

## 1. Review of Regional Weather Conditions for First Fortnight of July 2019

1.1 In the first fortnight of July 2019, moderate to strong southwesterly or westerly winds prevailed over the northern ASEAN region. In particular, anomalously strong southwesterly winds were observed to the east of Viet Nam during the first half of the fortnight under the influence of Tropical Storm Mun (Figure 2). In the southern ASEAN region, the prevailing winds blew mainly from the southeast or southwest, with wind anomalies observed west of Sumatra. Figure 1 shows the average and anomalous winds at 5000 feet.

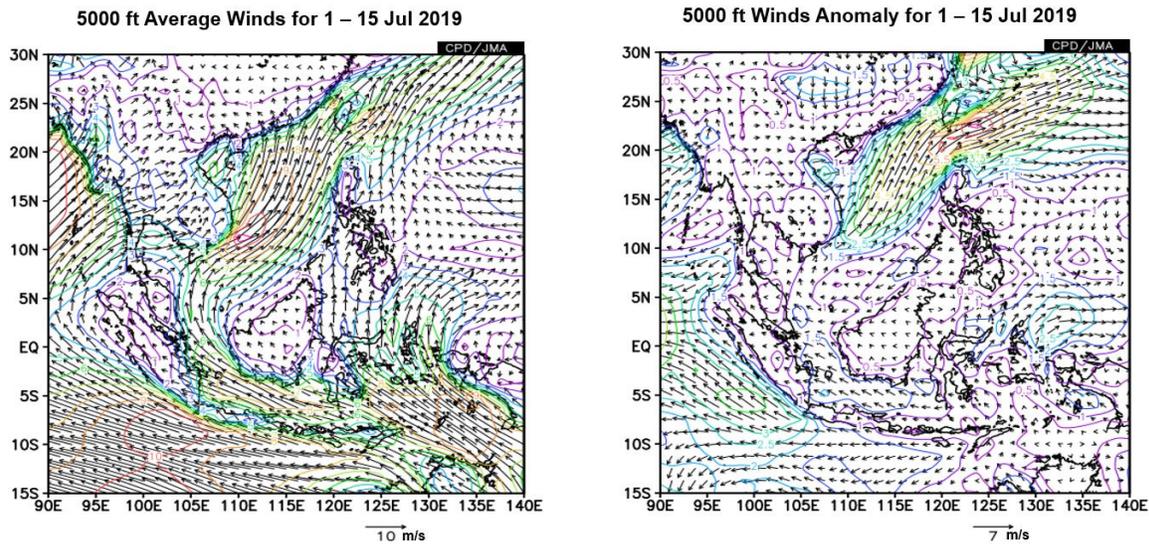


Figure 1: 5000 ft average winds (left) and winds anomaly (right) for 1 - 15 July 2019. (Source: JMA)

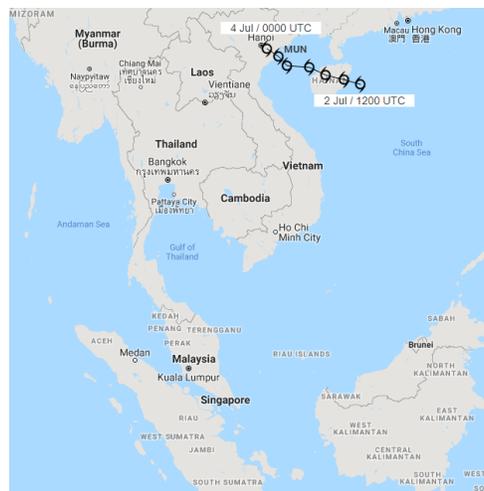


Figure 2: Track for Tropical Storm Mun (2-4 Jul 2019).

1.2 Southwest Monsoon conditions prevailed in the first half of July 2019. Much of the northern ASEAN region received above-average rainfall except for northern Philippines and Thailand. In the southern ASEAN region, below-average rainfall was observed over many areas (Figures 3 and 4).

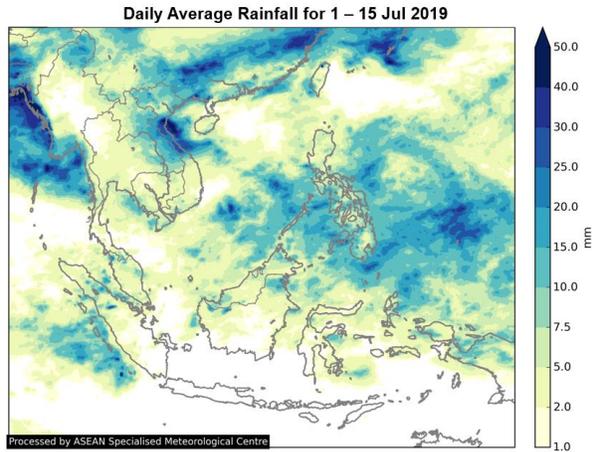


Figure 3: Daily average rainfall for the ASEAN region in the first fortnight of July 2019. (Source: JAXA Global Satellite Mapping of Precipitation)

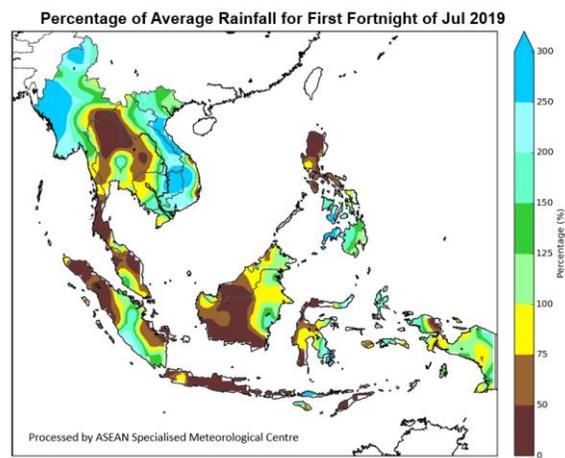


Figure 4: Percent of average rainfall for 1 – 15 July 2019. The rainfall data may be less representative for areas with a less dense rainfall network. Hatched areas indicate climatology dry mask (average daily rainfall below 1 mm). (Source: IRI NOAA/NCEP CPC Unified Precipitation Analyses)

1.3 Throughout the first fortnight of July 2019, the Madden-Julian Oscillation (MJO) was in the Western Hemisphere and Africa, and it did not significantly influence the weather over the ASEAN region (Figure 5).

