

**1. Review of Regional Weather Conditions for Second Fortnight of March 2019**

1.1 The Northeast Monsoon season gradually weakened and transitioned to inter-monsoon conditions in the second fortnight of March 2019. The prevailing winds over the Mekong sub-region were generally weak and variable in direction, while that in the southern ASEAN region, were blowing from the southwest and northwest. Over Java, there were westerly and southwesterly anomalies due to low pressure systems that developed south of Java during the fortnight. Figure 1 shows the average and anomalous winds at 5000 feet.

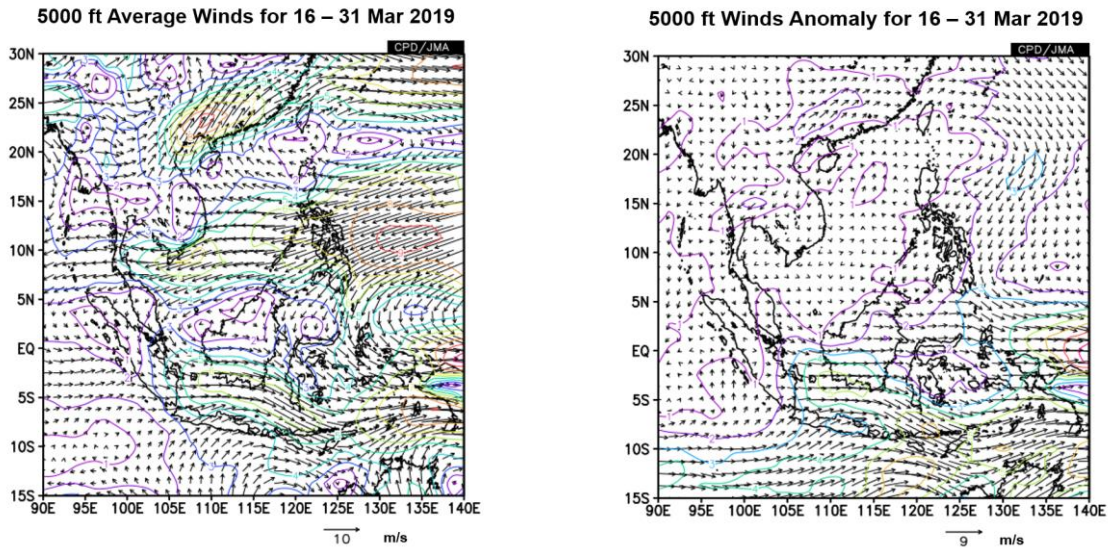


Figure 1: 5000 ft average winds (left) and winds anomaly (right) for 16 - 31 March 2019. (Source: JMA)

1.2 The transition to inter-monsoon conditions during the latter part of the fortnight brought an increase in rainfall over southern parts of the Mekong sub-region. However, dry conditions prevailed over Myanmar, and the northern parts of Lao PDR and Thailand (Figure 2). In the southern ASEAN region, areas along the equatorial region, including southern Thailand, Peninsular Malaysia, Sarawak, northern and central Sumatra and West Kalimantan received below-average rainfall under the influence of a persistent dry air mass extending from the Pacific Ocean over the Southeast Asia region (Figure 3).

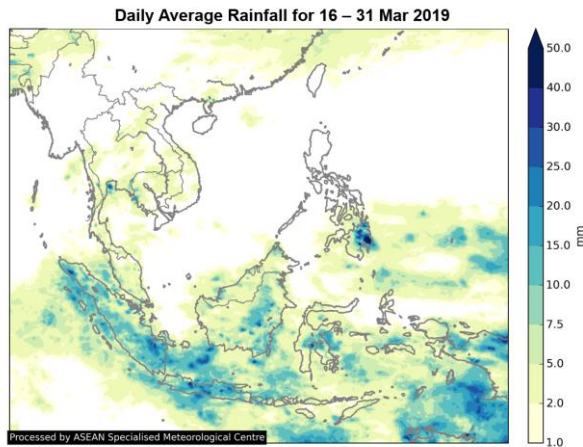


Figure 2: Daily average rainfall for the ASEAN region in the second fortnight of March 2019. (Source: JAXA Global Satellite Mapping of Precipitation)

