Weekly Flood Situation Report for the Mekong River Basin

Draft by KHEM Sothea

covering the week from 23th to 28th October 2019 and potential trend next week

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

General weather patterns

During the week from 23th to 28th October 2019, the weather outlook bulletins and maps issued by the Thailand Meteorology Department (TMD) were used to verify the weather condition in the LMB. There were no low pressures went across the LMB, except the low-lying area in Cambodia during this week brought slightly rainfall. Therefore, there were some rainfall in low-lying area and the Mekong Delta, as indicated. The Thai Meteorological Department (TMD) issued the seasonal forecast on climate characteristic expectation in Thailand, which stated on the outlooks of the coming Dry Season from November to February 2020. **Figures 1 & 2** presented the weather map for 23th to 28th October 2019.

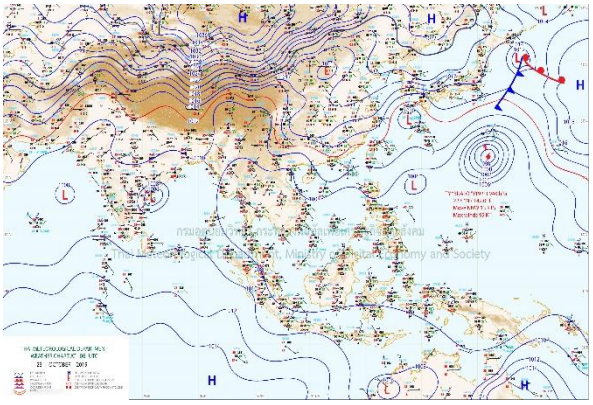


Figure 1: Weather map for 23h Oct 2019

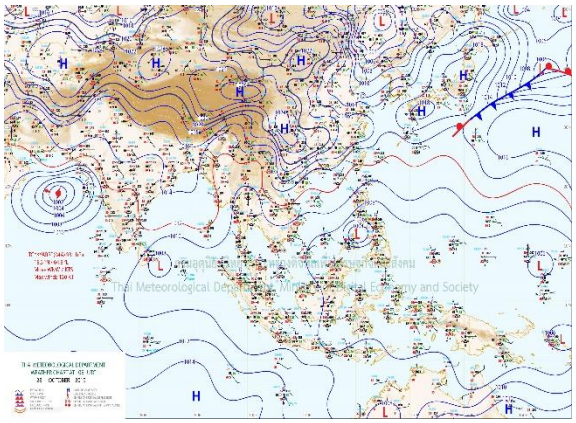


Figure 2: Weather map for 28th Oct 2019

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

No TD, TS or TY was presented in LMB during this week.

Other weather phenomena that affect the discharge

According to the Asian Specialized Meteorological Center (ASMC), climatologically, the prevailing Southwest Monsoon conditions is predicted for the below-normal rainfall over most of the southern Southeast Asia. The below-normal rainfall is predicted over the Northeastern parts of Cambodia, Thailand and Viet Nam in Oct-Nov-Dec 2019. In terms of temperature, near-average conditions can be expected over the equatorial ASEAN region and the inland areas of Thailand. For Oct-Nov-Dec 2019, all three models – ASMC predicted the below-normal rainfall over most of the southern Southeast Asia. **Figure 2** showed the rainfall outlook over Southeast Asia in Oct-Nov-Dec 2019.

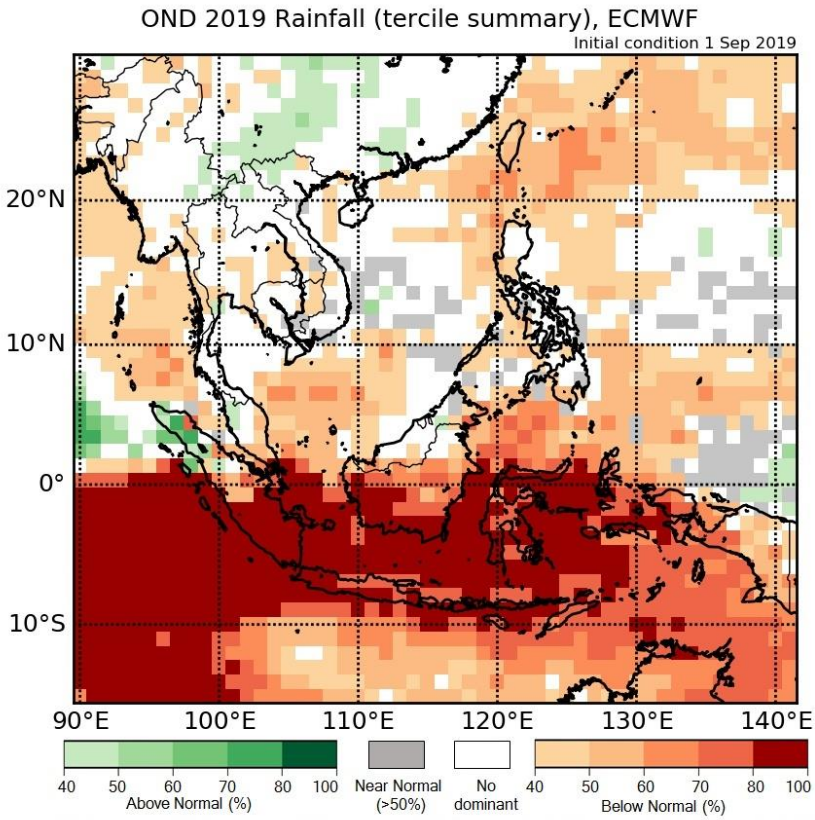


Figure 2: The predicted of below-normal rainfall in Oct-Nov-Dec 2019 in Southeast Asia

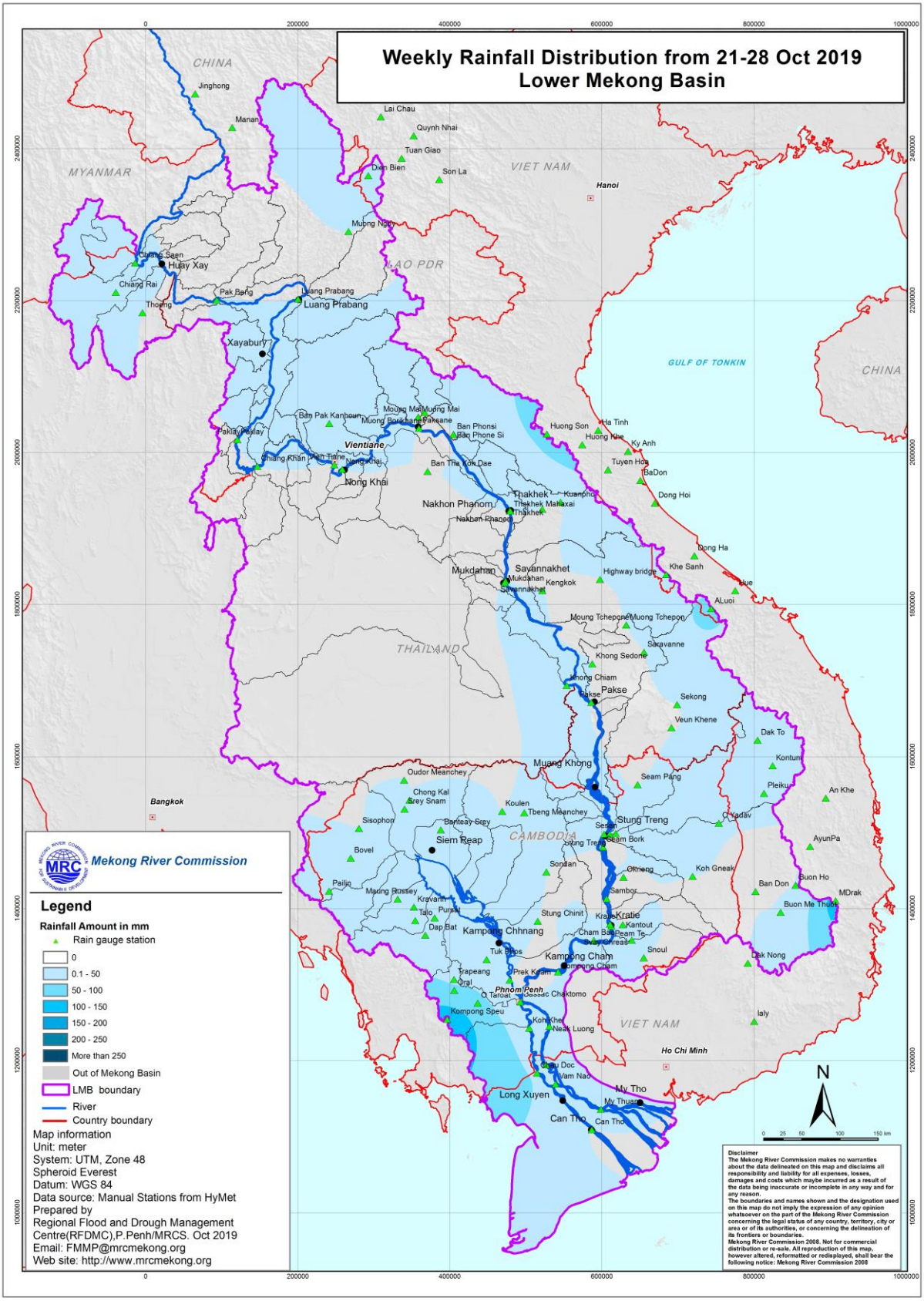
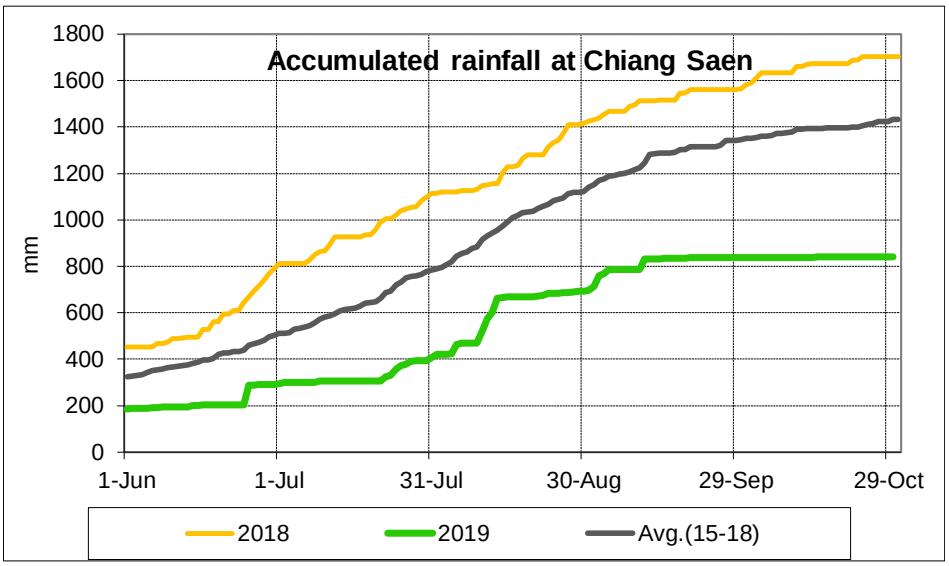
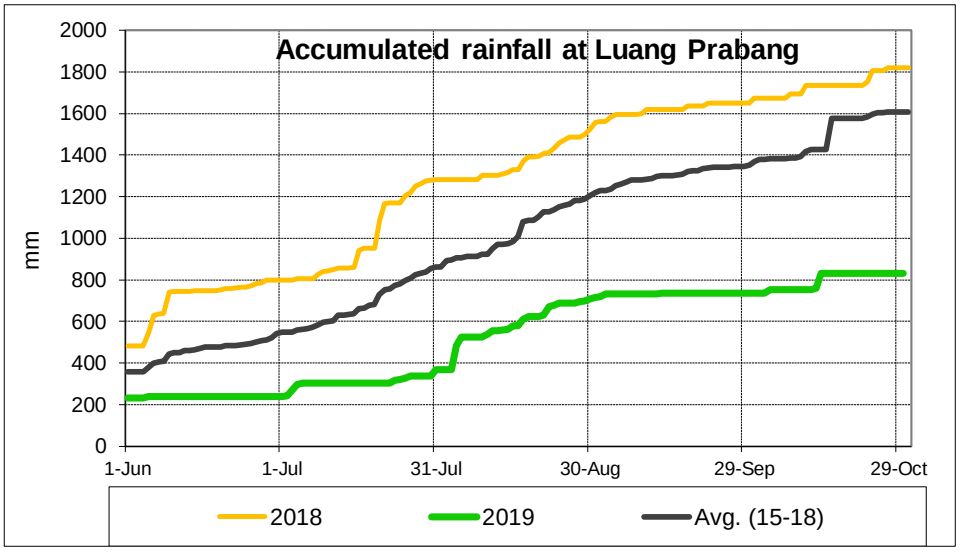