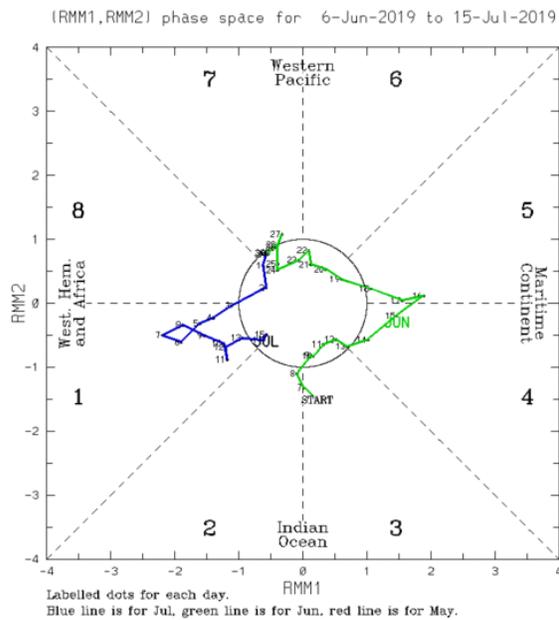


Figure 5: The MJO phase diagram for Jul 2019 (blue). The diagram illustrates the movement of the MJO through different phases, which correspond to different locations along the equator. The distance of the index from the centre of the diagram is correlated with the strength of MJO. When the index falls within the circle, the MJO is considered weak or indiscernible. (Source: Bureau of Meteorology)

1.4 The state of the El Niño-Southern Oscillation (ENSO) is currently neutral (neither El Niño nor La Niña). While the sea-surface temperature (SST) anomalies were slightly above average across the tropical Pacific Ocean Niño 3.4 region, other atmospheric indicators continued to show neutral conditions.

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

2.1 Under prevailing rainy conditions, no significant hotspot activity was observed in the northern ASEAN region. In the southern ASEAN region, periods of dry weather led to an increase in hotspot activities, particularly over Sumatra and Kalimantan where isolated hotspots with localised smoke plumes were detected (Figures 6 and 7).

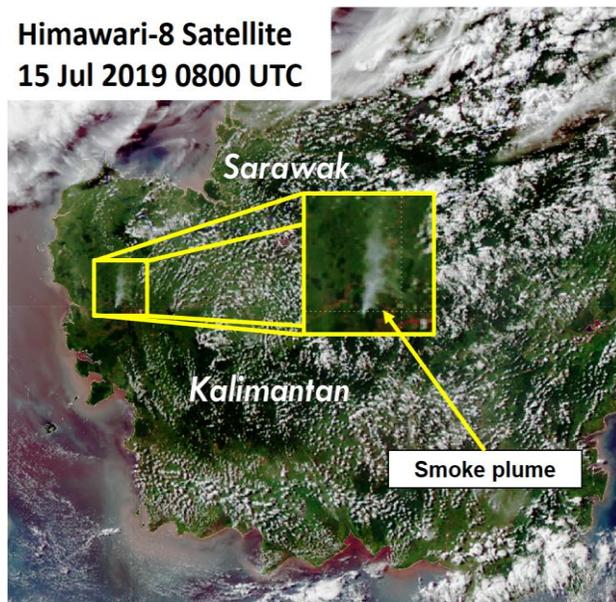


Figure 6: Himawari-8 satellite image on 15 July 2019 shows localised smoke plumes from hotspots detected in West Kalimantan.

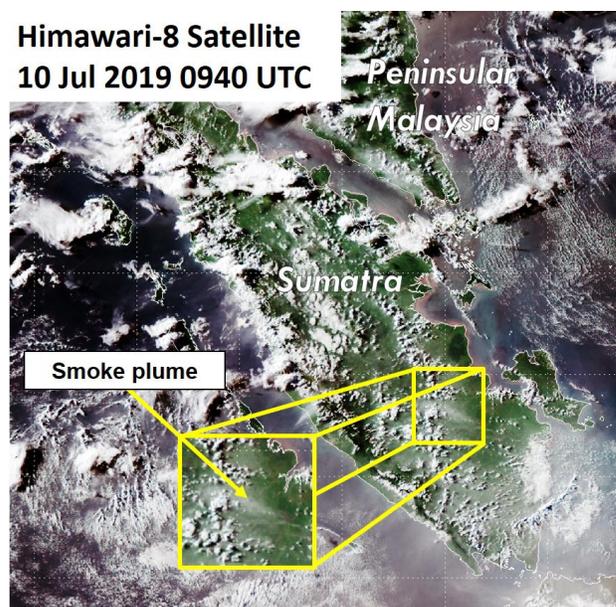


Figure 7: Himawari-8 satellite image on 10 July 2019 shows localised smoke plumes from hotspots detected in Sumatra.