

Weekly Flood Situation Report for the Mekong River Basin

Prepared by RFDMC

covering the week from 6th to 12th August 2019 and potential trend next week

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

General weather patterns

During the week from 6th to 12th August 2019, the weather outlook bulletins and maps issued by the Thailand Meteorology Department (TMD) were used to verify the weather condition in the LMB. The rainfall will be mostly 60-80% of the area along with heavy rain amount at many areas and very heavy rain amount at some areas, especially in August and September. The low pressure was observed at the middle part of LMB (Chaing Khan and Vientiane/ Nong Khai), which attracted rainfall in these locations last week. **Figures 1 & 2** presented the weather map for 8th and 12th August 2019.

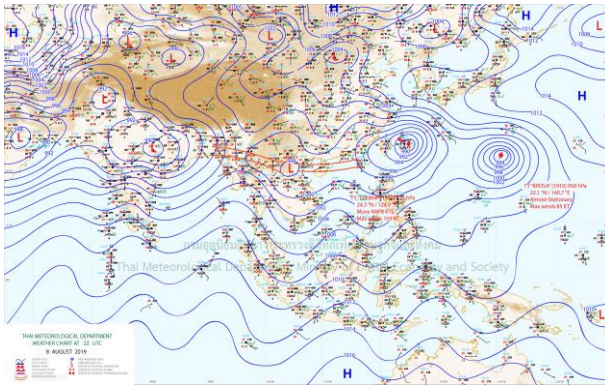


Figure 1: Weather map for 8th Aug 2019

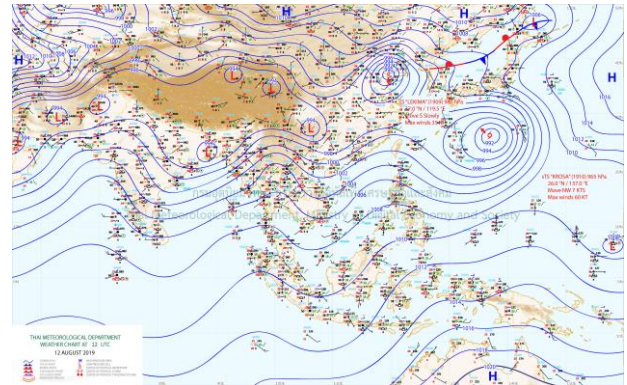


Figure 2: Weather map for 12th Aug 2019

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), from the beginning of August 2019, above-average rainfall is predicted over Viet Nam, parts of Myanmar and southern Thailand. In terms of temperature, warmer-than-average conditions can be expected over the equatorial ASEAN region and the inland areas of Thailand. **Figure 2** showed the rainfall outlook over southern Southeast Asia.

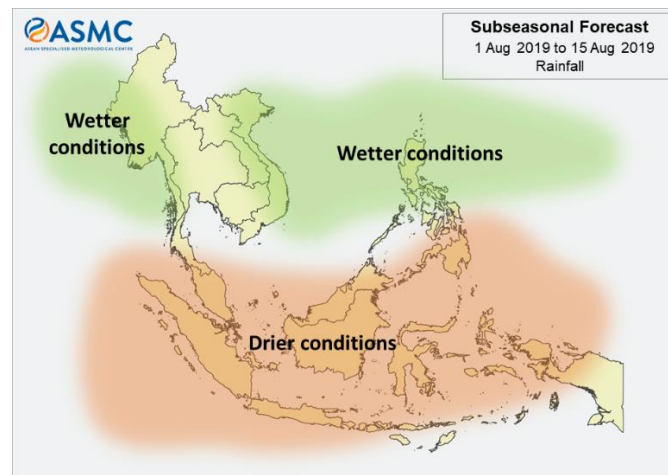


Figure 2: The predicted higher likelihood of above-normal rainfall over southern Southeast Asia in August 2019

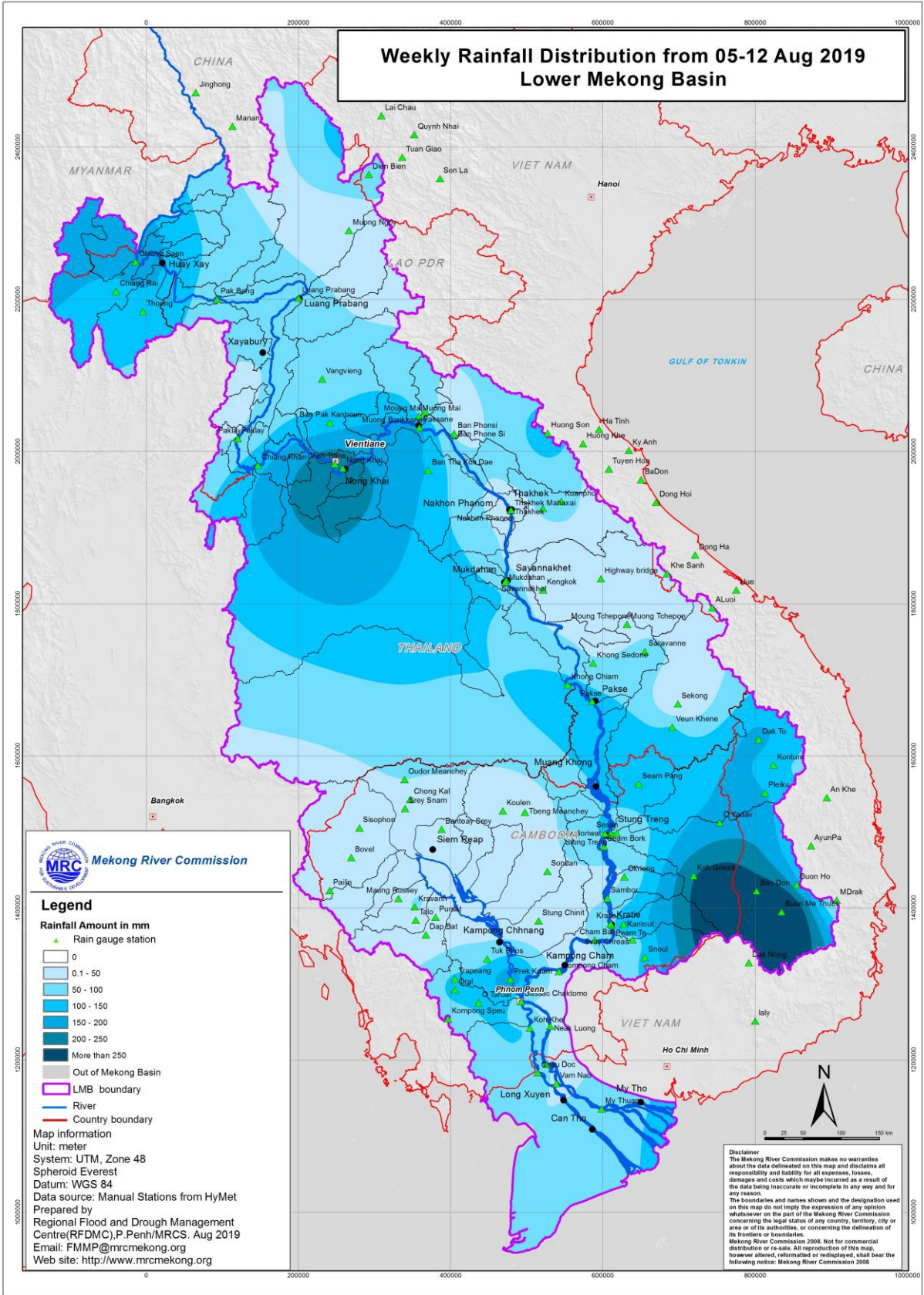
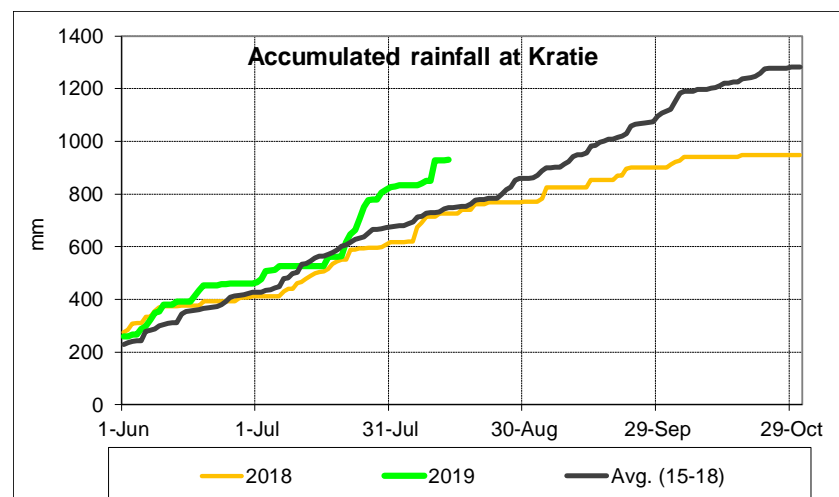
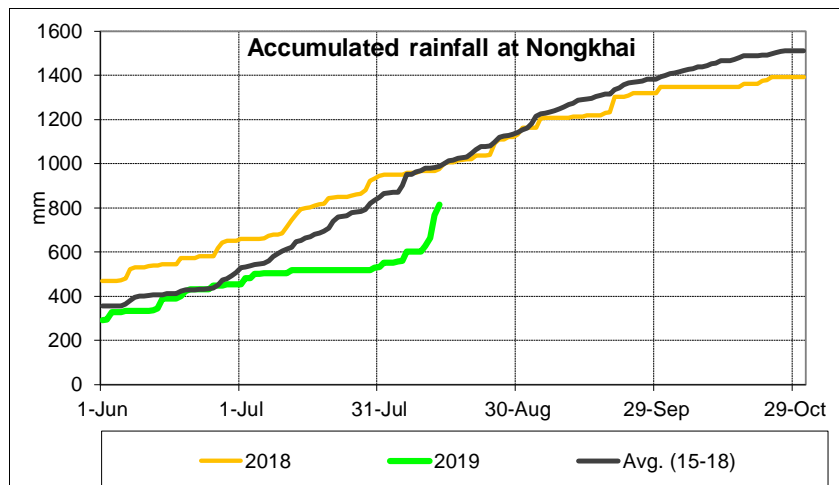
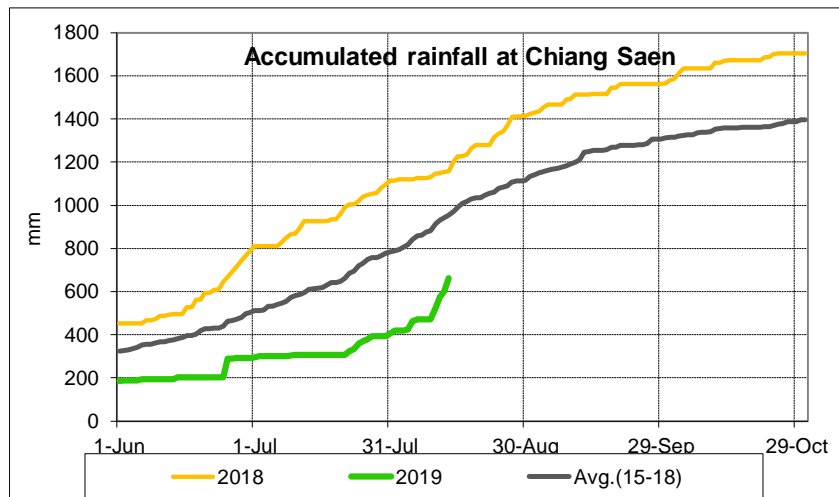


