

1. Review of Regional Weather Conditions for September 2017

1.1 In September 2017, Southwest Monsoon conditions prevailed over the ASEAN region, and the monsoon rain band migrated further south with most of the shower activities occurring over the equatorial region between 5° S and 15° N. The rainfall distribution for September 2017 is shown in Figure 1.

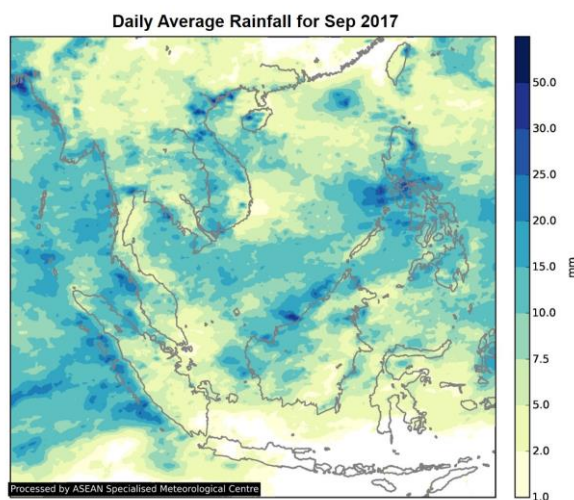


Figure 1: Daily average rainfall for the ASEAN region in September 2017. (Source: JAXA Global Satellite Mapping of Precipitation)

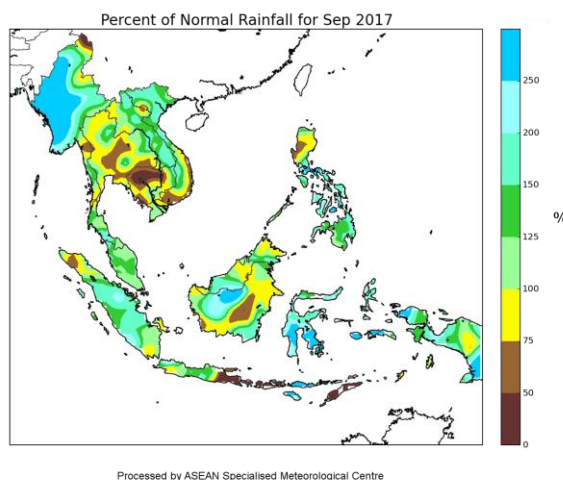


Figure 2: Percent of Normal Rainfall for September 2017. The rainfall data may be less representative for areas with a less dense rainfall network.

1.2 During the month, rainfall was below-normal over northern and central Thailand, while normal to above-normal rainfall prevailed for other parts of the northern ASEAN region. In contrast, for the southern ASEAN region, rainfall was mostly above-normal, particularly over Malaysia, Sumatra, Sulawesi and Papua. Figure 2 shows the percent of normal rainfall for September 2017.

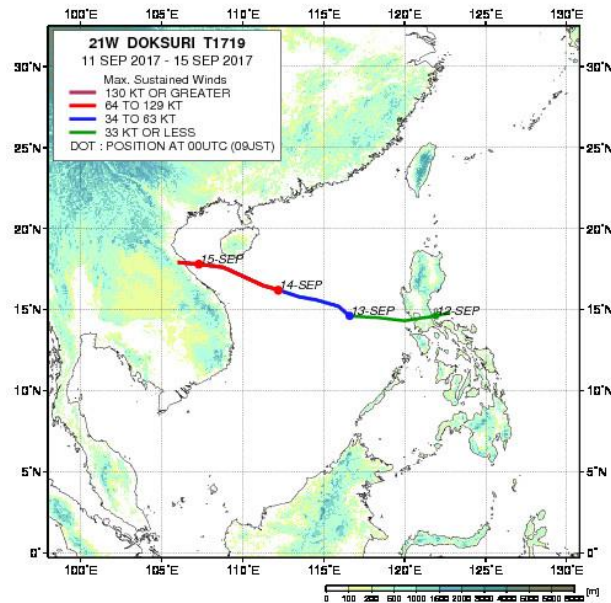


Figure 3: Historical storm track for Typhoon Doksuri. (Source: JAXA)

1.3 In September 2017, there were several tropical cyclones that brought heavy rainfall to Asia Pacific region. Among these tropical cyclones, only typhoon ‘Doksuri’ brought heavy rainfall and strong winds to the Philippines and Vietnam. “Doksuri” developed on 10 September 2017, and made landfall over Luzon, the Philippines before moving westwards over northern Philippines and into the South China Sea (see Figure 3). ‘Doksuri’ intensified into a typhoon as it continued to track west-northwestward over the South China Sea towards Vietnam. On 15 September 2017, Typhoon Doksuri made landfall near the north central regions of Vietnam. In addition to the torrential rain and strong winds, the coastal provinces of Vietnam experienced storm surges which accompanied the typhoon, Typhoon Doksuri weakened and dissipated shortly after making landfall.