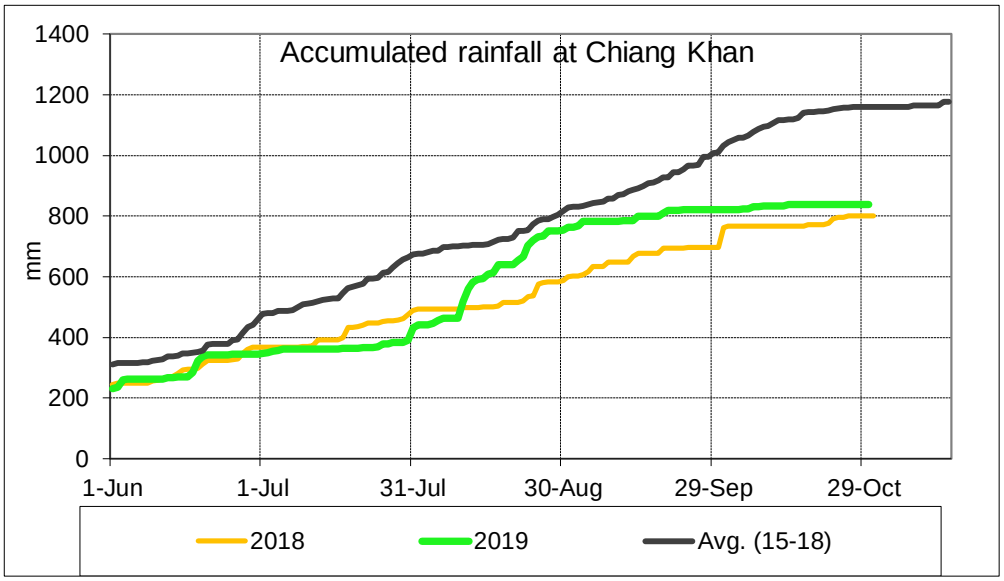
Figure 3: Weekly Rainfall Distribution over the LMB from 23th to 28th Oct 2019

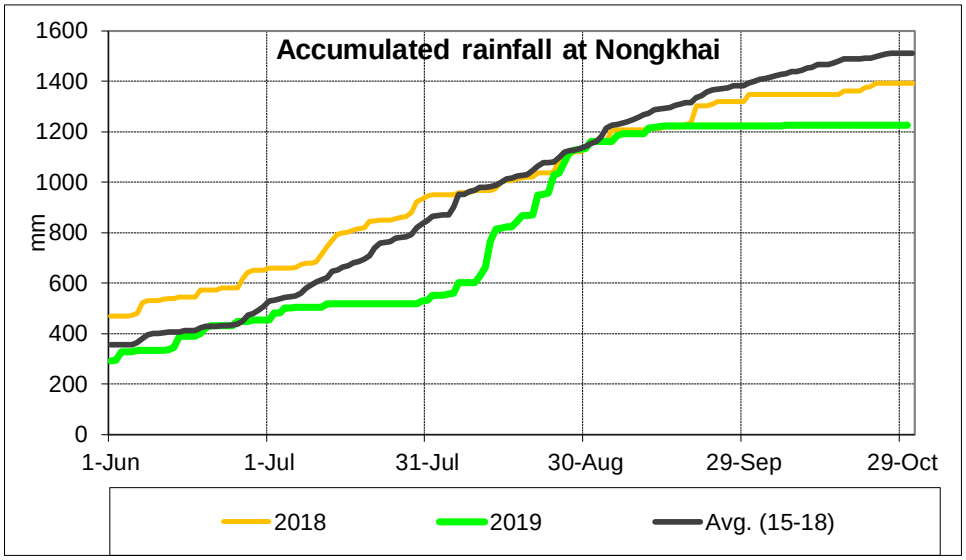
Over weather situation

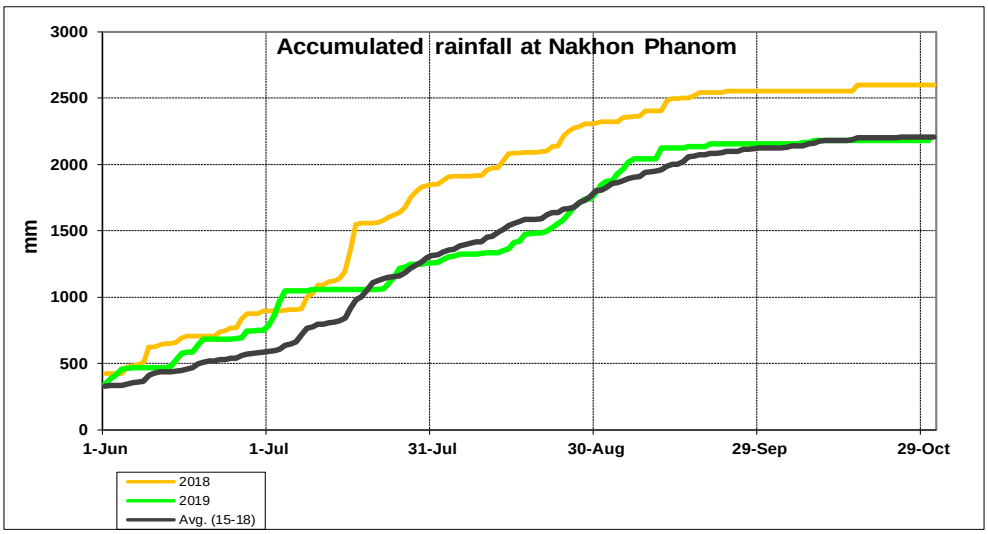
The weather of this week was brought moderate rainfall in the LMB. Rainfall in this week was considered below average, covered in the Luang Prabang and Thakhet areas, varied from 0.1 mm to 50 mm. The weekly rainfall distribution in the Lower Mekong Basin from 22th to 28th Oct 2019 is showed in **Figure 3.** The accumulated rainfall in the specific location at Chiang Sean, Luang Prabang, Chiang Khan, Nong Khai, Nakhon Phanom, Pakse, Kratie and Chau Doc up to 28th Oct 2019 are showed in **Figure 4**. The below- average rainfalls were found from Chiang Sean to Nong Khai, while from Nakhon Phanom and Kratie were considered above average condition, during this week.
It also indicated that last week rainfall over the LMB varied from place to places, which showed the less rainfall in the upper most part (Chiang Sean to Nong Khai), but at Nakhon Phanom and Kratie were showed higher than their LTAs (2015-2018).