Figure 3: Weekly Rainfall Distribution over the LMB from 05th to 12th Aug 2019

Over weather situation

The weather of this week was scattered thundershowers with moderate and heavy rain of the Southwest monsoon and tropical depression. Consequently, in this week there was heavy rainfall covered from Luang Prabang down to Pakse varied from 100 mm to 200 mm. Heavy rainfall was spread from Chiang Khan, Vientiane and Paksane and the 3S area in Cambodia, showed varied from 100 to over than 250 mm. The weekly rainfall distribution in the Lower Mekong Basin from 05th to 12th Aug 2019 is showed in **Figure 3**. The accumulated rainfall in the specific location at Chiang Saen, Nong Khai, Kratie and Chau Doc from 05th to 12th Aug 2019 are showed in **Figure 3**. It indicated the early August's rainfall is still low in most of the stations, compared to their LTAs except at Kratie was higher than its LTA.



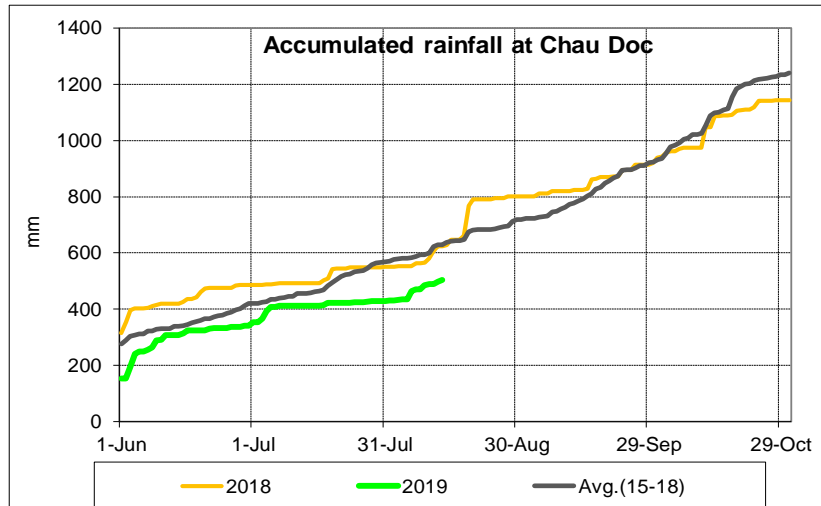


Figure 4: Accumulated Rainfall up to 12th Aug 2019 in specific stations over the LMB

General behaviour of the Mekong River

During the last week, the water levels at stations from upper to middle part of LMB has been increasing, due to some rainfall in the catchment inflows. However, water levels at those key stations are lower than their historical minimum levels from Chiang Sean down to Cambodia’s Mekong River System (Bassac and Tonle Sap), except at Luang Prabang station where water level was higher than its minimum level due to the operation of upstream inflow from tributaries and the downstream at Xayaburi. The trends of water level in the entire Mekong River Basin is suggested a significant reduction in the natural groundwater contribution to these tributaries over the last months. This might arise as a response to what might be described as a hydrological low flow following on from the very deficient rainfall in early Wet Season of 2019. It may be that the ground water contributions tail off exponentially under such conditions

For stations from Chiang Saen and Luang Prabang

Water levels from 05th to 12th Aug 2019 at Chiang Sean station were slightly decreased and stay below their historical minimum levels (1980-2018). It was decreased about 0.02 m to 0.21 m. For Luang Prabang station, water levels were also decreased about 0.10 to 1.36 m (06 August 2019). The current water level at this station is higher than their minimum levels but still below the LTA. 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 stay 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 05th to 12th Aug 2019 at these stations were also followed the same trend of upstream inflowed from Chiang Sean. It was observed that at Chiang Khan, Vientiane, Nong Khai and Paksane stations, water levels were dropped about 0.25 m to 0.65 m and still stay lower than their historical minimum levels (1980-2018).

For stations from Nakhon Phanom/Thakhet to Mukdaha/Sovannakhet

Water levels from 05th to 12th Aug 2019 at Nakhon Phanom/Thakhet to Mukdahan/Sovannakhet stations were also followed the same trend as upstream stations and influenced by catchment rainfall, which caused water level slightly decreased about 0.02m to 0.16m. However, the current water levels at those stations are still staying below their historical minimum levels (1980-2018).

For stations from Khong Chiam to Pakse

The same trend as upstream part, water levels from 05th to 12th Aug 2019 at Khong Chiam to Pakse stations were slightly increased about 0.02 m to 0.25 m. However, those are still staying below their historical minimum levels (1980-2018).

