

## 1. Review of Regional Weather Conditions

1.1 In the second fortnight of October 2019, the prevailing winds over the northern ASEAN region blew from the northeast or east, while the winds over the southern ASEAN region were from the southeast or east. Over the equatorial areas, weaker winds prevailed. There were anomalously strong easterly winds over southern Thailand and Peninsular Malaysia, and stronger-than-usual southeast winds over southern Sumatra.

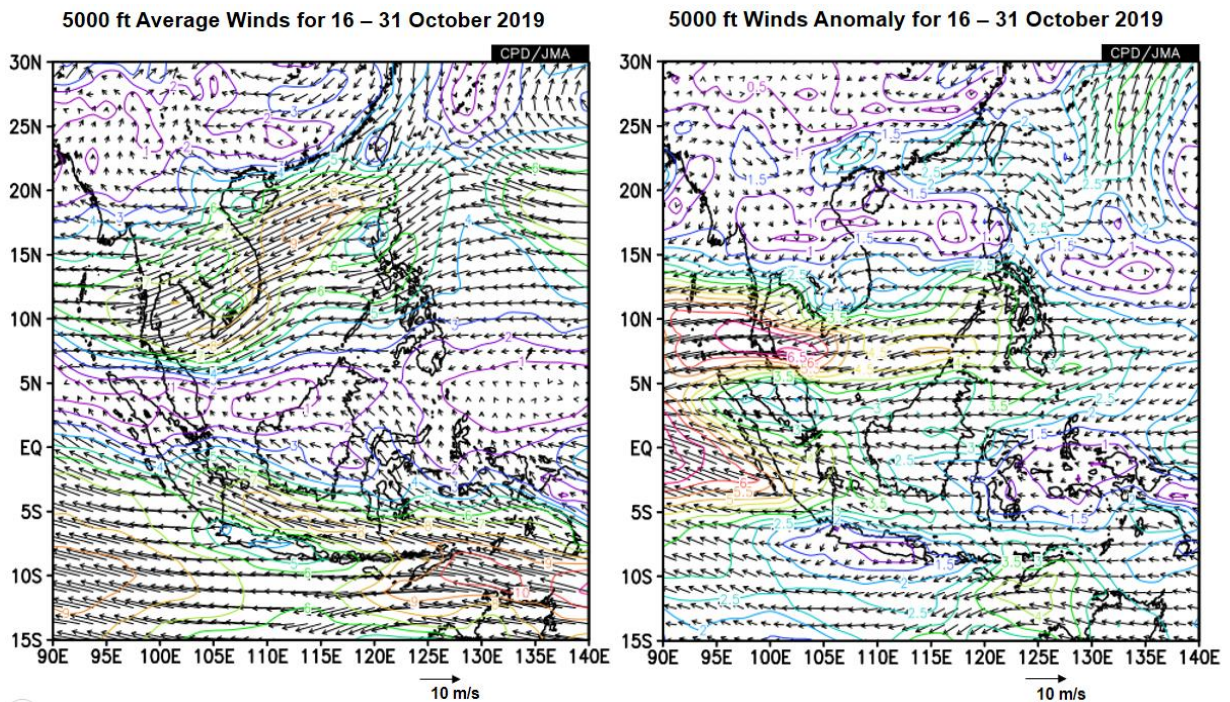


Figure 1 5000 ft average winds (left) and anomalies (right) for 16 - 31 October 2019. (Source: JMA)

1.2 The presence of the monsoon rain band over the equatorial ASEAN region brought near-to above-average rainfall over Peninsula Malaysia, northern Sumatra, and the western part of Borneo Island. Over the areas surrounding the Java Sea (including southern Sumatra, southern Kalimantan and Java), rainfall was below average. The northern ASEAN region received well below-average rainfall in general, except for Viet Nam and parts of Myanmar. Figures 2 and 3 shows the daily average rainfall and the percentage of average rainfall for the second fortnight of October 2019 respectively.

Daily Average Rainfall for Second Fortnight of October 2019

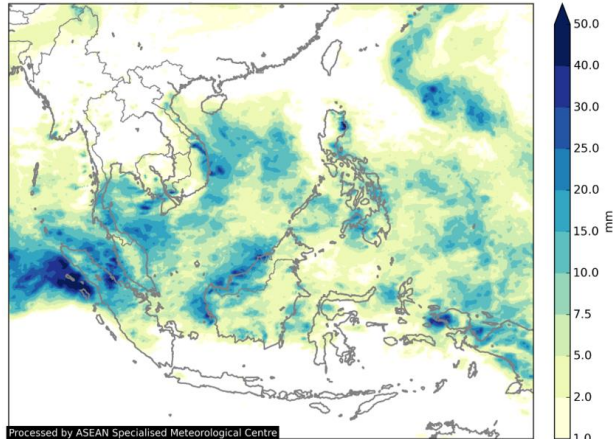


Figure 2 Daily average rainfall for the ASEAN region in the second fortnight of October 2019. (Source: JAXA Global Satellite Mapping of Precipitation)