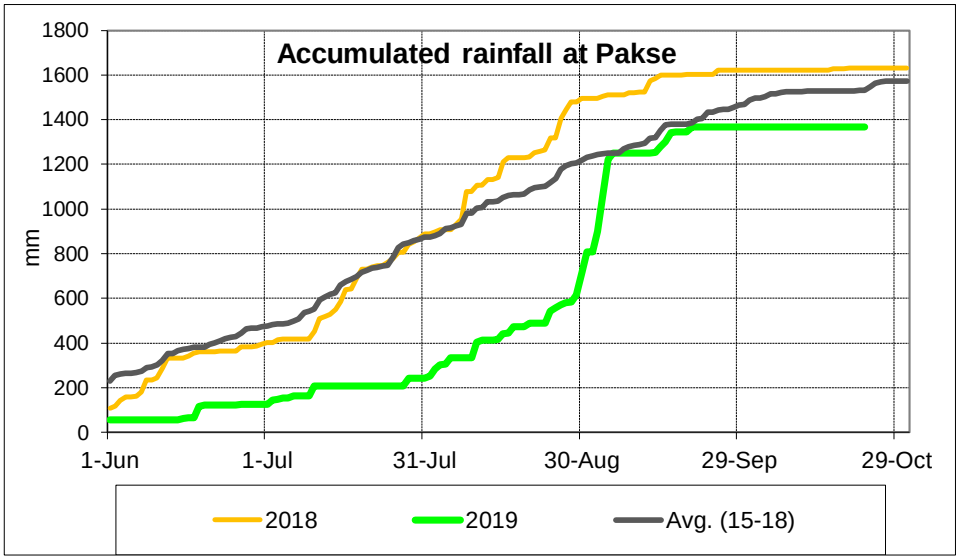


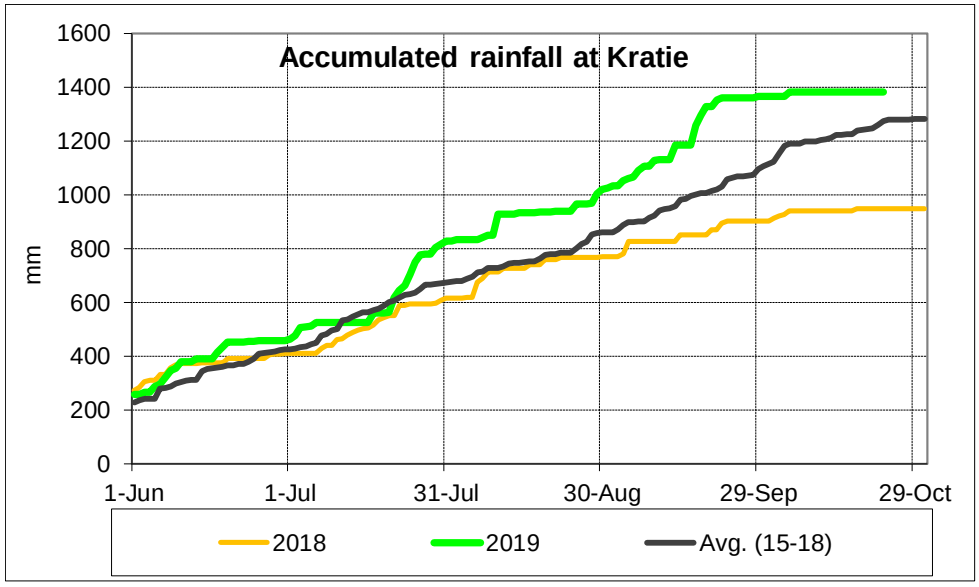



Accumulated rainfall at Chiang Khan
1400
1200
1000
800
600
400
200
0
mm
1-Jun
1-Jul
31-Jul
30-Aug
29-Sep
29-Oct
2018
2019
Avg. (15-18)


Accumulated rainfall at Nongkhai
1600
1400
1200
1000
800
600
400
200
0
mm
1-Jun
1-Jul
31-Jul
30-Aug
29-Sep
29-Oct
2018
2019
Avg. (15-18)


Accumulated rainfall at Nakhon Phanom
3000
2500
2000
1500
1000
500
0
mm
1-Jun
1-Jul
31-Jul
30-Aug
29-Sep
29-Oct
2018
2019
Avg. (15-18)





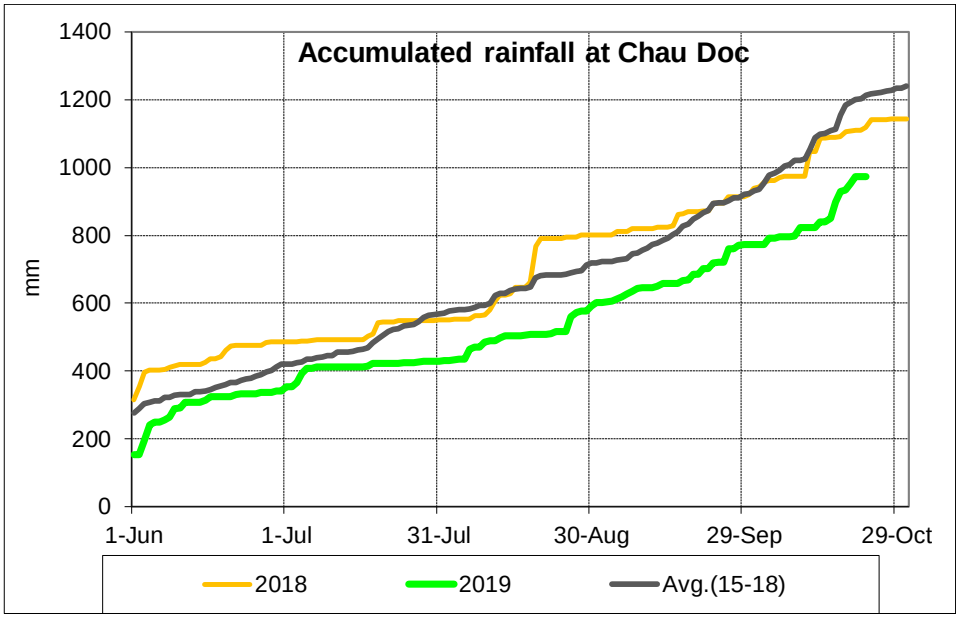


Figure 4: Accumulated Rainfall up to 28th October to 2019 in specific stations over the LMB

General behaviour of the Mekong River

This week from 23th to 28th October 2019, water levels from Chiang Sean were decreased slightly due to the inflow from China, varied from 0.03 m to 0.33 m but still stay below its LTA. However, water level trend at Luang Prabang and Chiang Khan are likely impacted by hydropower dam at Xayaburi, in which they fluctuated, varied from 0.02 m to 0.76 m. Water levels at stations at the middle part of LMB from Vientiane to Pakse decreased and stay below their minimum levels. Follow the same trend of water levels from upstream, stations at Stung Treng, Kratei, Chaktomuk on the Bassac, Phnom Penh Port and Neak Luong were also below minimum levels. For the 2 tidal stations at Tan Chau and Chau Doc, water levels decreased since middle of October 2019, and stayed below their LTAs.

For stations from Chiang Saen and Luang Prabang

Water levels from 23th to 28th October 2019 at Chiang Sean station were slightly decreased, due to the decreased flow from Jinghong on 23 Oct 2019 (see its hydrograph in **Annex A**). At this station water levels increased from 0.03 m to 0.33 m. However at Luang Prabang station, water levels were fluctuated and stay below its LTA. Water levels at this station sometime increased rapidly in 0.66 m, due to the reservoir operation of upstream and downstream at Xayaburi. It was observed that the Luang Prabang stations is likely nominated by hydro power dam operation upstream (tributaries) and downstream (Xayaburi) in which water levels always fluctuated above their LTAs, during the impounding reservoir at Xayaburi from end of October 2018 to May 2019.

For stations from Chiang Khan, Vientiane and Nong Khai and Paksane

Water levels from 23th to 28th October 2019 at Chiang Khan station were likely also nominated by upstream hydropower dam of Xayaburi, which was noted that water levels fluctuated from -0.76 to 0.44 m (see its hydrograph in **Annex A**). The current observed water levels at Vientiane/Nong Khai and Paksane stations are lower than their historical minimum levels and drought year of 1992.

For stations from Nakhon Phanom/Thakhet to Mukdaha/Sovannakhet

Water levels from 23th to 28th October 2019 at Nakhon Phanom/Thakhet to Mukdahan/Sovannakhet stations were slightly increased, varied from 0.02 m to 0.17 m. The current water levels at these stations reached below their minimum historical levels and drought years 1992.

For stations from Khong Chiam to Pakse

Water levels from 23th to 28th October 2019 at Khong Chiam to Pakse stations were also slightly increased, followed the inflow from upstream. The water levels decreased from 0.01 m to 0.08 m. The current water levels at these stations below their minimum historical levels.

For stations from Stung Treng to Kompong Cham/ Phnom Penh to Koh Khel/Neak Luong

Water levels from 23th to 29th October 2019 at Stung Treng, Kratie and Kompong Cham were continued to decrease, varied from 0.02 m to 0.27 m. The current water levels at Stung Trend, Kratie, Kompong Cham, Chaktomuk Koh Khel, Phnom Penh Port, Neak Luong and Prekdam on the Tonle Sap were below their historical minimum levels, while at (1980-2018).

Tan Chau and Chau Doc

Water levels from 23th to 29th October 2019 at the 2 tidal stations at Tan Chau and Chau Doc were slightly increased, follows the tidal effect from the sea. Water levels of these stations were stay below their LTAs.

According to the Japan Meteorological Agency (JMA), Sea surface temperature (SST) variability in the tropics Neutral, which has no major impact.

Discussion and Conclusion

From 23th to 29th October 2019, the trend of water levels at Chiang Sean were slightly decreased due to the low outflows from Jinghong from 23th Oct 2019. Water level at Chiang Sean is relied from inflow from Jinghong Hydropower Station on Lancang and its catchment rainfall. The impact could obviously see the gradually decreasing water level to downstream to Vientiane/Nong Khai. Based on a hydrological phenomenon, the inflow contribution of water from the upstream of Lancang-Mekong in China to the Mekong mainstream is about 16% in total during the Dry season from Nov to May, while 24% in the Wet season (Adamson. 2010). The whole inflow of water into the lower Mekong basin is influenced more by inflow from tributaries and the direct rainfall catchment.
The low inflows from upstream and less rainfall in catchments, resulting water levels from Paksane to Pakse are drastically dropped below their minimum levels.
However, from Stung Treng, Kratie and Kompong Cham stations water levels are followed the same trend from upstream which stay below their minimum levels.
Wet Season 2019 (Sep-Oct) is characterized low rainfall at the upper part.

Due to the low flow of the Mekong, the upcoming ***Dry Season*** can be possible of facing some proble, related to the shortage of drinking water and agricultural production, fishery production, ecological systems, biodiversity, bank erosion, salinity intrusion in the Mekong Delta and waterway transport because not enough water for fish spawning and also aquatic lives ect. The reduced water flow could also affect to the expanding unsaturated soil which cause bank erosion and salinity intrusion from the sea.