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

Water levels from 05th to 12th Aug 2019 at Stung Treng, Kratie, Kompong Cham and Phnom Penh stations on the Mekong, Bassac and Tonle Sap were infected by rainfall from catchment inflow and at the stations, drawing water levels increased from 0.02 m to 0.70 m. It was found that water levels at Stung Trend, Kratie and Kompong Cham stations were reached above their historical minimum levels (1980-2018), while at Chaktomuk on the Bassac, Phnom Penh port and Prekdam on the Bassac and Neak Luong on the Mekong are still staying close their Minimum Levels (1980-2018).

Tan Chau and Chau Doc

Water levels from 05th to 12th Aug 2019 at these 2 tidal stations were still maintaining fluctuated over their LTAs but did not follow the same trend as previous years as indicated in **Annex B**. This might affect by the El Nino process in the South China Sea, based on the information done by Japan Meteorological Agency (JMA).

According to the Japan Meteorological Agency (JMA), Sea surface temperature (SST) variability in the tropics can significantly impact on the global climate through atmospheric circulation. El Niño event, which are identified by SST fluctuations from the central to the eastern equatorial Pacific (NINO.3), are widely known examples of this. The NINO3 index is one of several El Niño/Southern Oscillation (ENSO) indicators based on sea surface temperatures. The five-month running mean of the SST deviation for NINO.3 predicted by JMA's El Niño prediction model is presented in **Figure 5**.

According to the ASMC, the El Niño Southern Oscillation (ENSO) has been downgraded to “Neutral” status at this time. While warmer sea-surface temperature (SSTs) remain over the Nino3.4 Region.

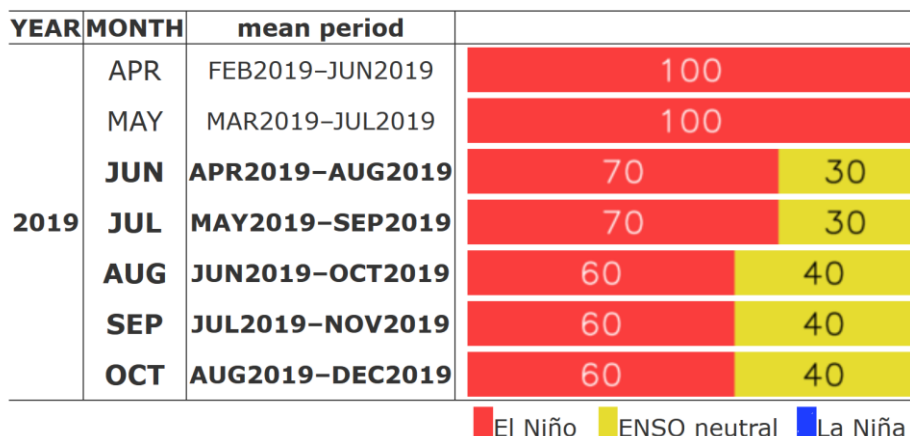


Figure 5 Five-month running mean of the SST deviation for NINO.3 predicted by JMA's El Niño prediction model (JMA/MRI-CGCM2)

Discussion and Conclusion

From 05th to 12th Aug 2019, the trend of water levels at Chiang Sean were slightly increased but still staying below their minimum levels, due to the low inflow from upstream (the decreased inflow from Jinghong from 11th to 15th as notified by the Min. of water resource China dated on 5th Aug 2019) and low rainfall since last week. Water flow realised from Jinghong Hydropower Station on Lancang was considered strong impact at this station. The impact could obviously see the gradually decreasing water level to downstream at 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 Wet season from June to October. The whole inflow of water into the lower Mekong basin is influenced more by tributaries and a direct rainfall distribution.

The initial conclusion (for discussion) is that the regional tail off in water levels is a combined response to regional low rainfall conditions and dam operation. The rapidity of the decrease seems associated with reduced turbined flows from the Upper Mekong reservoirs which in turn are no doubt a reflection of the hydrological 'low-flow' and consequent low levels of reservoir storage.

On the other hand, the hydrological conditions (rainfall and flows) of the Mekong River during early

Wet Season 2019 (Aug-Sep) is characterized as low flow due to the low rainfall and water storing at upstream reservoirs, which caused low inflows. The low rainfall caused low-water levels in the mainstream and catchment inflow of the Lower Mekong Basin.

In short, the low-flow condition in the Mekong River system is likely caused by the low rainfall, the impact of hydropower operation and storing water at reservoirs at upstream and tributaries.

Further work to clarify the issues, with specific attention being paid to conditions on the large northern Lao tributaries, need to be clarified

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

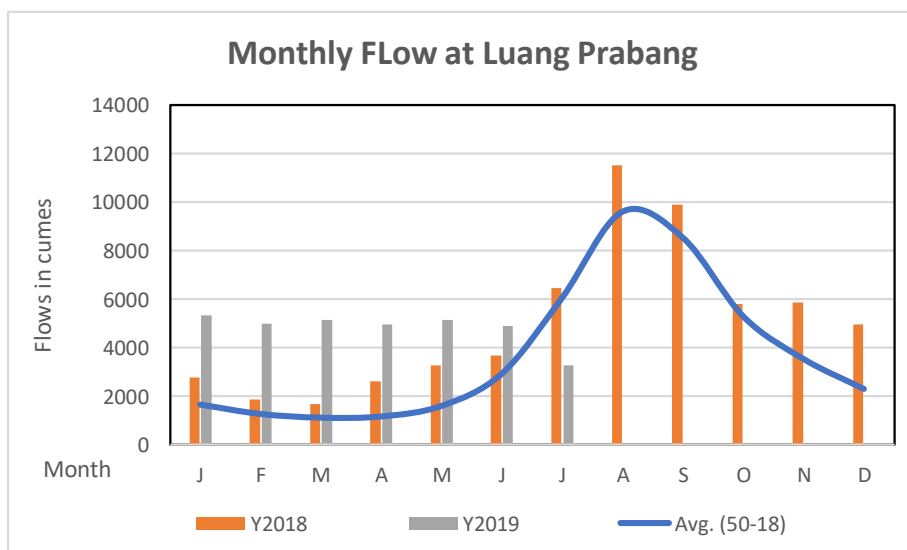
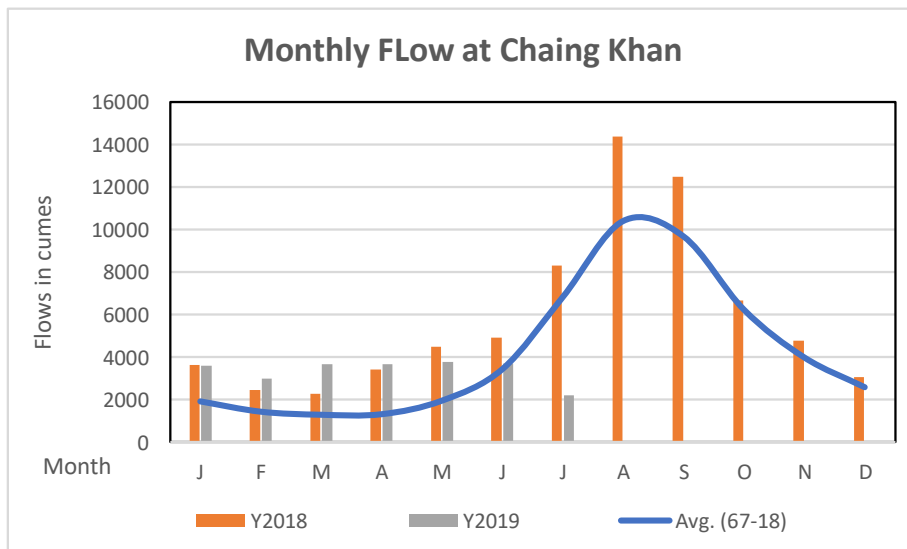
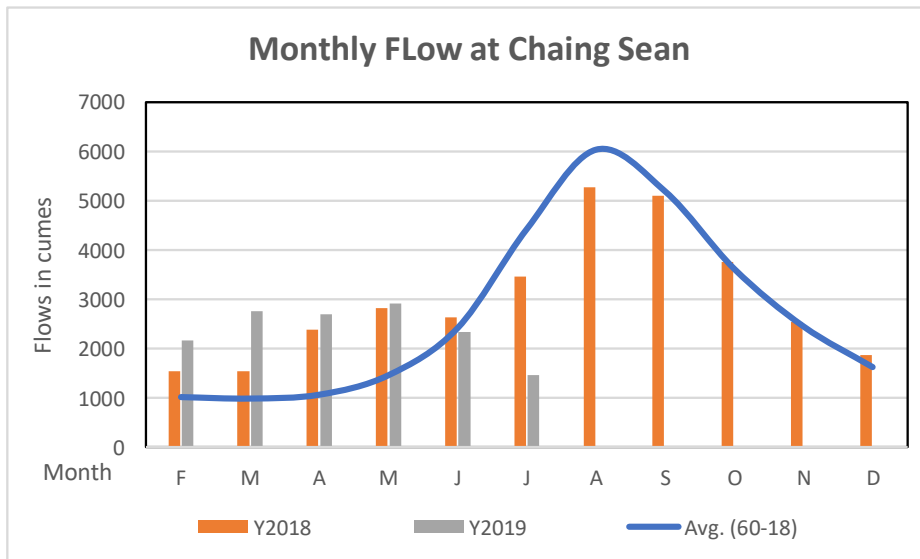
The Trend of water level and its Outlook

