

**1. Review of Regional Weather Conditions for First Fortnight of November 2018**

1.1 Northeast Monsoon conditions prevailed over the northern ASEAN region in the first half of November 2018. In most parts of the Mekong sub-region and the northern Philippines, conditions were drier with a decrease in shower activities as compared to the previous fortnight. Below-average rainfall was also received in many parts of the northern ASEAN region. In contrast, there were wetter-than-average conditions over many parts of the southern ASEAN region as a result of the Madden – Julian Oscillation (MJO) and wind convergence.

1.2 The daily average rainfall and the percentage of average rainfall for the first fortnight of November 2018 are shown in Figure 1 and Figure 2.

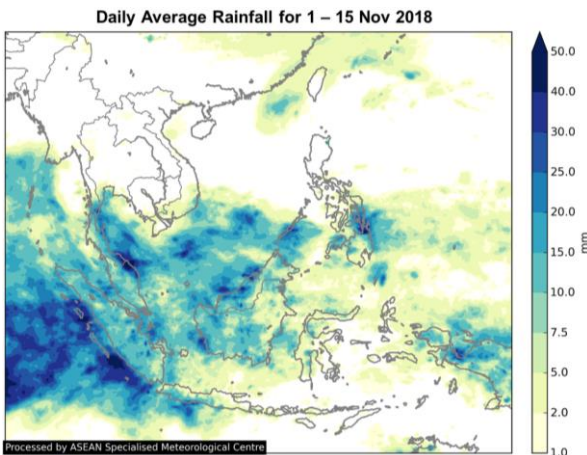


Figure 1 Daily average rainfall for the ASEAN region in the first fortnight of November 2018. (Source: JAXA Global Satellite Mapping of Precipitation)

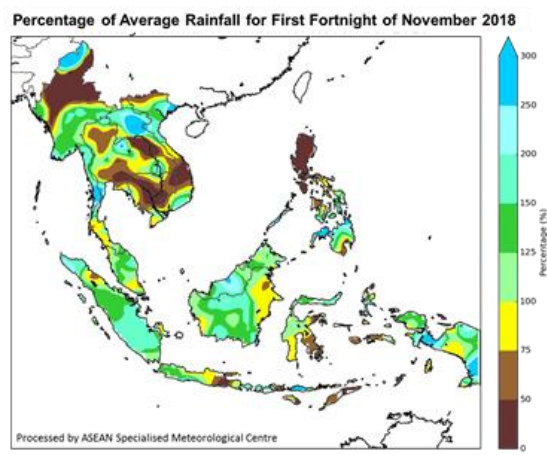


Figure 2 Percentage of average rainfall for 1 – 15 November 2018. The rainfall data may be less representative for areas with a less dense rainfall network. (Source: IRI NOAA/NCEP CPC Unified Precipitation Analyses)

1.3 Tropical Storm Yutu, traversed across the Philippines in October 2018 and track northwestwards before it weakened into a low pressure system over the South China Sea in early November 2018. In the second week of the fortnight, Tropical Cyclone Gaja developed over the Bay of Bengal and subsequently tracked westwards away from the ASEAN region. The presence of Tropical Storm Yutu and Tropical Cyclone Gaja in the region during the fortnight influenced the winds in the region.