Note: For detail information on the current flows and water levels situation from upstream to downstream, **Annex A** presented hydrographs of water level at the 22 key stations on the Mekong River.

The Trend of water level and its Outlook

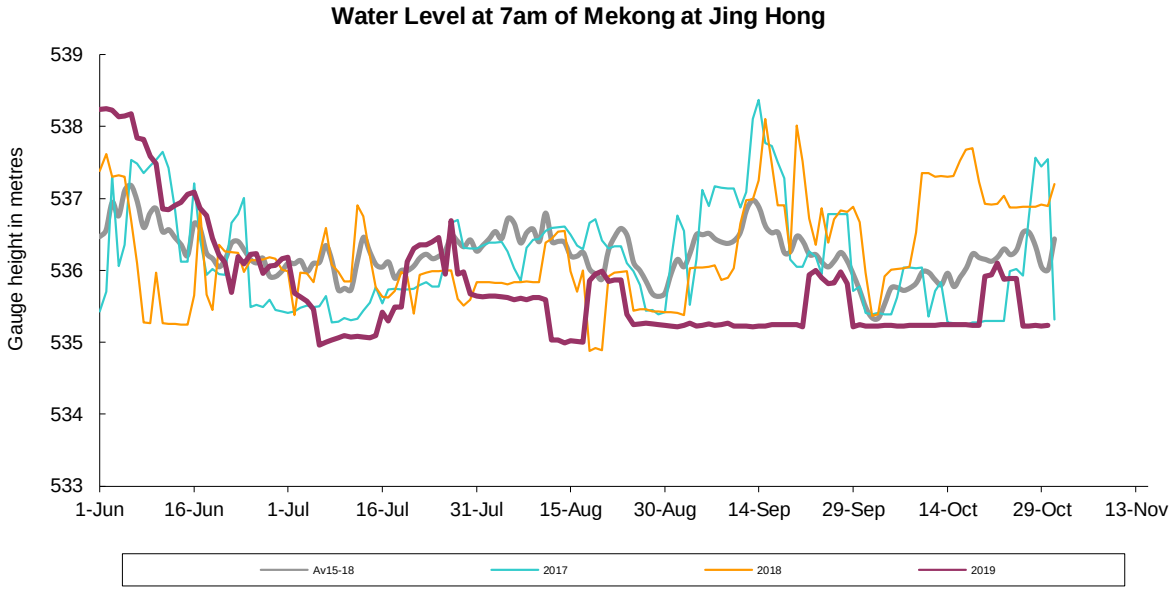
Referred to daily river flood forecasting bulletin next week from 31th October to early November 2019, water levels at Chiang Saen will slight increase that can be varied from 0.02 m to 0.20 m, while the water level of the station at Luang Prabang and Chiang Khan will be fluctuated due to the impact of the inflow from reservoir operation upstream and downstream. Water levels at Vientiane /Nong Khai and Paksane follow the same trend as upstream inflows, varied from 0.02 to 0.18 m. From Nakhon Phanom to Sovanakhet, water levels will be decreased from 0.04 m to 0.15 m. The 5 days forecasted rainfall of NOAA (GFAS) of showed below-normal rainfall will continue in the next 5 days in some places mainly in the low-lying area and the Mekong Delta.

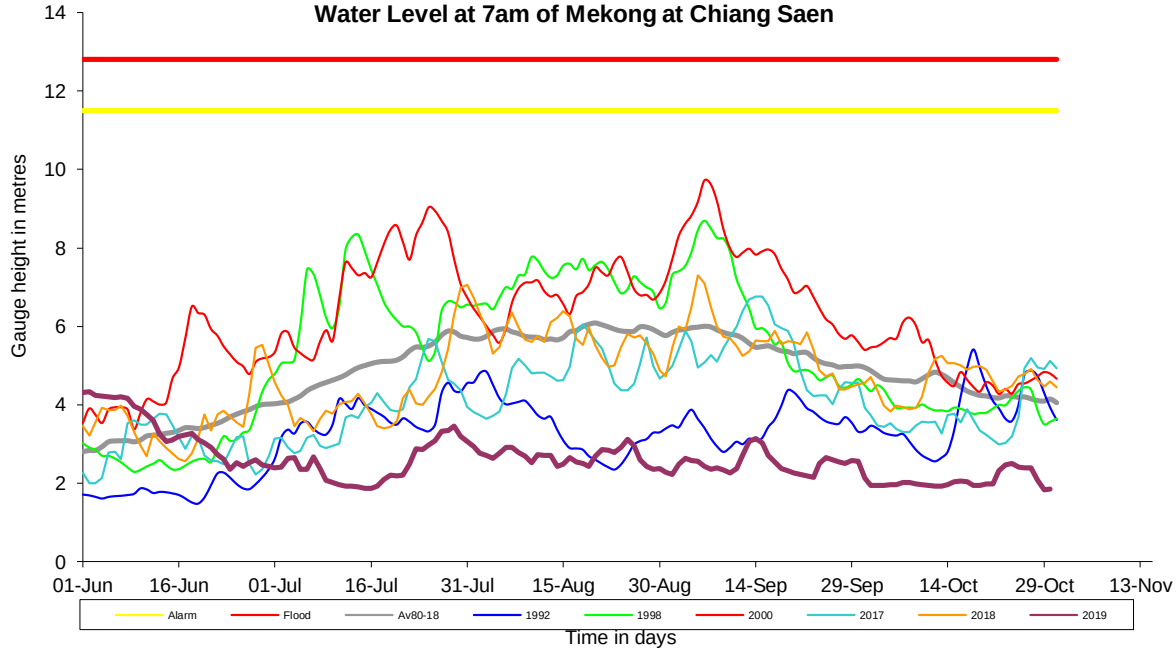
From Stung Treng, Kratie and Kompong Cham, water levels for the 5 days forecasting from 31th October to early November 2019 will decreased from 0.05 m to 0.35 m, while at Chaktomuk, Tole Sap at Phnom Penh Port, Prekdam on the Tonle Sap and Neak Luong on the Mekong will slightly increase due to some rainfall in the low-lying area in the Mekong Delta.

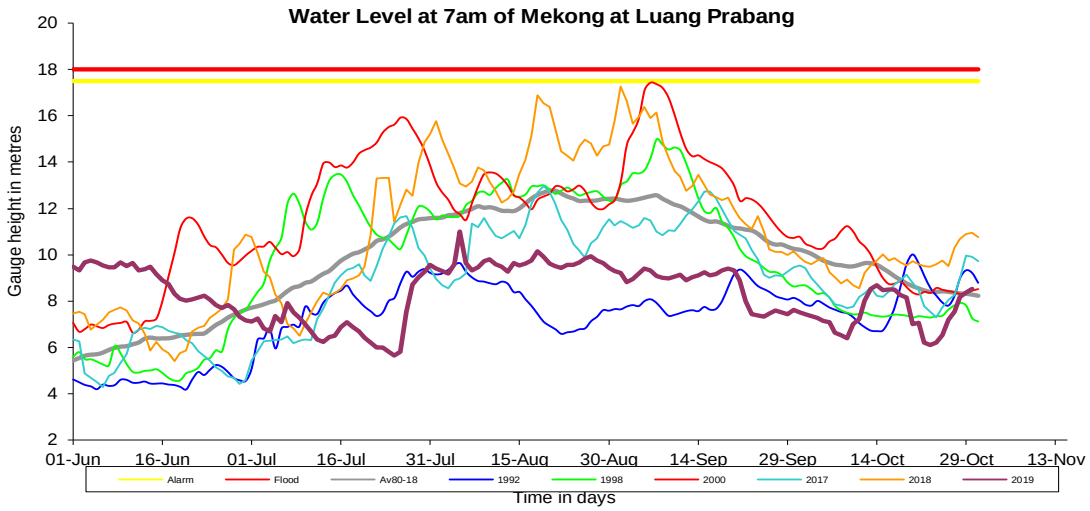
For the tidal stations at Tan Chau and Chau Doc will decreased and stay below their LTAs from 31th October to early November 2019, varied from 0.03m to 0.20 m.

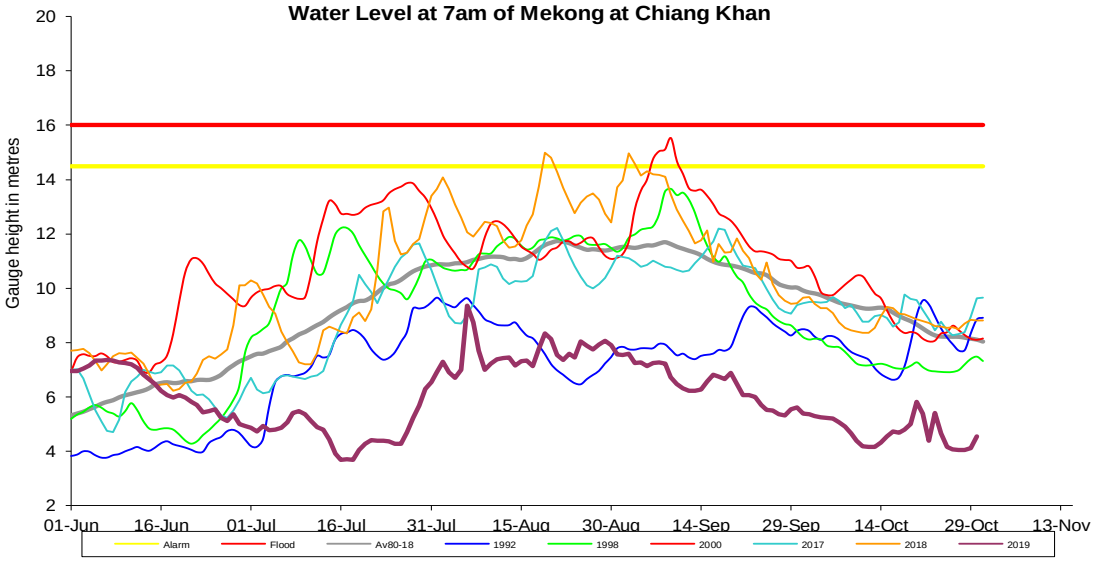
Annex A: Seasonal Water Level Hydrographs