1.4 The prevailing winds during September 2017 were predominantly from the southeast or southwest, particularly over the southern ASEAN region. In the northern ASEAN region, winds were light and blew from the south or southwest. Broad easterly wind anomalies were observed over the western Pacific Ocean and parts of the South China Sea. Figure 4 shows the average and anomalous winds at 5000 feet.

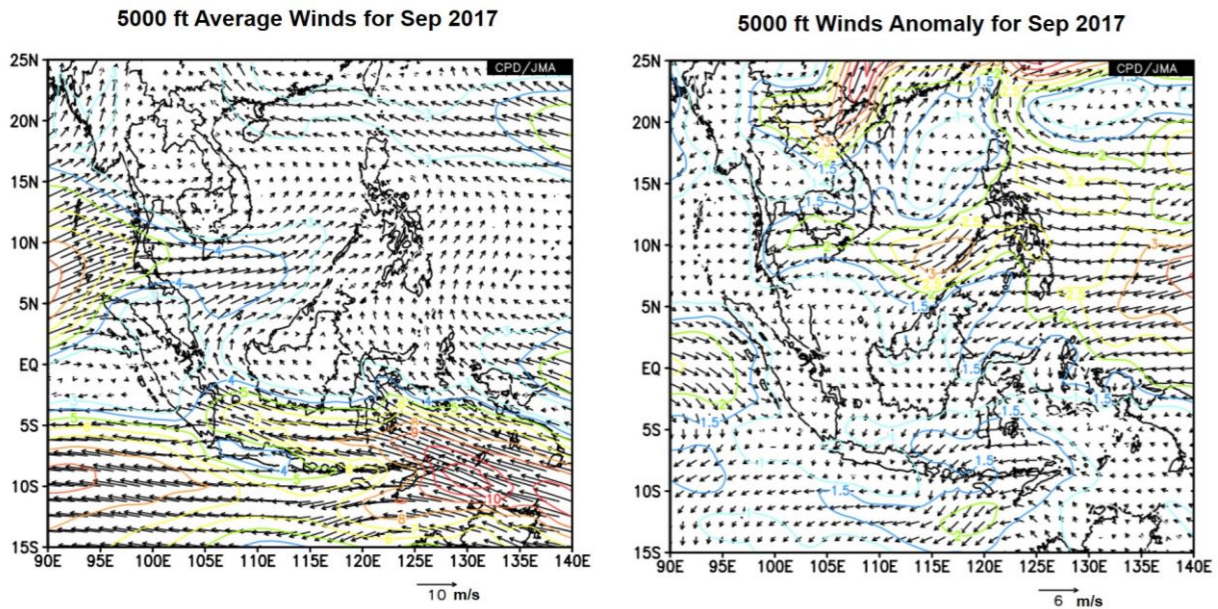


Figure 4: 5000 ft average winds (left) and anomaly (right) for September 2017. (Source: JMA)

1.5 In September 2017, the equatorial Pacific Ocean's sea-surface temperature (SST) over the Nino 3.4 region remained at neutral (neither El Niño nor La Niña) values. However, in recent weeks, there has been a gradual cooling of the sea surface temperatures, and the Nino 3.4 index dipped to negative values. However, atmospheric conditions, such as trade winds and cloudiness, over the equatorial Pacific have largely remained neutral.

1.6 The Madden Julian Oscillation (MJO)¹ was weak and non-discernible in September 2017. Although there was a faint and brief MJO signal in Phase 3 in mid-September 2017, overall, the MJO did not have a significant influence on the weather conditions over the southern ASEAN region during the month.

¹ 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.

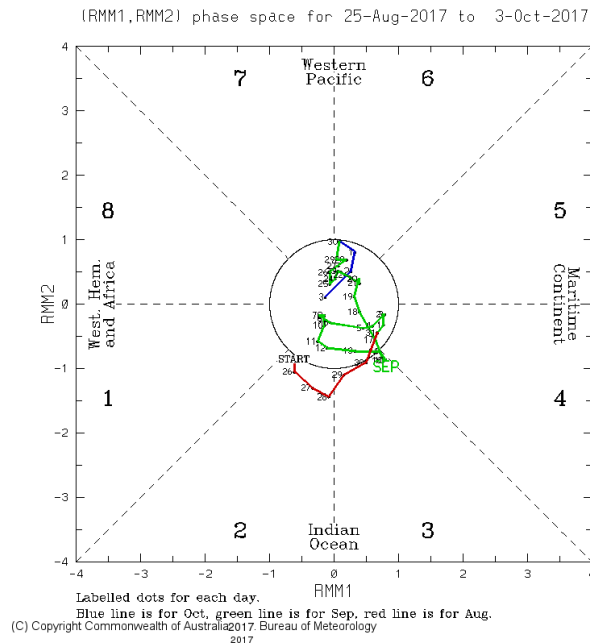


Figure 5: The MJO phase diagram for September 2017 (green). The MJO phase diagram illustrates the movement of the MJO through different phases, which correspond to different locations along the equator. The distance of the index from the centre of the diagram is correlated with the strength of MJO. When 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 Hotspot activities in the northern ASEAN region were generally subdued in September 2017 due to wet weather conditions. In the southern ASEAN region, there were isolated or scattered hotspots detected mainly in southern Sumatra and West Kalimantan but the region was relatively wetter than usual during the month.