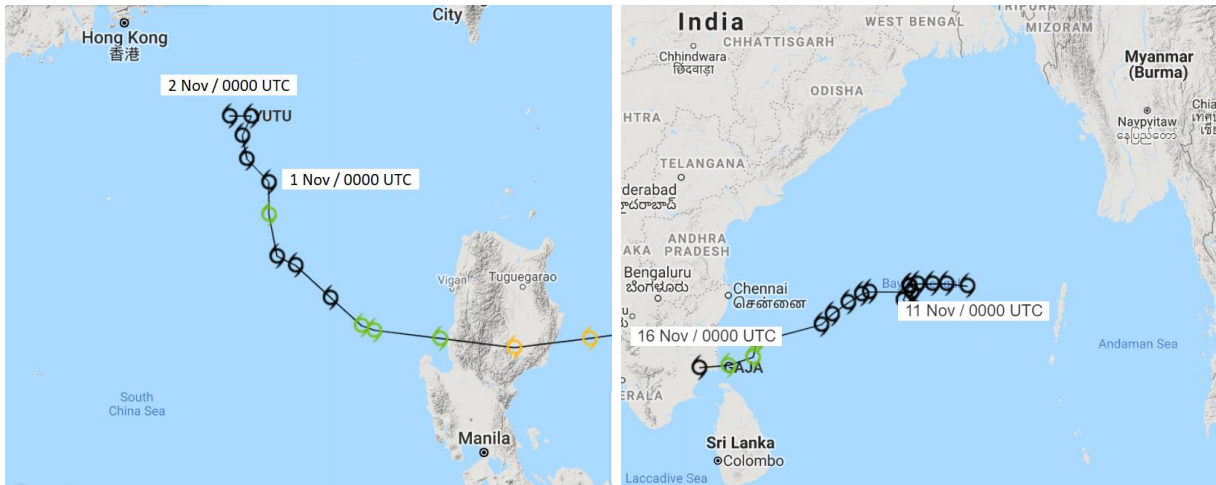


Figure 3 Tracks for Tropical Storm Yutu (left) and Tropical Cyclone Gaja (right) in November 2018

1.4 North-easterly or easterly winds prevailed over the northern ASEAN region, however there were anomalous south-westerly winds over the South China Sea to the northwest of the Philippines with the presence of Tropical Storm Yutu in the surrounding vicinity. In the southern ASEAN region, Tropical Cyclone Gaja over the Bay of Bengal led to anomalously strong westerly winds over the Indian Ocean to the west of Sumatra, Indonesia, and gave rise to the convergence of winds over the equatorial ASEAN region.

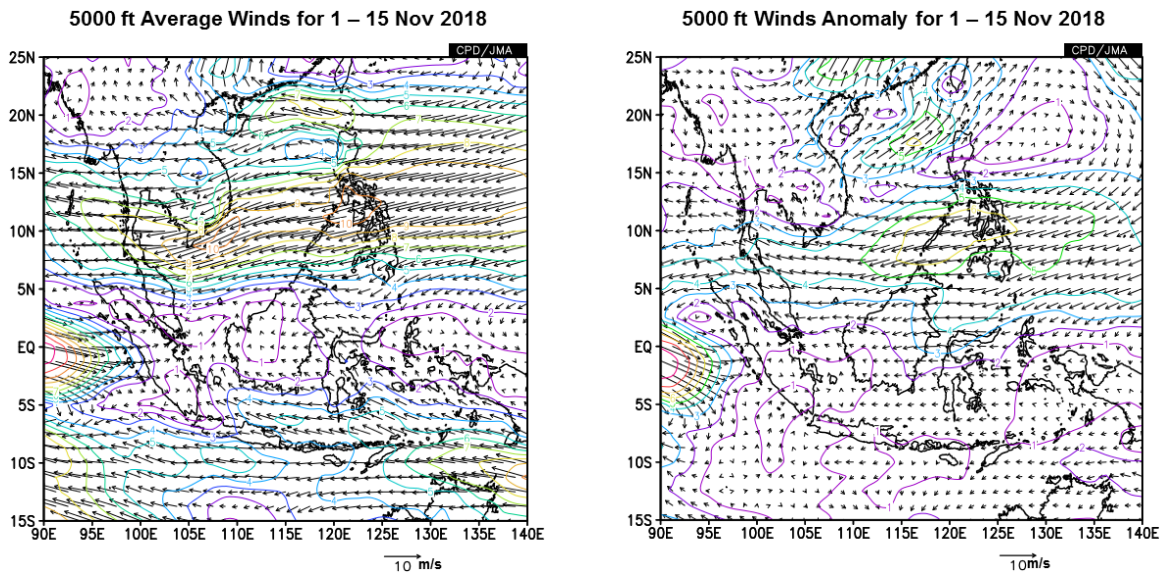


Figure 4 5000 ft average winds (left) and anomalies (right) for 1 - 15 November 2018. (Source: JMA)

1.5 The Madden – Julian Oscillation (MJO)<sup>1</sup> transitioned from Phase 1<sup>2</sup> to Phase 5 in the first half of November 2018. The MJO activities contributed to the rainy conditions experienced in the southern ASEAN region.

<sup>1</sup> The MJO is characterised by an eastward propagation of clouds and rainfall over the tropics with an average cycle of 30 to 60 days. The MJO is more prominent between the Indian and western Pacific Ocean, and consists of two phases – an enhanced rainfall (convection) phase and a suppressed rainfall phase.

<sup>2</sup> Based on the Average Outgoing Longwave Radiation (OLR) information by the Bureau of Meteorology, Australia.