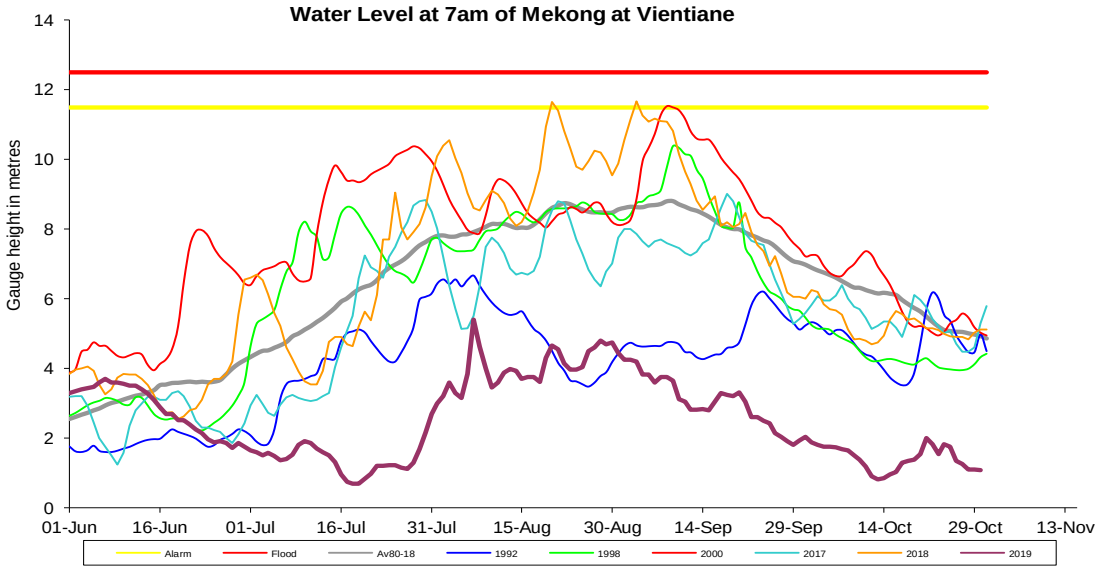
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS IN FLOOD SEASON FROM UP TO 28 OCTOBER 2019

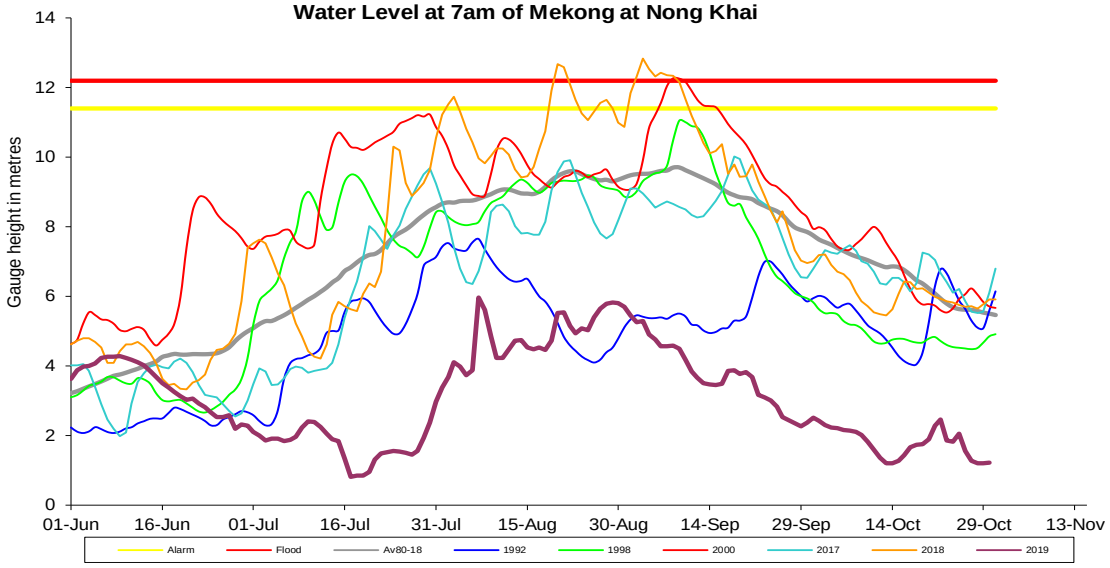


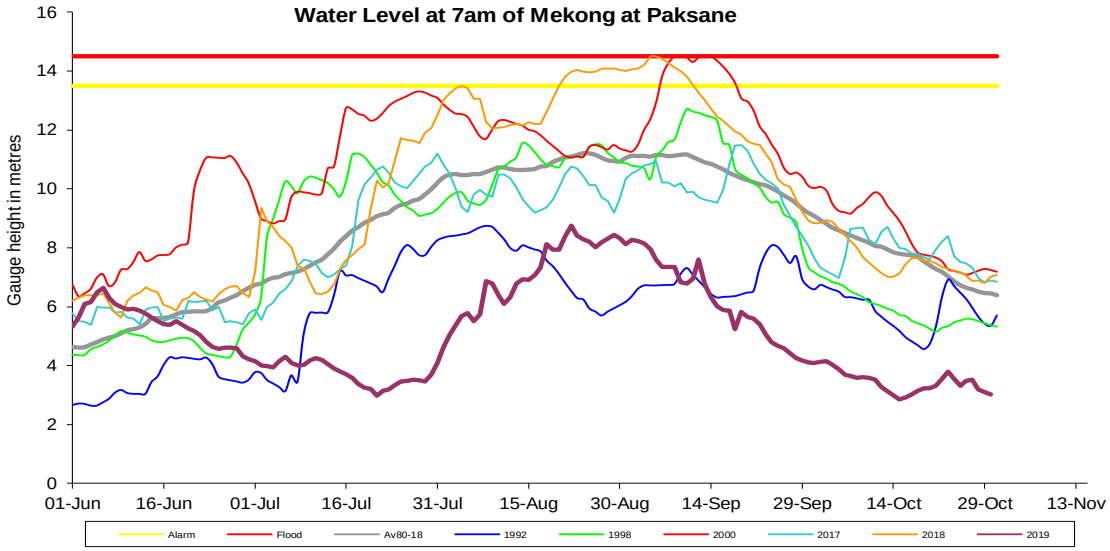


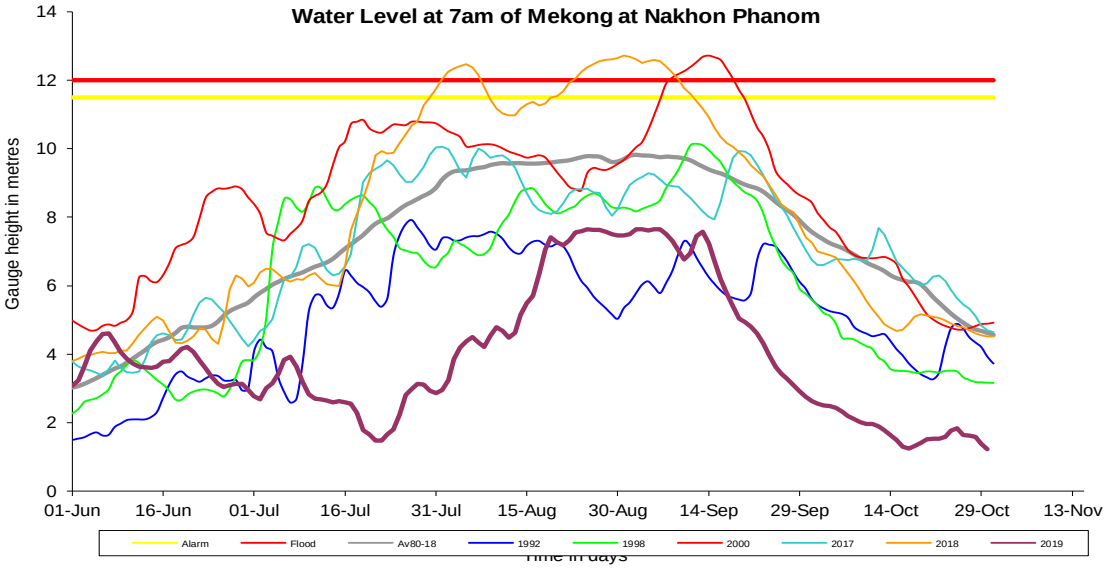

Water Level at 7am of Mekong at Luang Prabang
Gauge height in metres
20
18
16
14
12
10
8
6
4
2
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019
Time in days

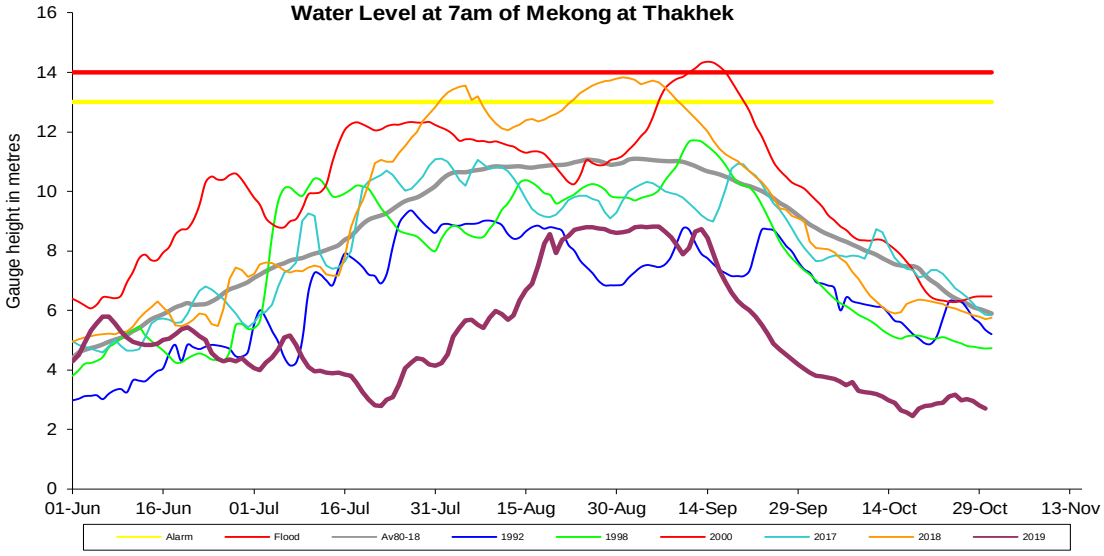

Water Level at 7am of Mekong at Chiang Khan
Gauge height in metres
20
18
16
14
12
10
8
6
4
2
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