Percent Average of Rainfall for 16 – 31 October 2019

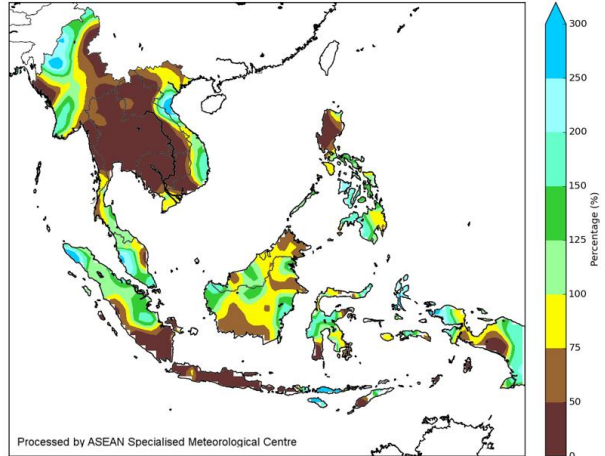
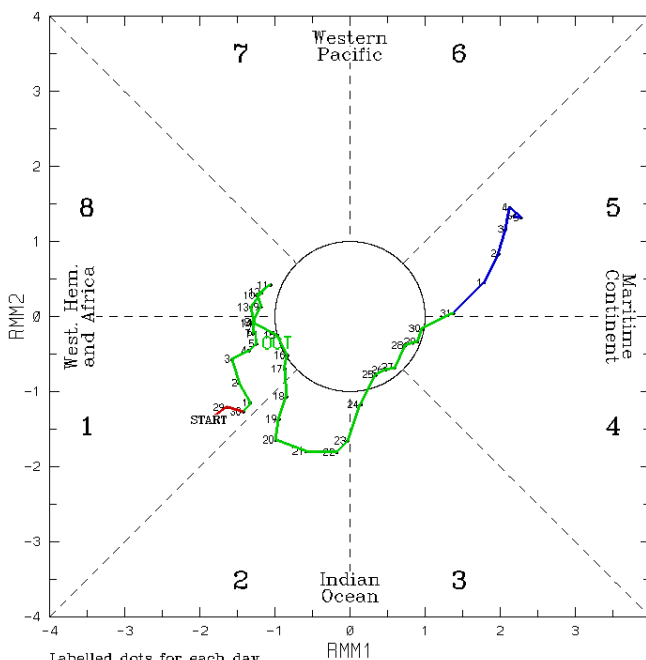


Figure 3 Percentage of average rainfall for 16 – 31 October 2019. The rainfall data may be less representative for areas with a less dense rainfall network. Hatched areas indicate climatology dry mask (average daily rainfall below 1 mm). (Source: IRI NOAA/NCEP CPC Unified Precipitation Analyses)

1.3 Over the tropical Pacific Ocean, El Niño – Southern Oscillation (ENSO) remained neutral. In the Indian Ocean, the Indian Ocean Dipole (IOD) remained strongly positive during the fortnight.

1.4 The Madden-Julian Oscillation (MJO) propagated through Phase 2 during the third week of October 2019, before weakening towards the last week of the month. During this period, the MJO had some influence on the ASEAN region. It brought easterly anomalies and above-average rainfall over the western Maritime Continent.