Based on of the daily river flood forecasting outcomes, next week water levels at Chiang Saen will be fluctuated bases on the inflow from Jinghong in China, while the water level of the stations from Luang Prabang will increase due to the impact of the flood at Luang Prabang occurred on 16th and 17th August 2019, but the level of these stations is still lower than its LTA. The 5 days forecasted rainfall of NOAA (GFAS) of showed above normal rainfall in the next 5 days.

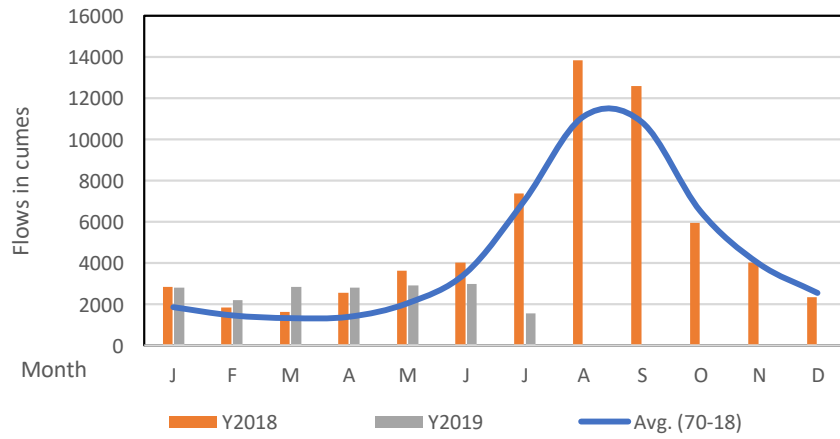
ASMC also expected that for July-August-September 2019, above-normal rainfall will be nominated the northern Southeast Asia (southern parts of Myanmar, Thailand, Laos, Cambodia and Vietnam).

Annex A: Monthly Flow Hydrographs

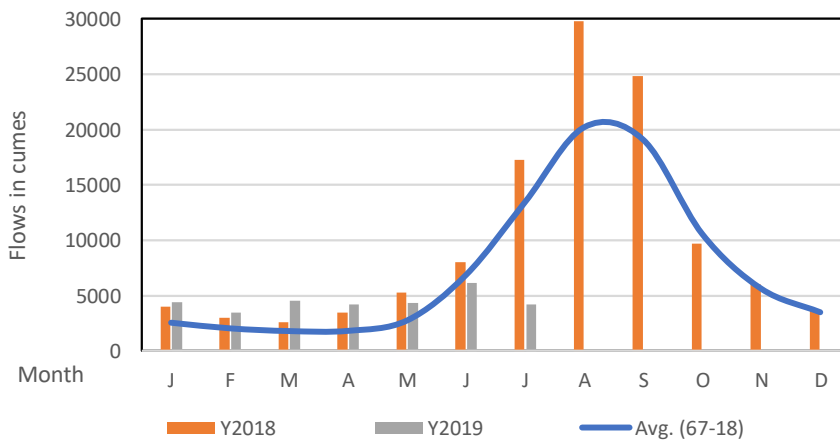
**MONTHLY FLOWS HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS
IN FLOOD SEASON FROM JAN TO JULY 2019**