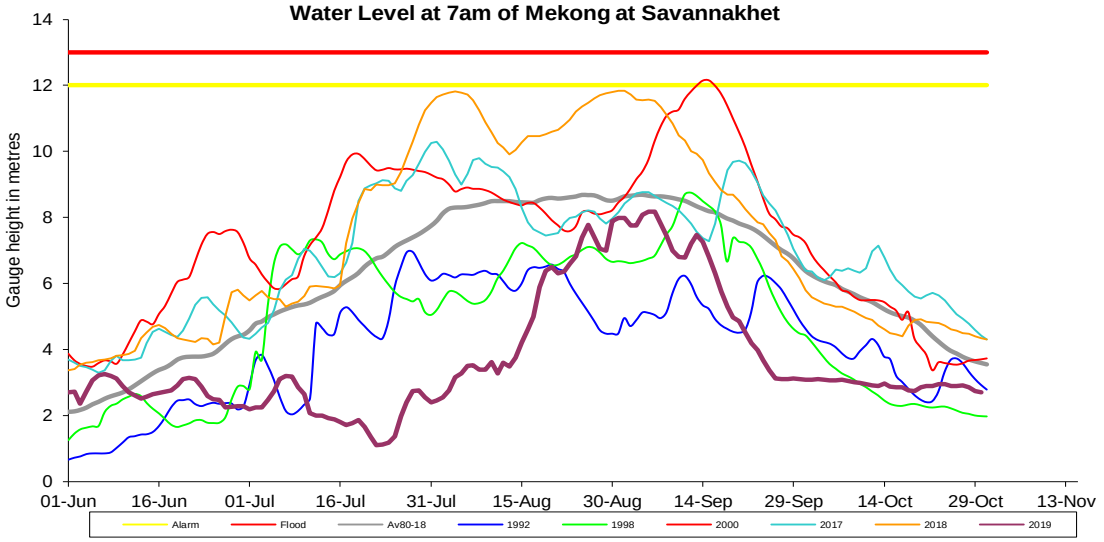

Water Level at 7am of Mekong at Vientiane
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

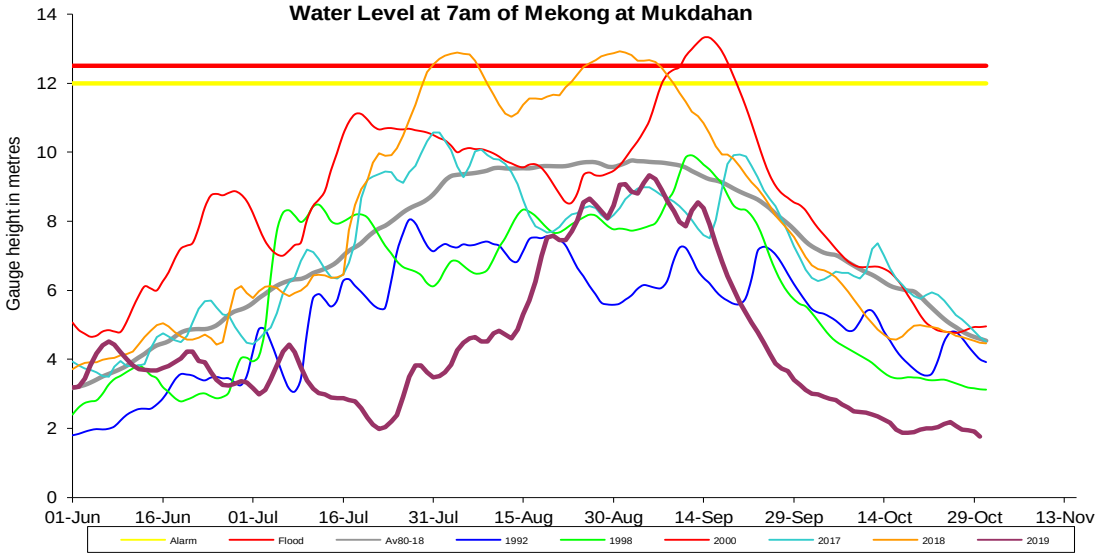

Water Level at 7am of Mekong at Nong Khai
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

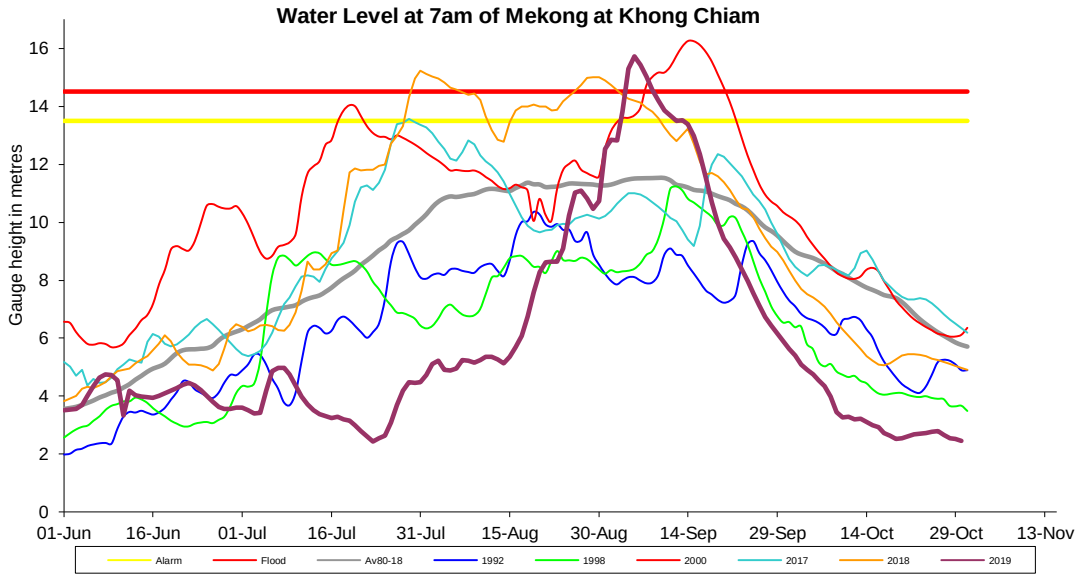

Water Level at 7am of Mekong at Paksane
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

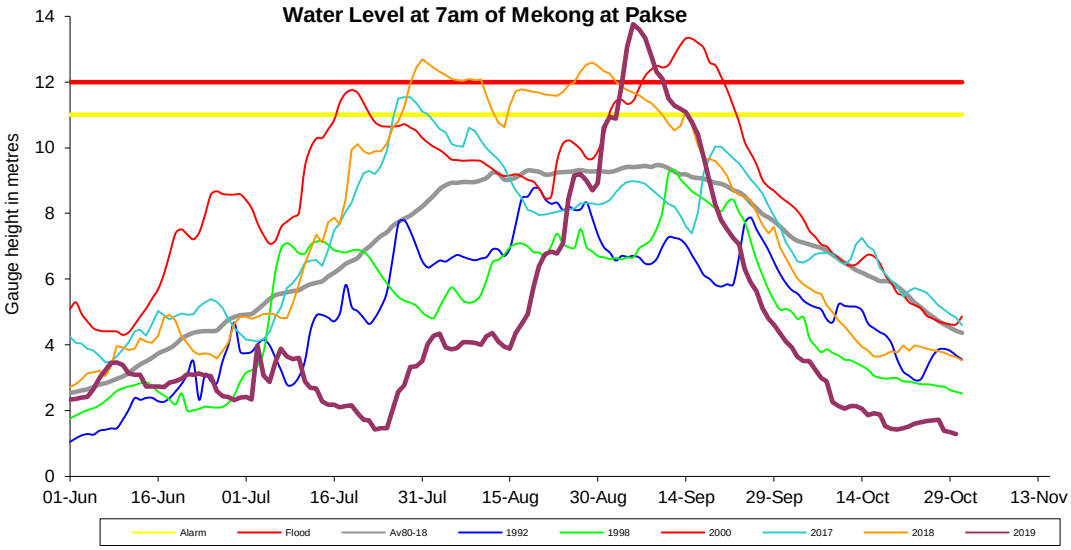

Water Level at 7am of Mekong at Nakhon Phanom
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

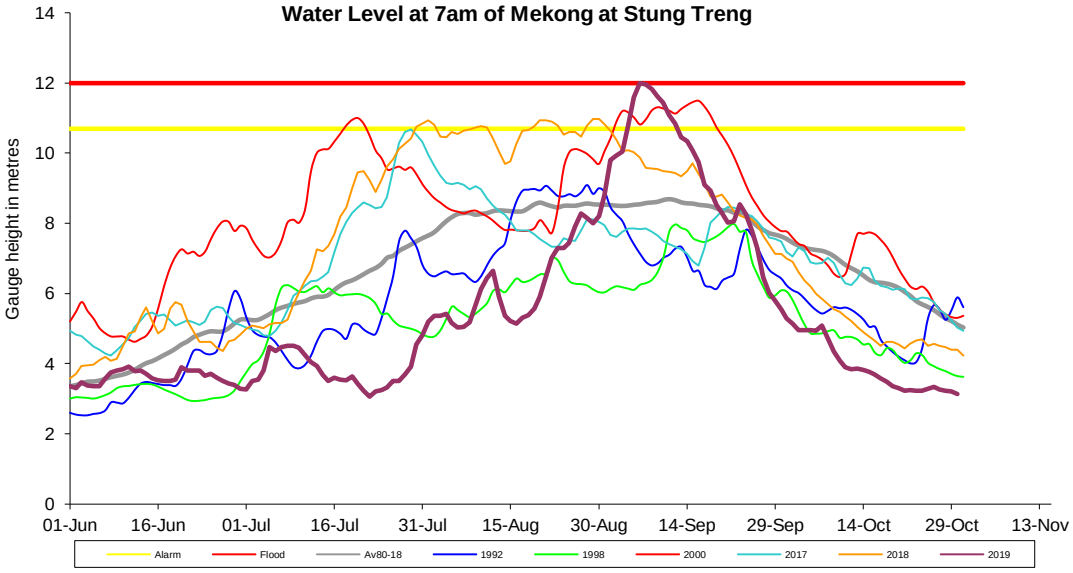

Water Level at 7am of Mekong at Thakhek
Gauge height in metres
16
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