(RMM1,RMM2) phase space for 28-Sep-2019 to 6-Nov-2019



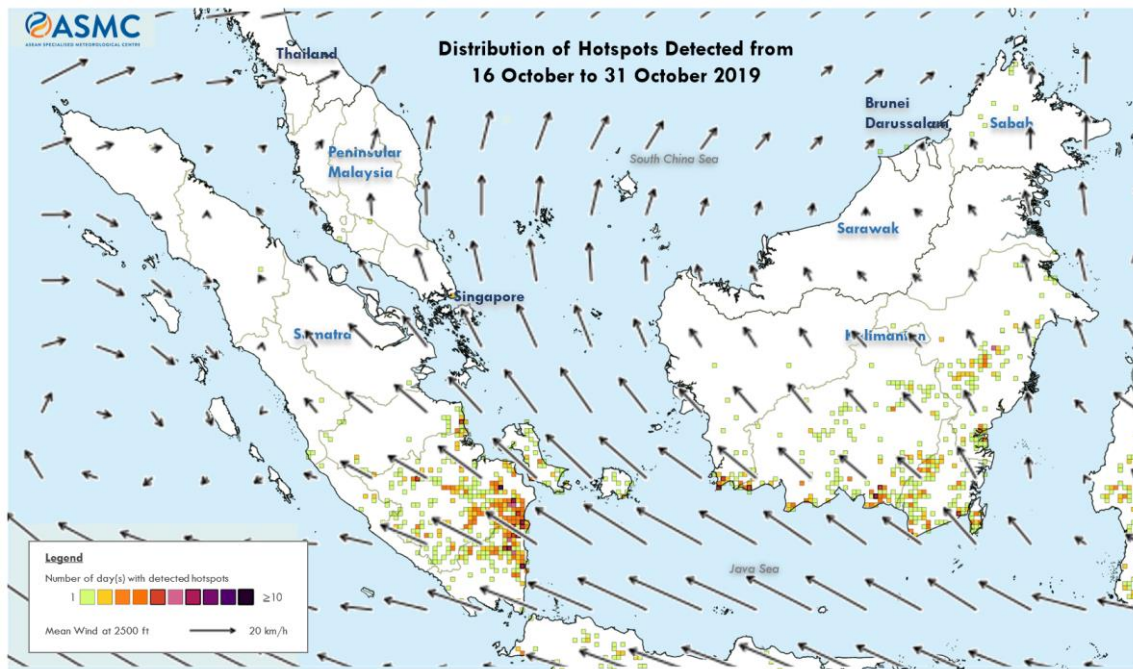
Labelled dots for each day.  
Blue line is for Nov, green line is for Oct, red line is for Sep.  
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Figure 4: The MJO phase diagram (green for October 2019). The diagram illustrates the movement of the MJO through different phases, which correspond to 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)

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

2.1 During the second fortnight of October 2019, hotspot activities in the northern ASEAN region remained subdued.

2.2 In the southern ASEAN region, there were persistent hotspot clusters with moderate to dense smoke haze in southern Sumatra, particularly in the provinces of South Sumatra and Lampung. There were also isolated hotspots with smoke plumes detected in southern Kalimantan, Java, Sulawesi and Nusa Tenggara.



**Note:**  
Hotspots may not have been detected on some days due to cloudiness or partial satellite pass.  
Each coloured 10km x 10km grid represents the number of days in which hotspots were detected within that grid over the two-week period. A darker grid colour indicates more days with detected hotspots within that grid.

Figure 5: Distribution of hotspots detected based on NOAA-20 satellite surveillance and mean winds at 2500ft in the second half of October 2019 (Source of wind data: JMA)

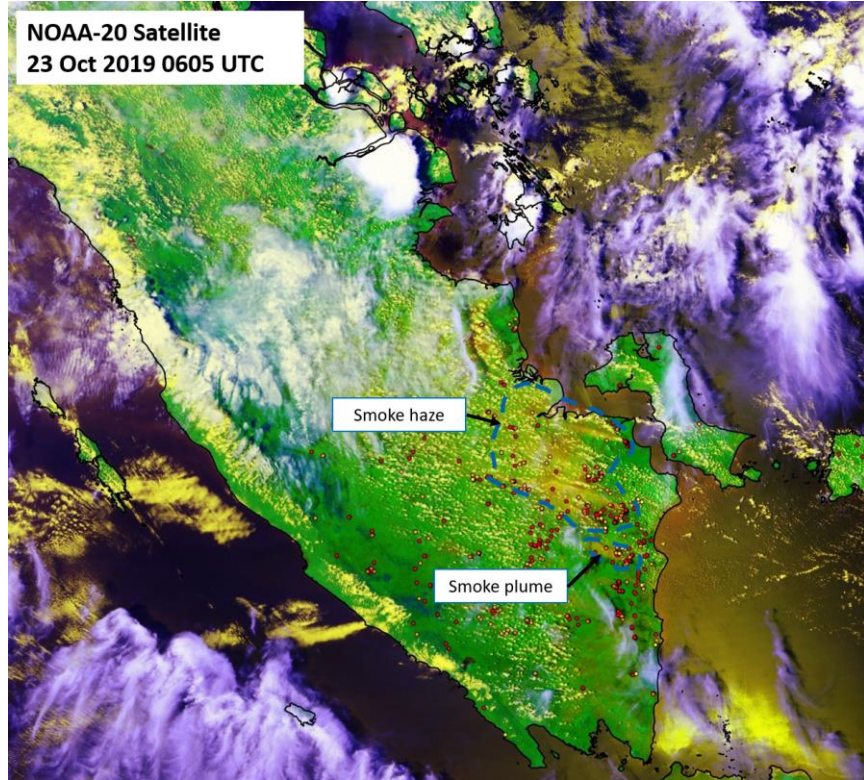


Figure 6: Smoke haze emanating from hotspot clusters in the southern parts of Sumatra (marked by yellow dotted lines)