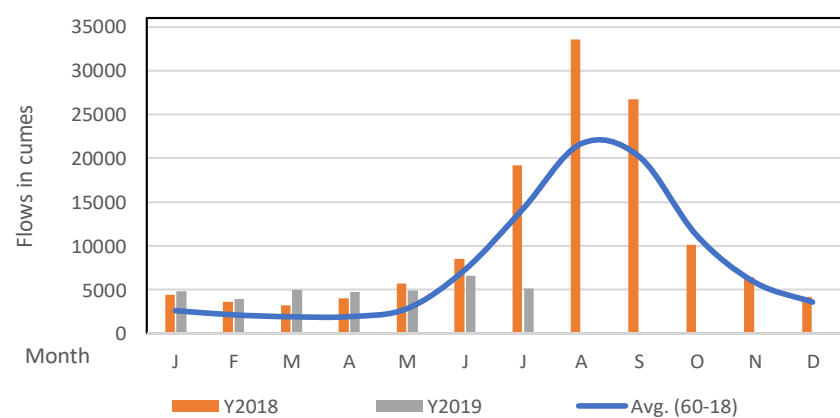
Monthly Flow at Nong Khai



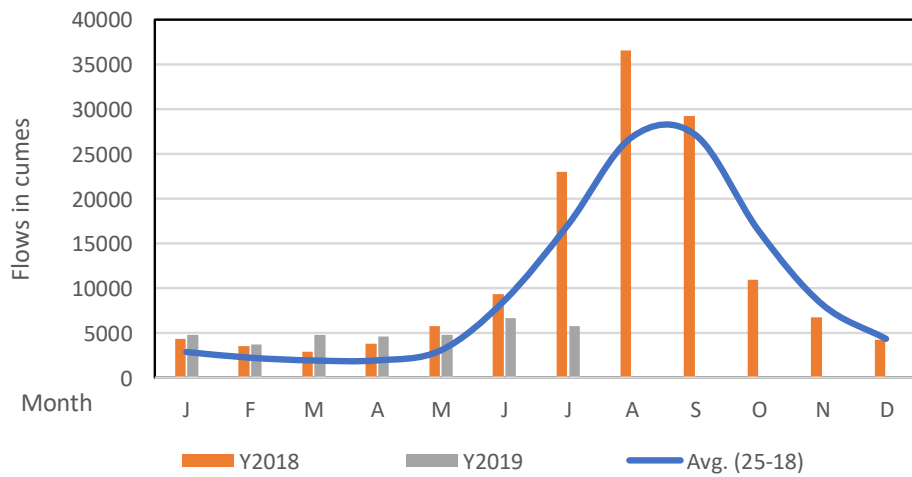
Monthly Flow at Nakhon Phanom



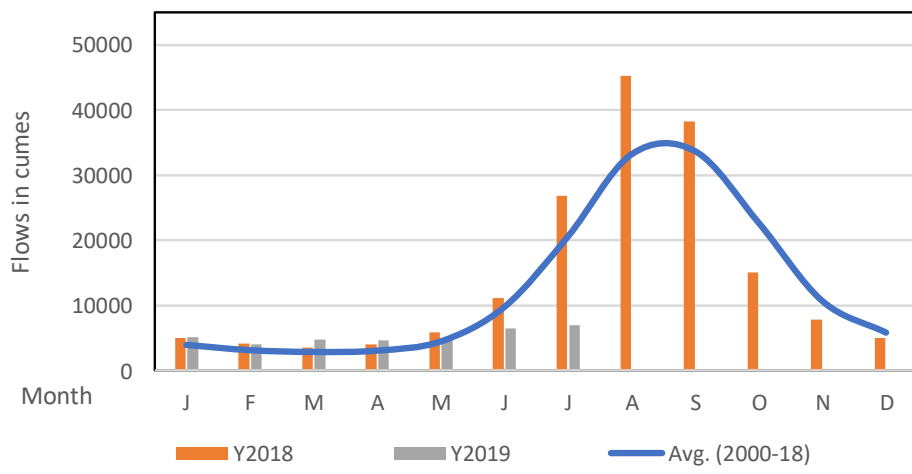
Monthly Flow at Mukdahan



Monthly Flow at Pakse



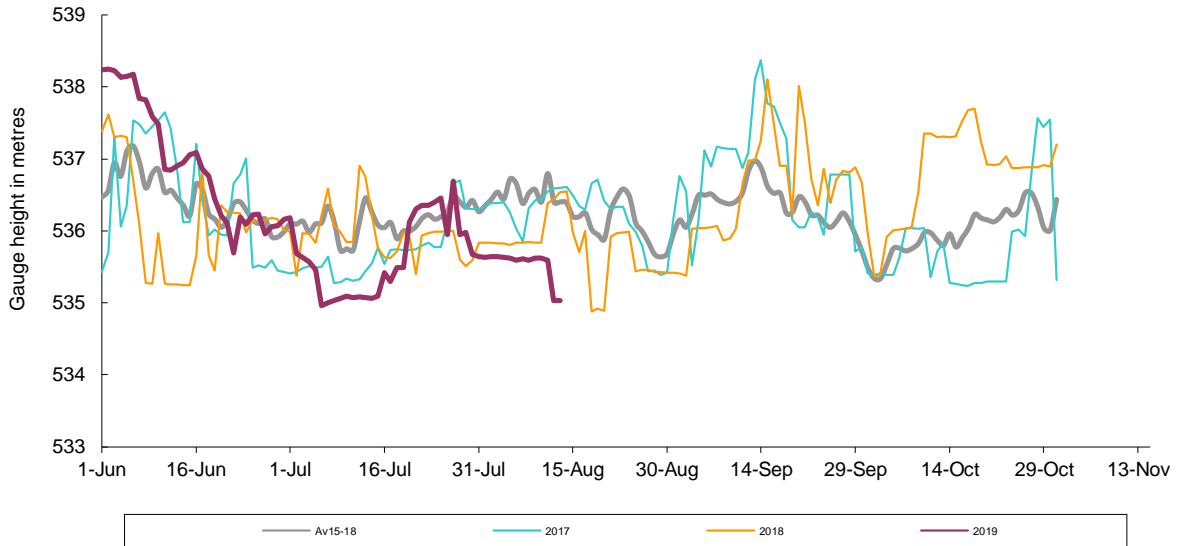
Monthly Flow at Kratie



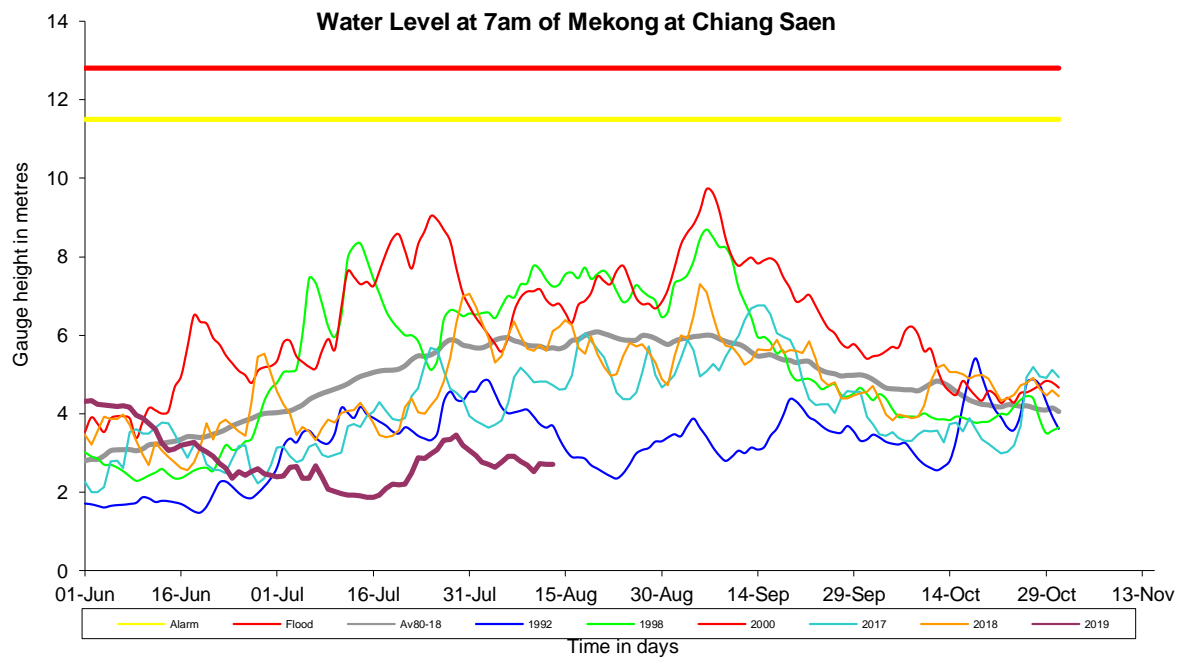
Annex B: Seasonal Water Level Hydrographs

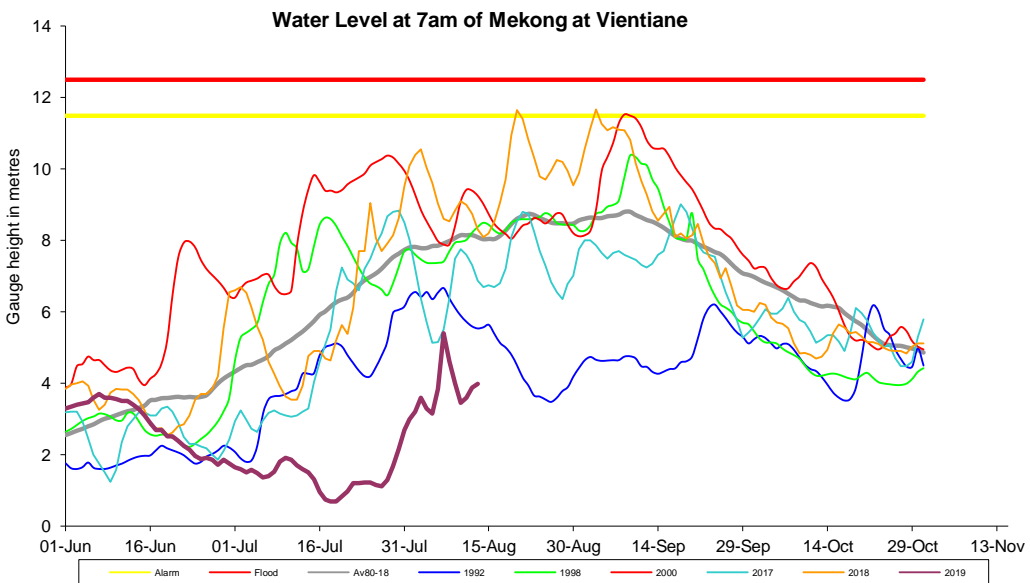
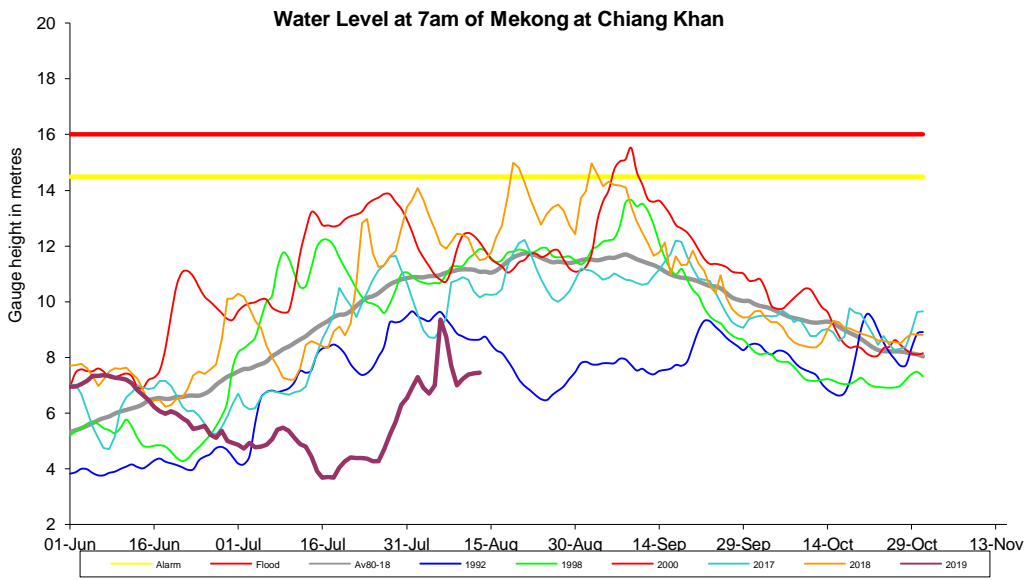
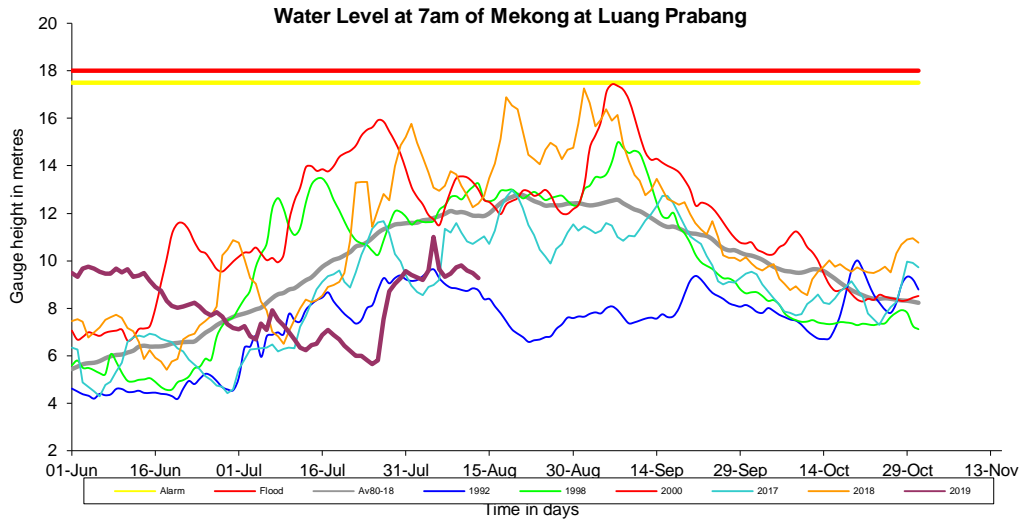
HYDROGRAPHS OF THE MEKONG AT MAINSTREAM STATIONS IN FLOOD SEASON FROM UP TO 12th AUG 2019