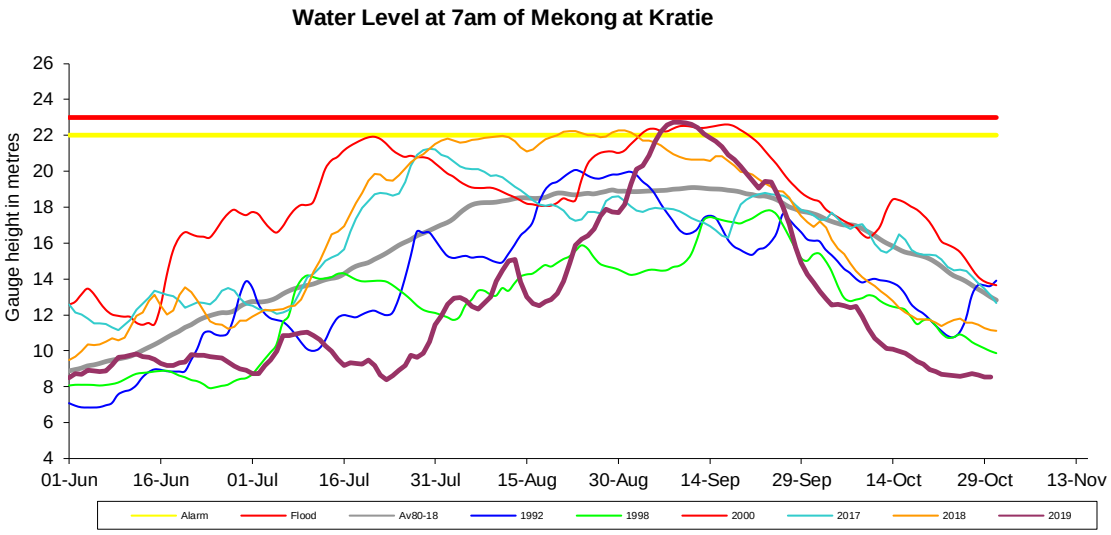

Water Level at 7am of Mekong at Savannakhet
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

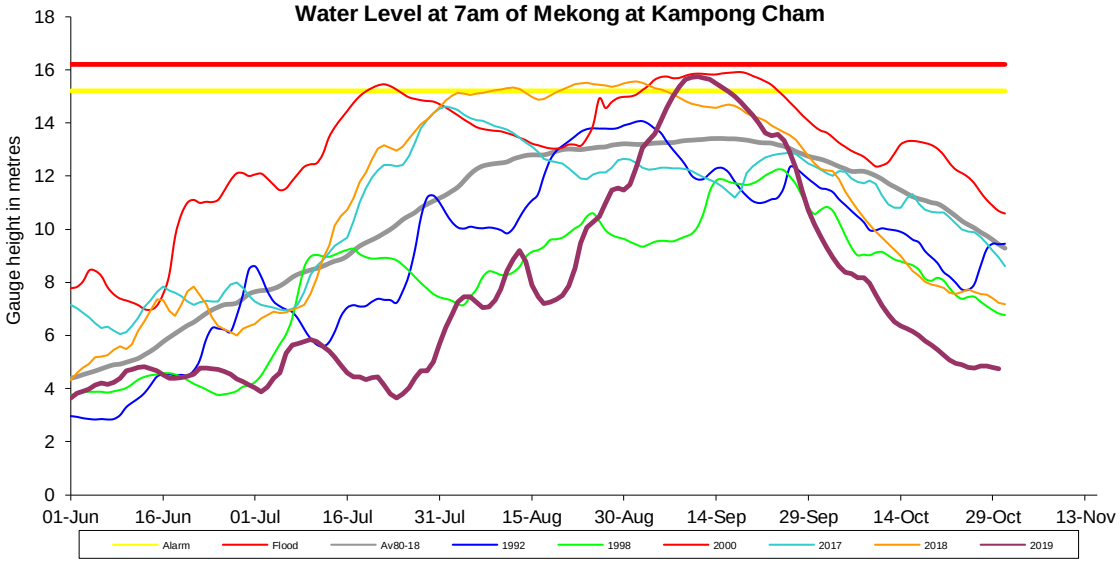

Water Level at 7am of Mekong at Mukdahan
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

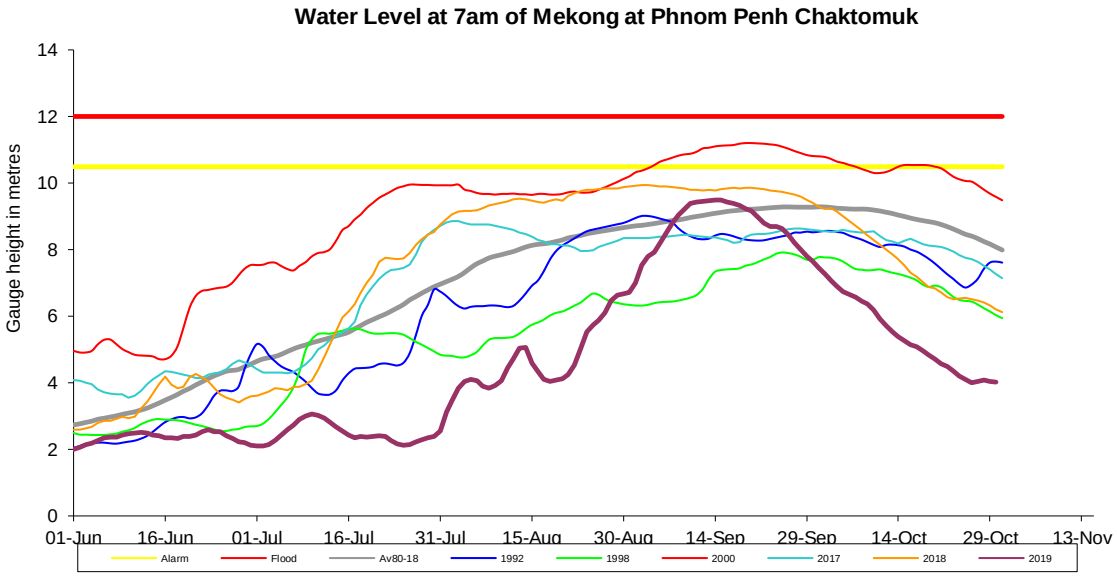

Water Level at 7am of Mekong at Khong Chiam
Gauge height in metres
0
2
4
6
8
10
12
14
16
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

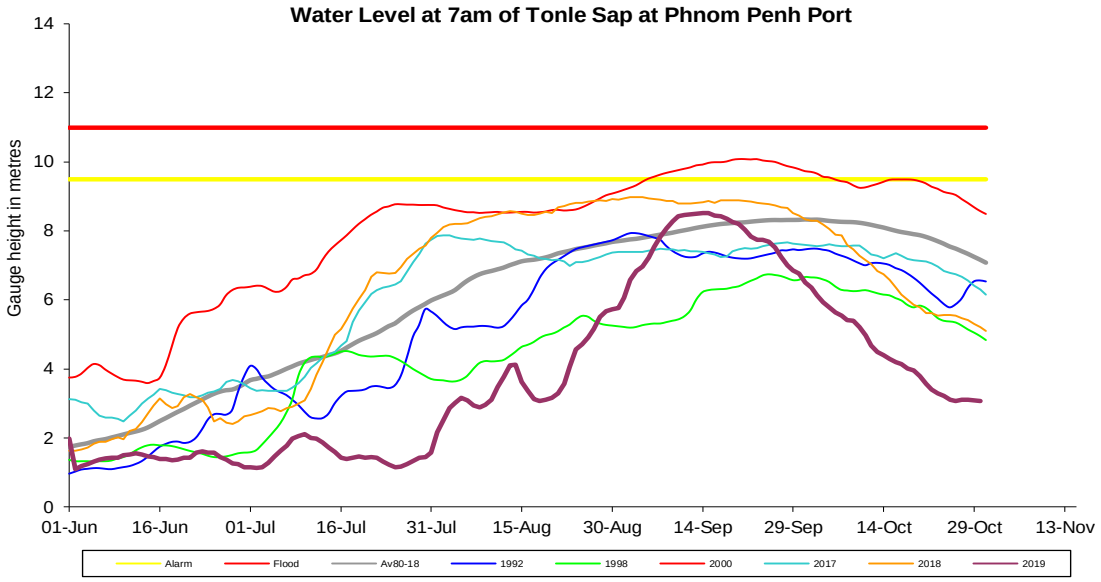

Water Level at 7am of Mekong at Pakse
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

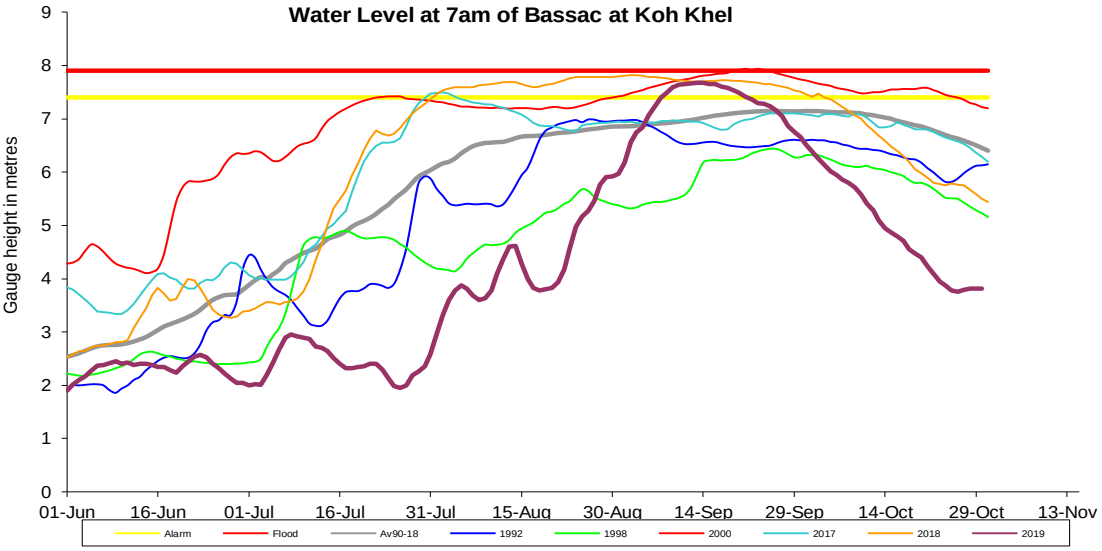

Water Level at 7am of Mekong at Stung Treng
Gauge height in metres
0
2
4
6
8
10
12
14
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