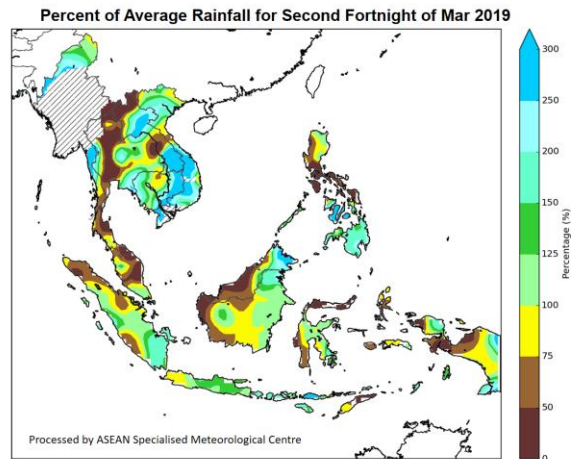


Figure 3: Percent of average rainfall for 16 – 31 March 2019. The rainfall data may be less representative for areas with a less dense rainfall network. Hatched areas indicate climatology dry mask (average daily rainfall below 1 mm). (Source: IRI NOAA/NCEP CPC Unified Precipitation Analyses)

1.3 The Madden-Julian Oscillation (MJO) signal remained weak during the second fortnight of March 2019 and had no significant influence on the weather over the ASEAN region (Figure 4).

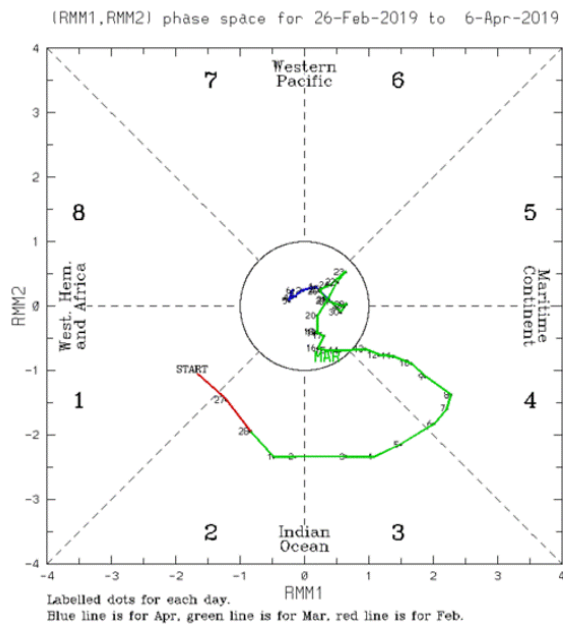


Figure 4: The MJO phase diagram for Mar 2019 (green). The diagram illustrates the movement of the MJO through different phases, which correspond to different locations along the equator. The distance of the index from the centre of the diagram is correlated with the strength of MJO. When the index falls within the circle, the MJO is considered weak or indiscernible. (Source: Bureau of Meteorology)

1.4 The sea surface temperatures over the tropical Pacific Ocean Nino 3.4 region were warm and close to the El Niño thresholds. However, there was little atmospheric response observed, such as the lack of consistent weaker-than-average trade winds and large-scale rainfall patterns over the tropical Pacific.

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

2.1 Dry weather prevailed over the Mekong sub-region in the second fortnight of March 2019. As a result, smoke haze from persistent hotspots continued to be observed over many areas in the sub-region. In particular, dense smoke haze persisted over parts of Lao PDR, Myanmar and Thailand on many days, and some smoke haze was blown by the prevailing winds toward northern Viet Nam (Figure 5). Toward the end of March 2019, an increase in shower activities over the southern parts of the Mekong sub-region helped improve the haze situation in Cambodia, southern Lao PDR and eastern Thailand (Figure 6).

2.2 In the southern ASEAN region, during periods of dry weather in the fortnight, isolated hotspots with localised smoke plumes were detected in Riau, Sumatra and Peninsular Malaysia (Figure 7). Elsewhere, scattered shower activities helped to keep hotspot activities subdued.