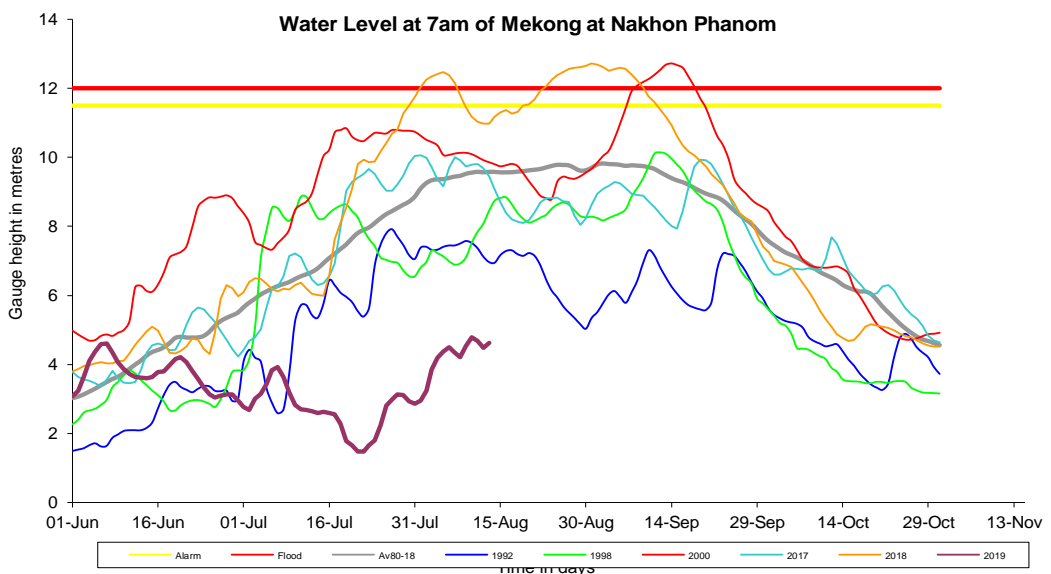
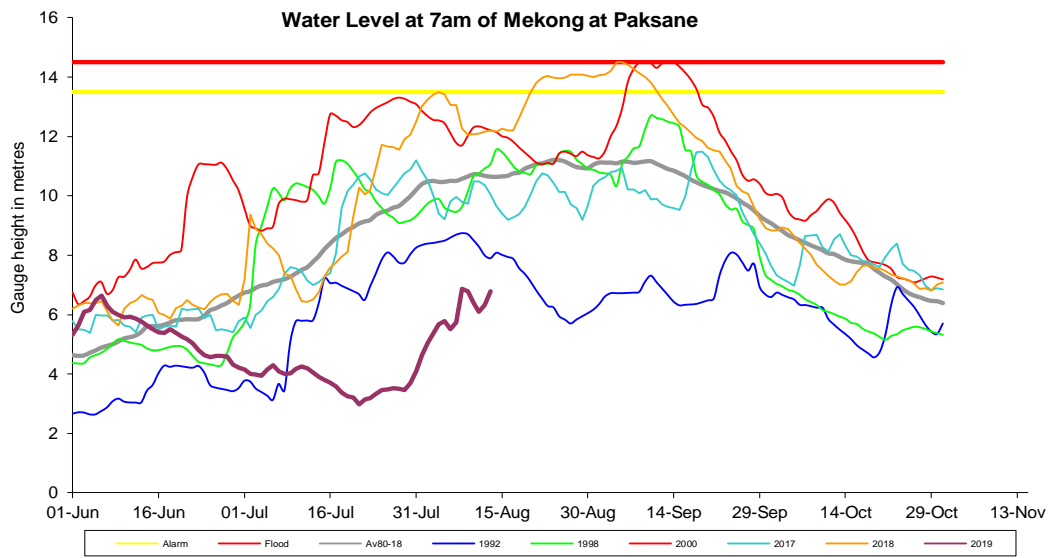
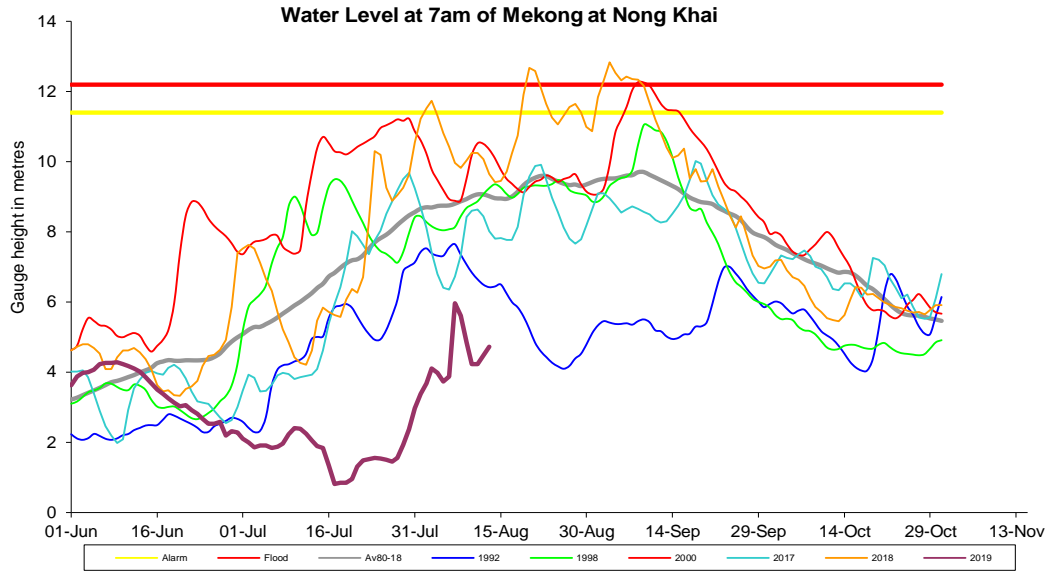
Water Level at 7am of Mekong at Jing Hong

