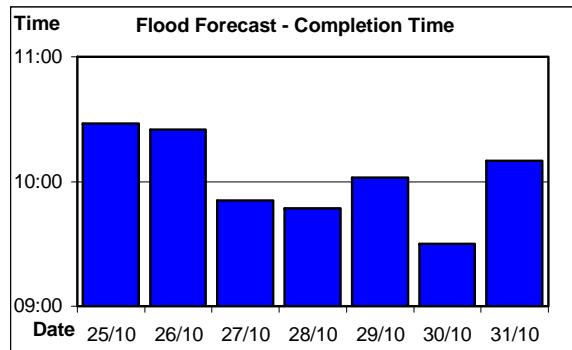


Figure B4: Flood forecast completion time

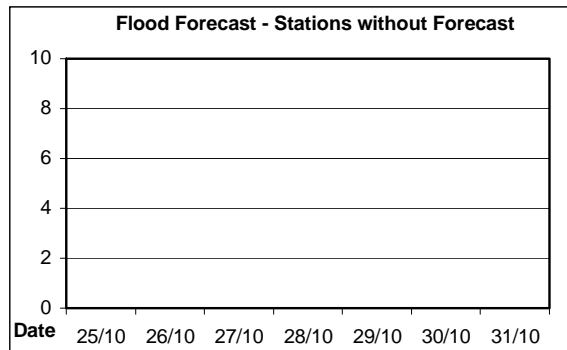


Figure B5: Flood forecast stations without forecast

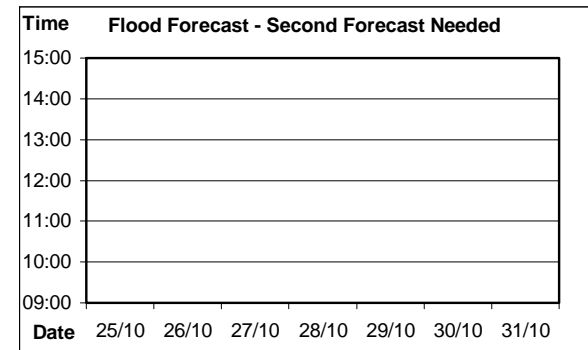


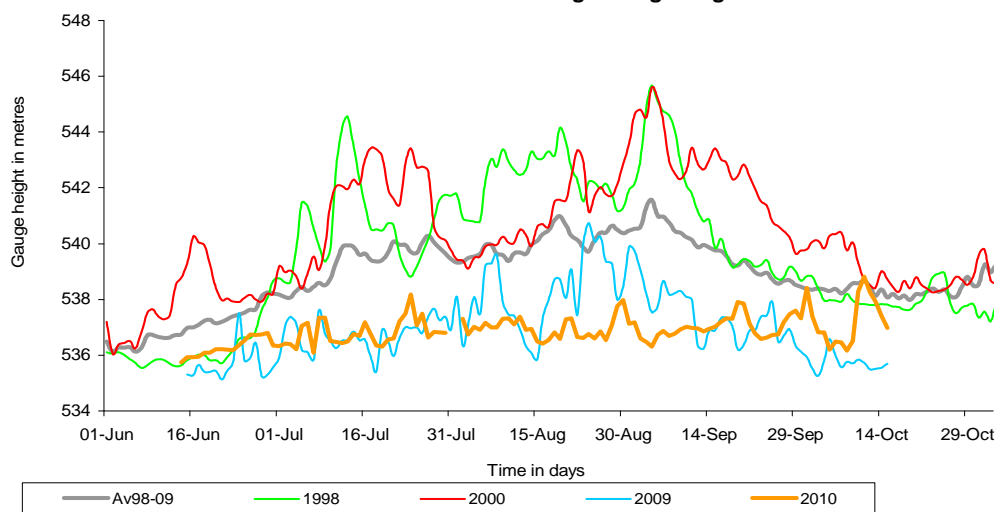
Figure B6: Second forecast needed

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