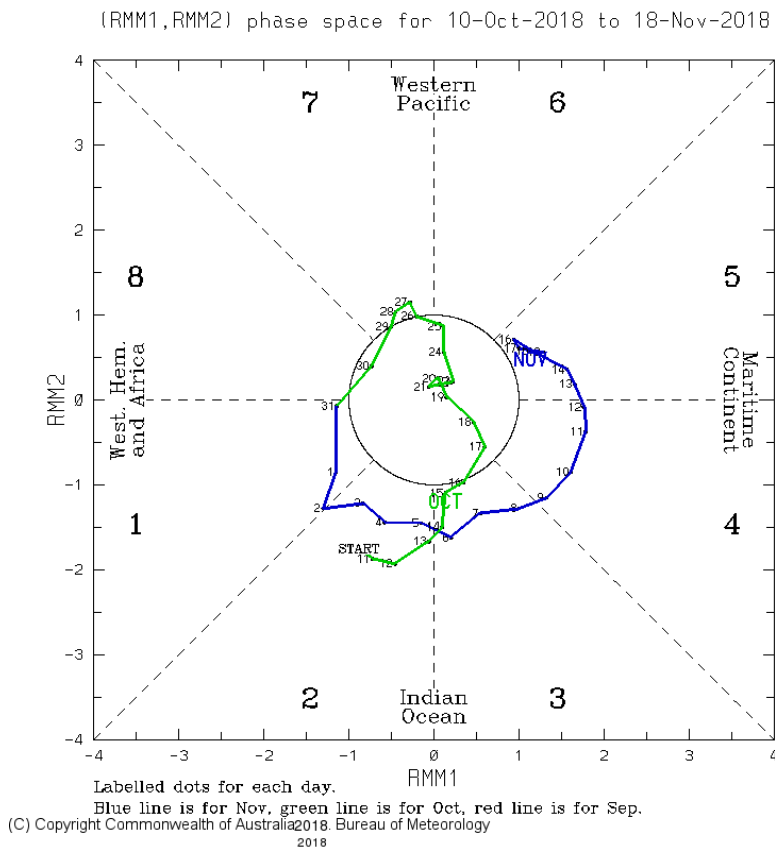


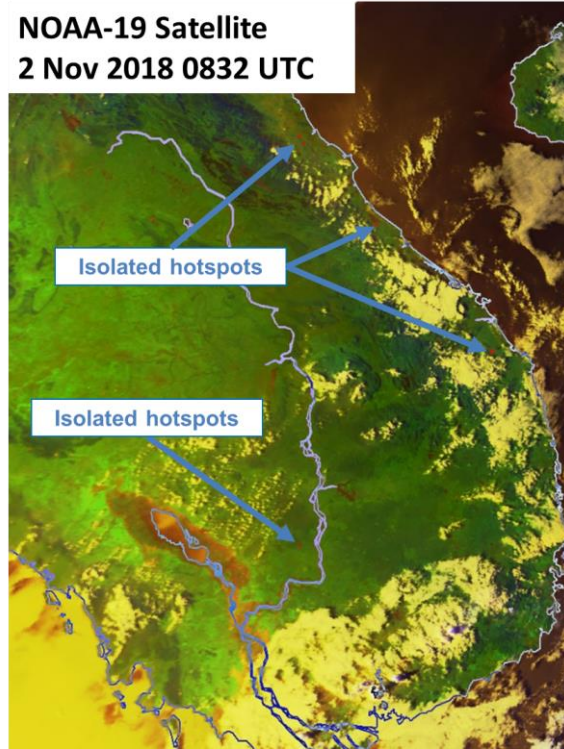
Figure 5 The MJO phase diagram for Oct-Nov 2018 (green for July). The diagram illustrates the movement of the MJO through different phases, which correspond to different locations along the equator. The distance of the index from the centre of the diagram is correlated with the strength of MJO. When the index falls within the circle, the MJO is considered weak or indiscernible. (Source: Bureau of Meteorology)

1.6 The warming of sea surface temperatures in the tropical Pacific Ocean brought near El Niño thresholds to the region. However, the lack of sustained signs of El Niño in the trade winds, cloudiness and the Southern Oscillation Index (SOI) indicates that the tropical ocean and the atmosphere remained uncoupled. Hence, El Niño conditions have yet to be fully established.

## 2. Review of Land/Forest Fires and Smoke Haze Situation

2.1 Dry conditions gave rise to isolated hotspot activities in parts of the Mekong sub-region (Figure 6) but the hotspots were generally short-lived. In the southern ASEAN region, hotspot activities were generally subdued due to the rainy weather.

NOAA-19 Satellite  
2 Nov 2018 0832 UTC



*Figure 6 Isolated hotspots detected in Cambodia and Viet Nam in early November*