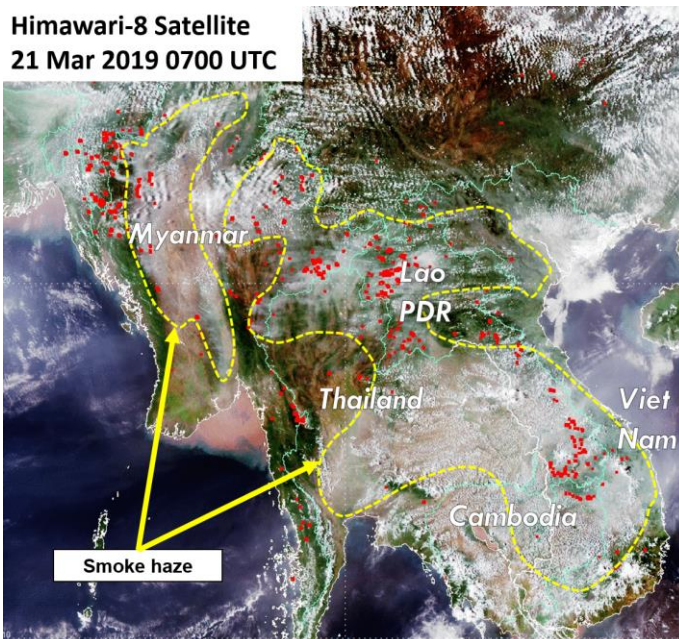


Figure 5: Himawari-8 satellite image on 21 March 2019 shows widespread smoke haze over the Mekong sub-region.

Himawari-8 Satellite  
31 Mar 2019 0940 UTC

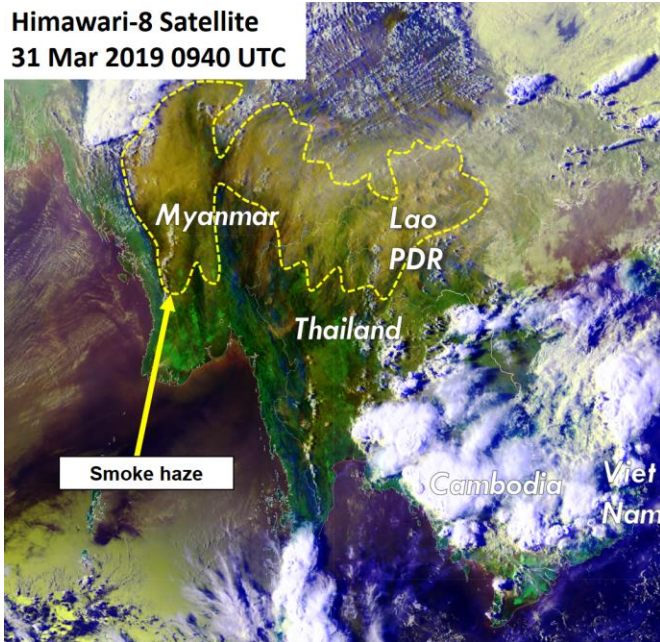


Figure 6: Himawari-8 satellite image on 31 March 2019 shows smoke haze largely confined over the northern Mekong sub-region, and increase in rainfall over the south toward end-March.

Himawari-8 Satellite  
18 Mar 2019 0940 UTC

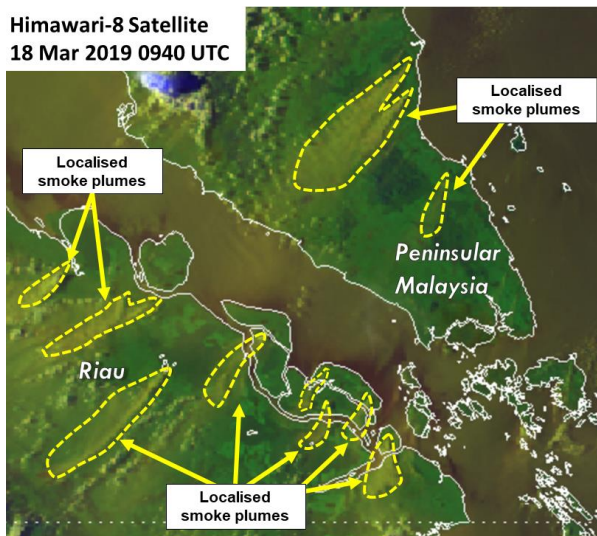


Figure 7: Himawari-8 satellite image on 18 March 2019 shows isolated hotspots with smoke plumes in Peninsular Malaysia and Riau, Sumatra.