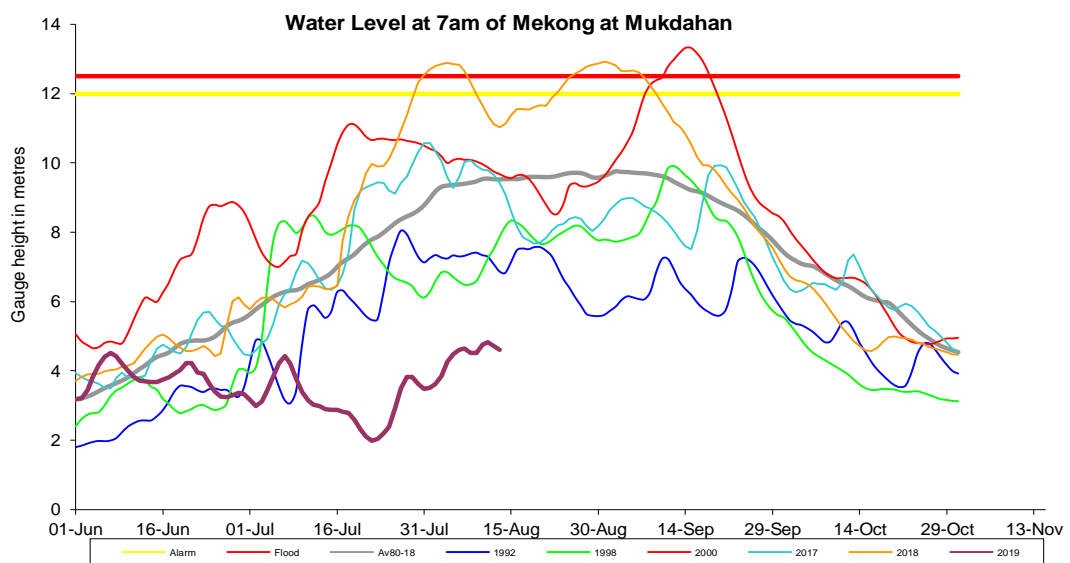
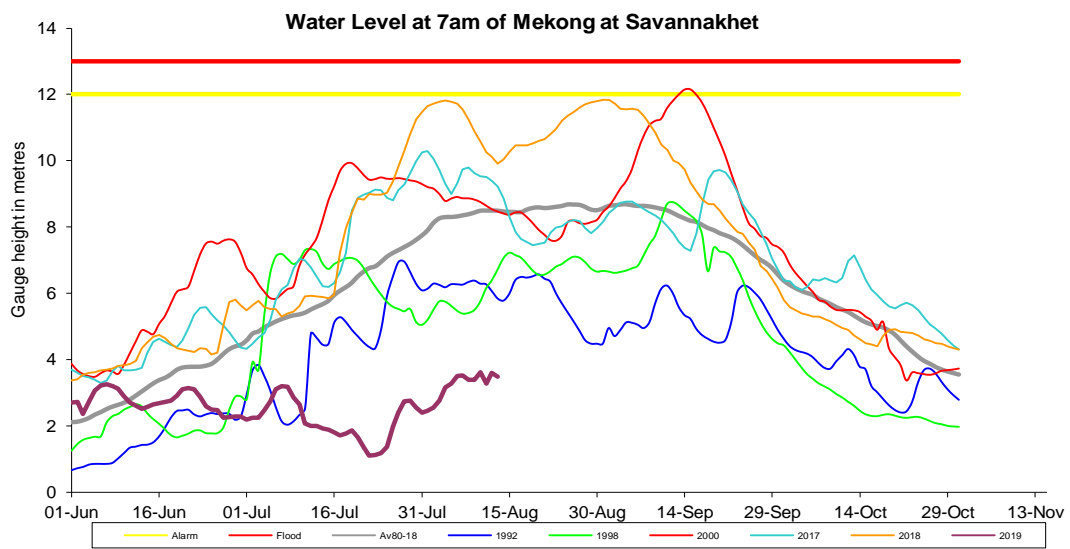
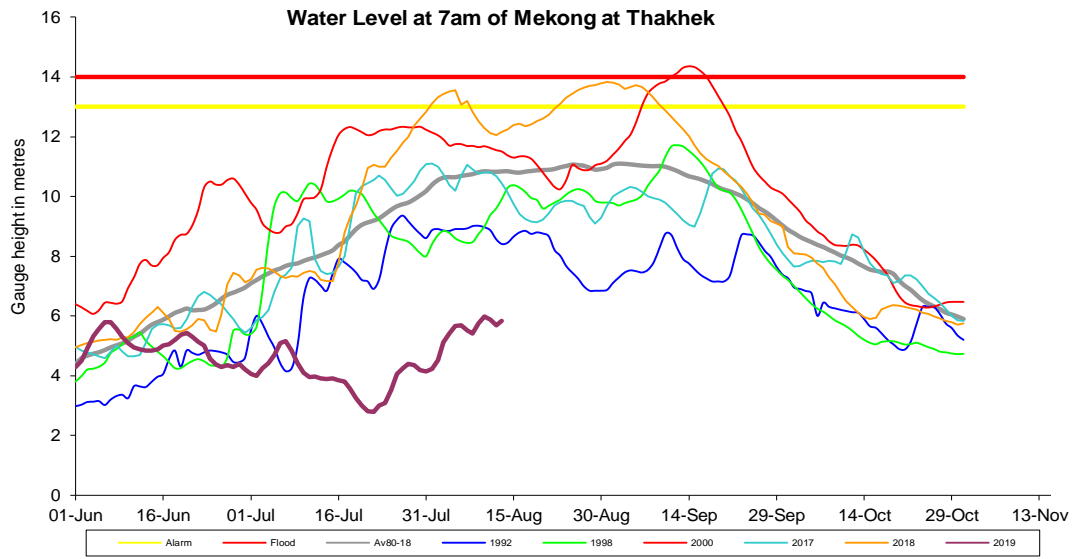