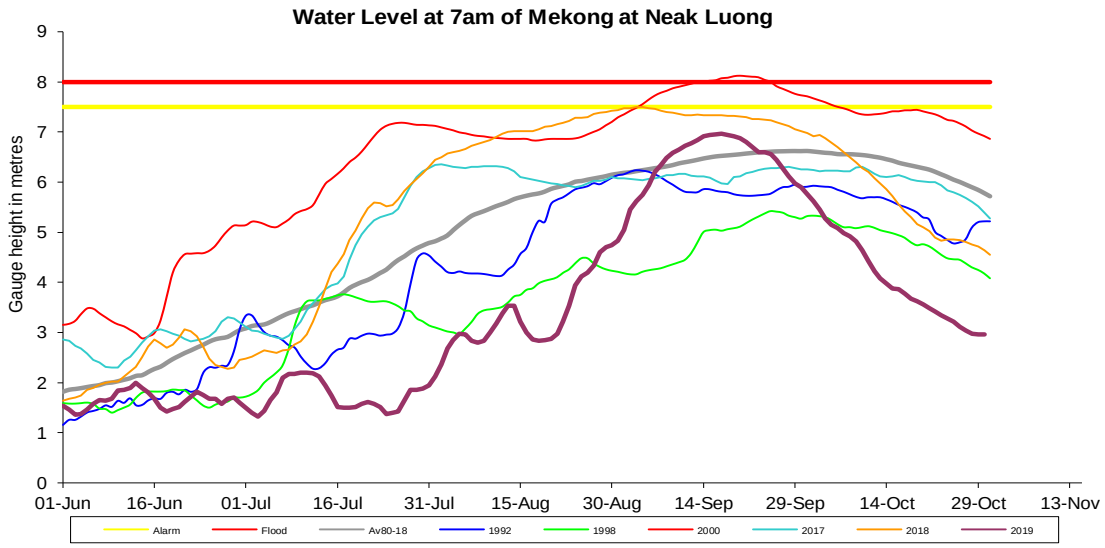

Water Level at 7am of Mekong at Kratie
Gauge height in metres
26
24
22
20
18
16
14
12
10
8
6
4
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

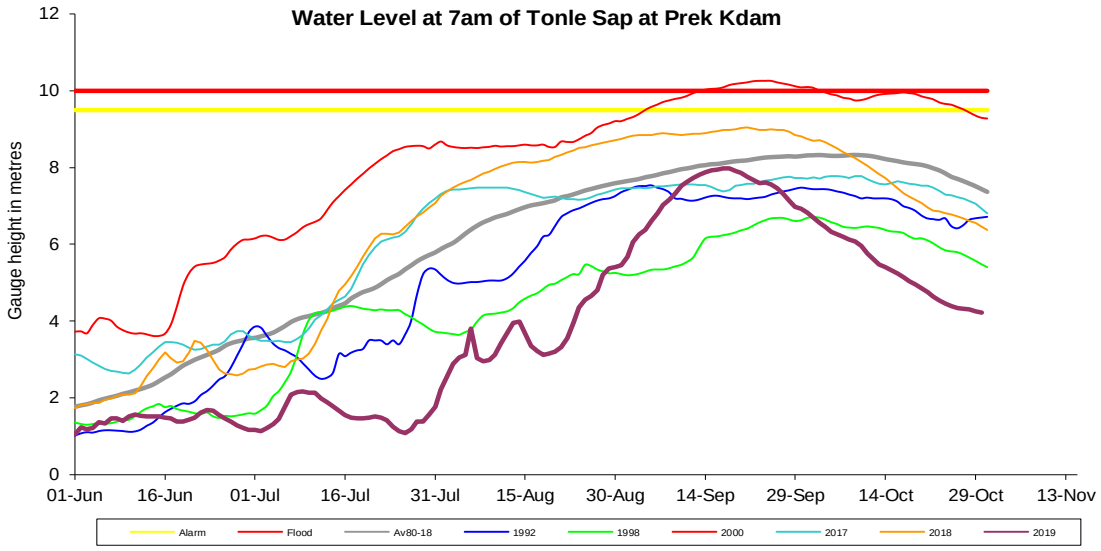

Water Level at 7am of Mekong at Kampong Cham
Gauge height in metres
18
16
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

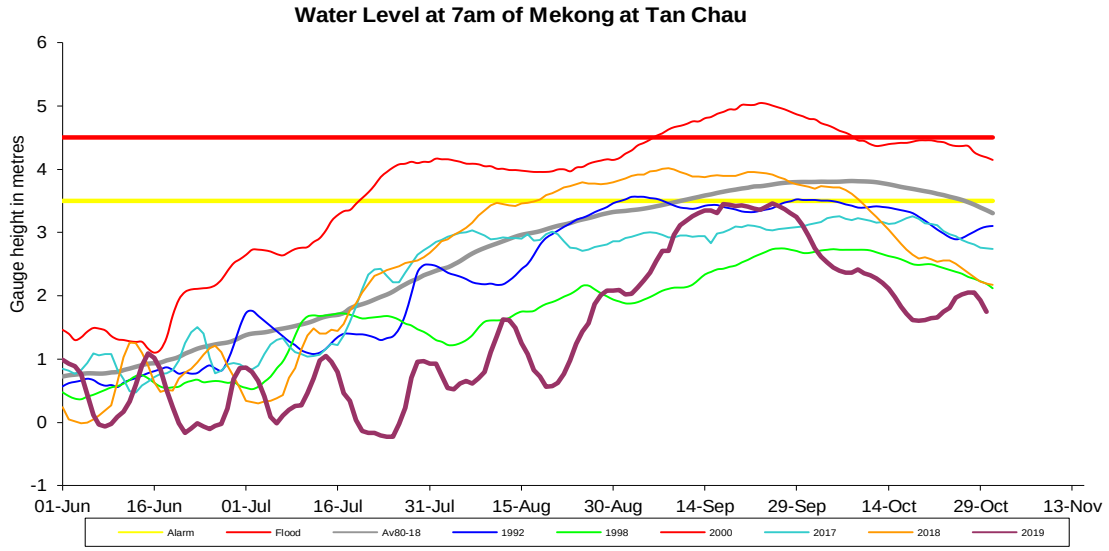

Water Level at 7am of Mekong at Phnom Penh Chaktomuk
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019

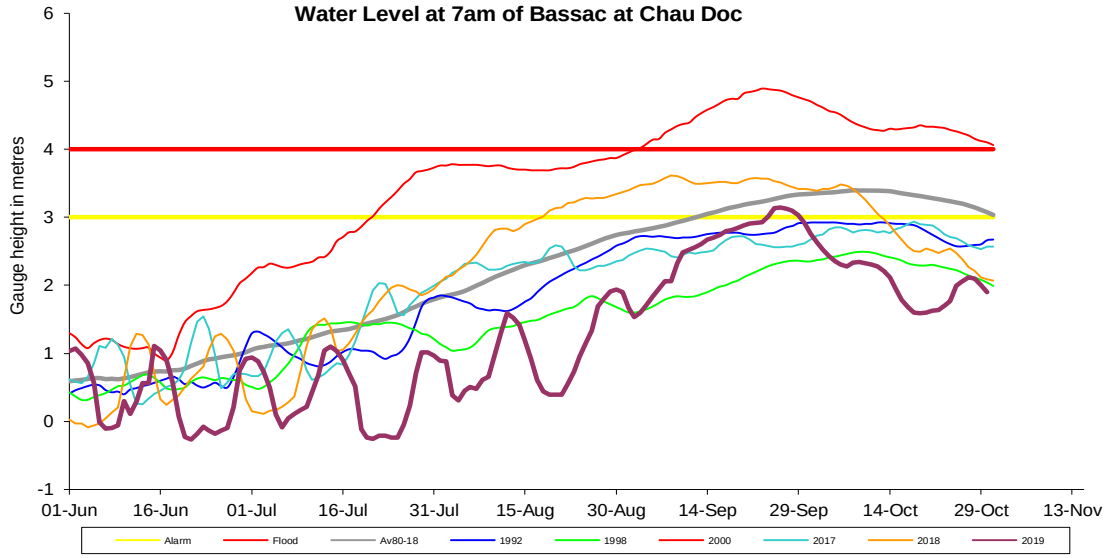

Water Level at 7am of Tonle Sap at Phnom Penh Port
Gauge height in metres
14
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019


Water Level at 7am of Bassac at Koh Khel
Gauge height in metres
9
8
7
6
5
4
3
2
1
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av90-18
1992
1998
2000
2017
2018
2019


Water Level at 7am of Mekong at Neak Luong
Gauge height in metres
9
8
7
6
5
4
3
2
1
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019


Water Level at 7am of Tonle Sap at Prek Kdam
Gauge height in metres
12
10
8
6
4
2
0
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019


Water Level at 7am of Mekong at Tan Chau
Gauge height in metres
6
5
4
3
2
1
0
-1
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019


Water Level at 7am of Bassac at Chau Doc
Gauge height in metres
6
5
4
3
2
1
0
-1
01-Jun
16-Jun
01-Jul
16-Jul
31-Jul
15-Aug
30-Aug
14-Sep
29-Sep
14-Oct
29-Oct
13-Nov
Alarm
Flood
Av80-18
1992
1998
2000
2017
2018
2019