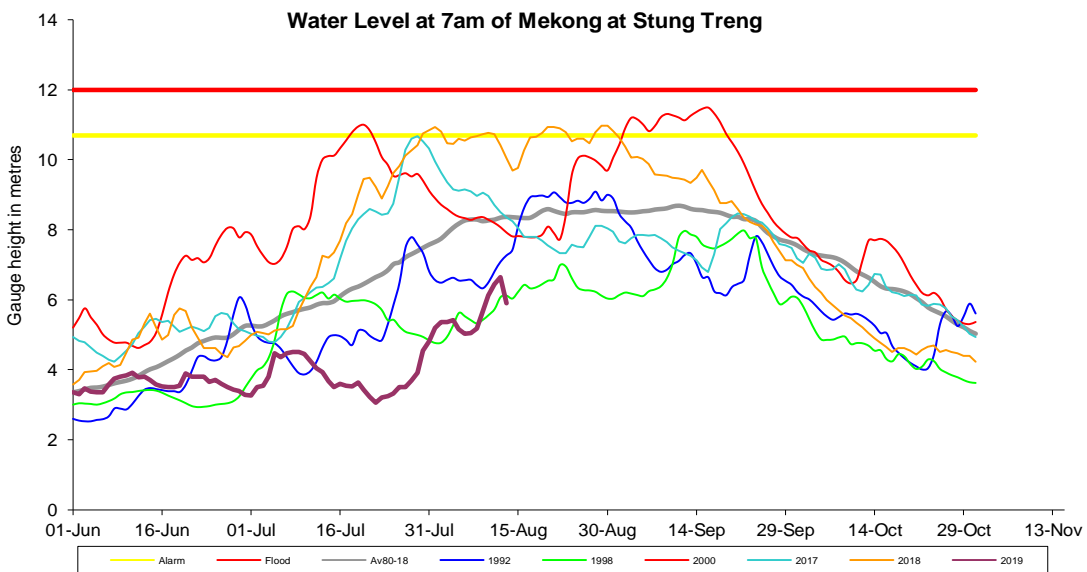
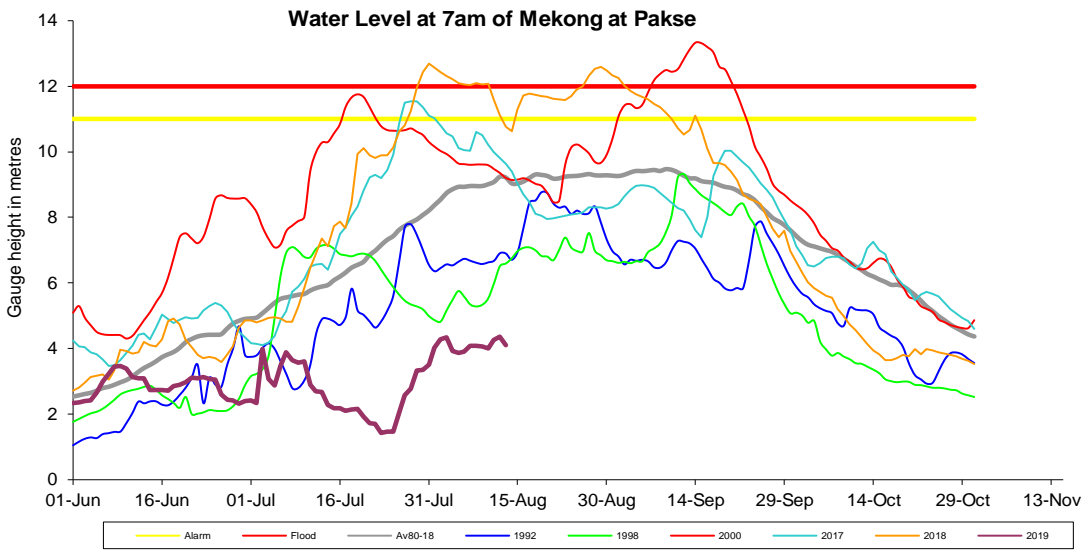
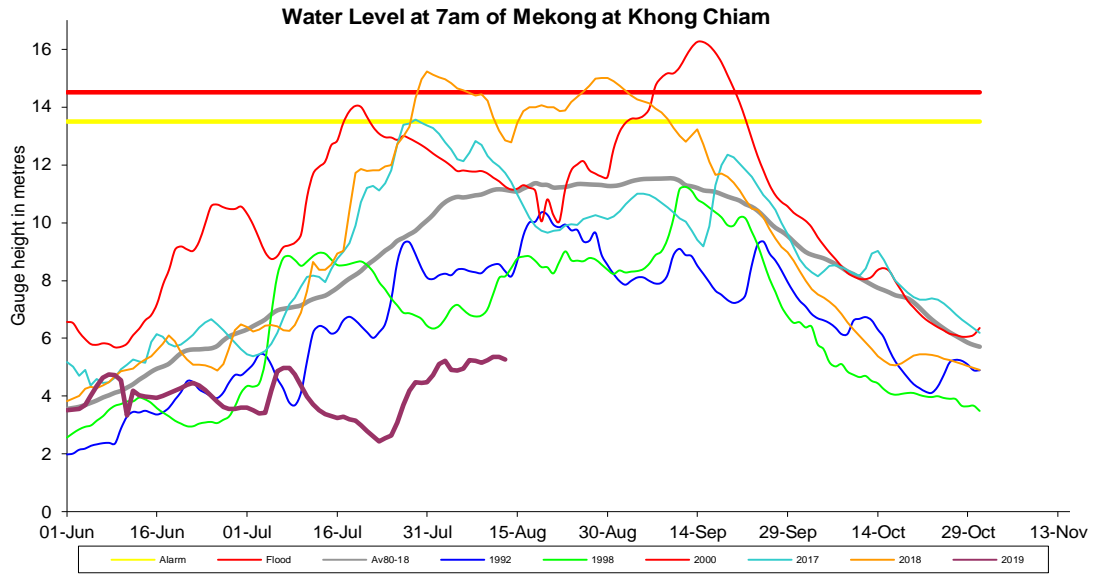
Water Level at 7am of Mekong at Chiang Saen



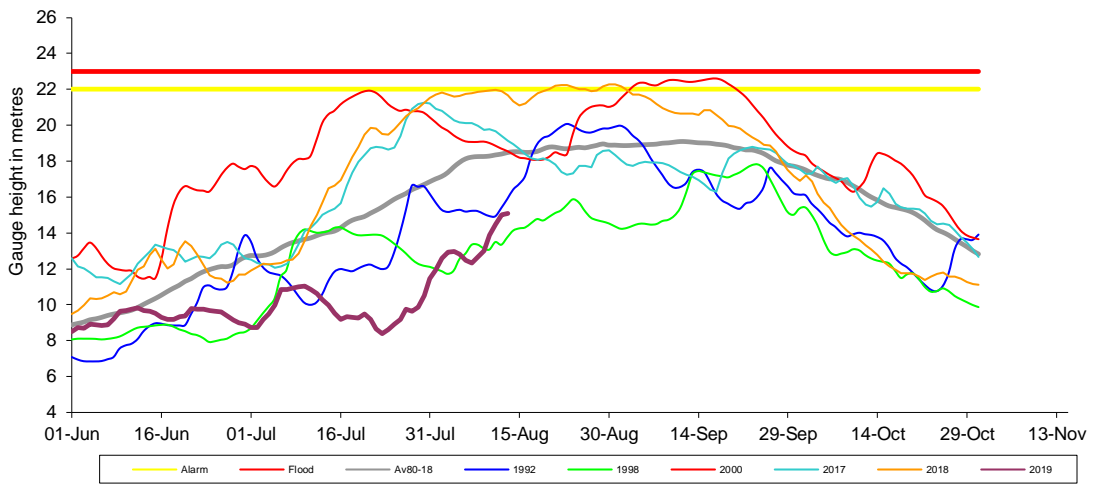




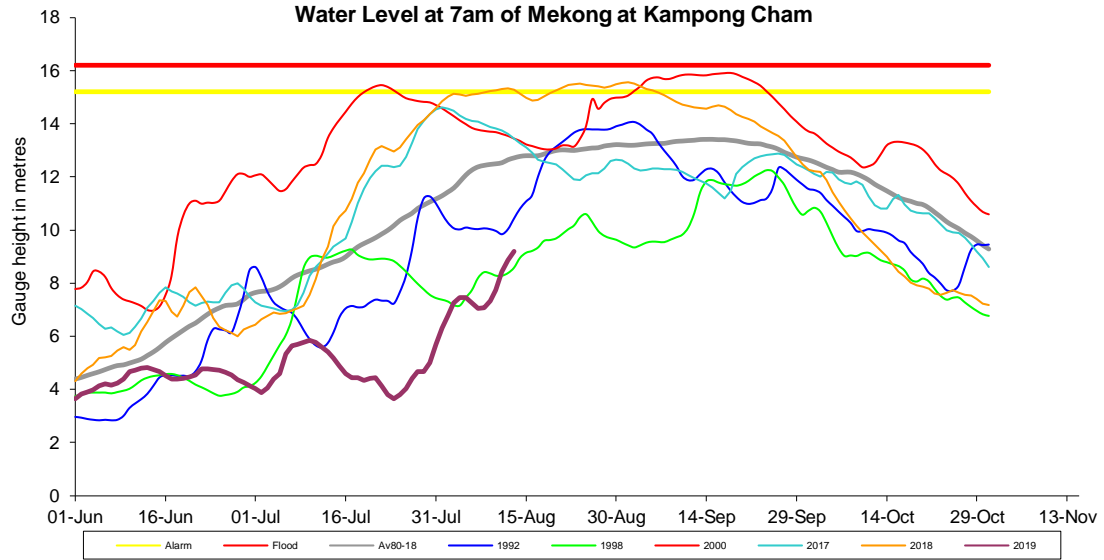




Water Level at 7am of Mekong at Kratie



Water Level at 7am of Mekong at Kampong Cham



Water Level at 7am of Mekong at Phnom Penh Chaktomuk