2.2 On a few days in the third week of September 2017, Kalimantan experienced a brief period of dry weather conditions. This led to an increase of hotspot activities in West Kalimantan on 22 and 23 September 2017, and localised smoke haze and plumes were seen emanating from some of the hotspots. The hotspots were short-lived as showers on subsequent days helped to bring an improvement to the hazy conditions. Satellite images depicting some of the hotspot activities over parts of the ASEAN region in September 2017 are shown in Figure 6 to Figure 10.

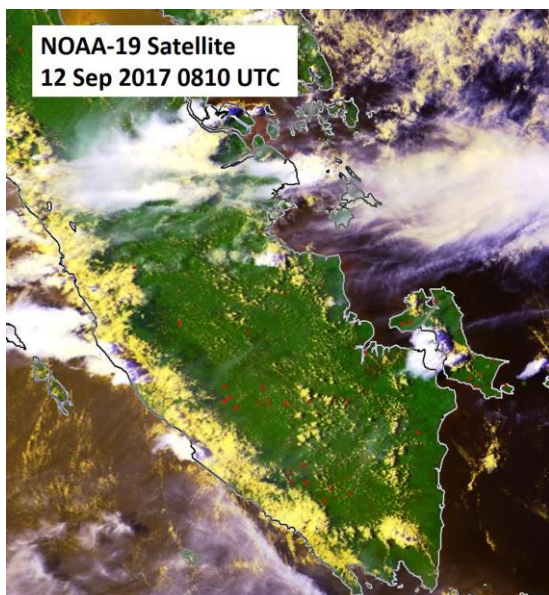


Figure 6: NOAA-19 satellite image on 12 September 2017 shows isolated hotspots detected in southern Sumatra.

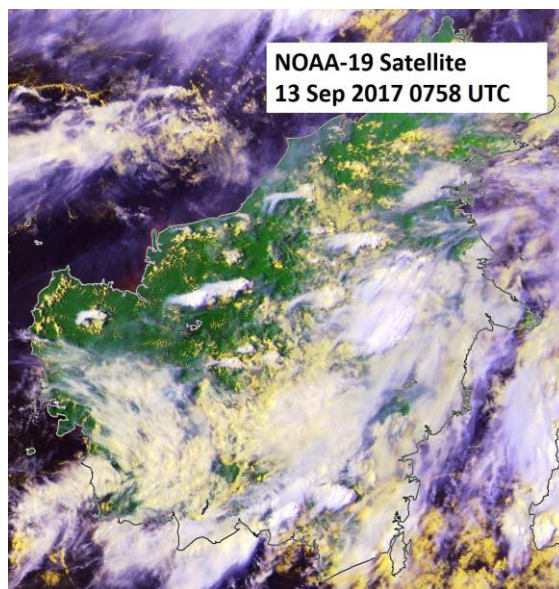


Figure 7: NOAA-19 satellite image on 13 September 2017 shows hotspot activities in Kalimantan subdued by wet weather conditions.



Figure 8: NOAA-19 satellite image on 14 September 2017 shows Typhoon Doksuri approaching Vietnam.

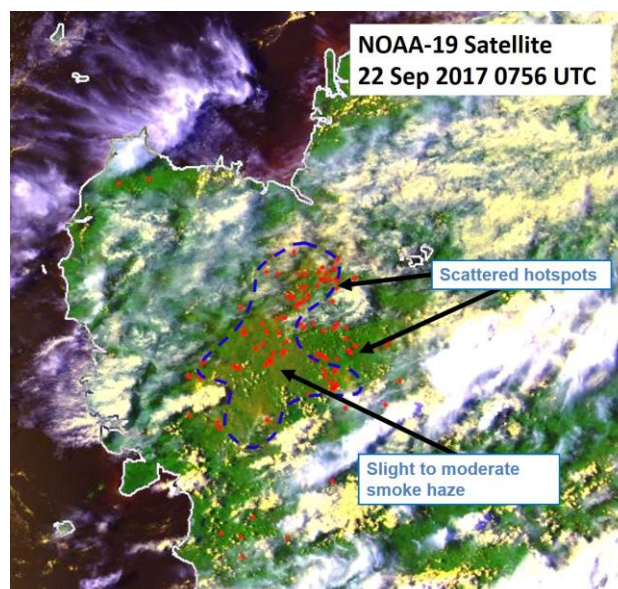


Figure 9: NOAA-19 satellite image on 22 September 2017 shows scattered hotspots with slight to moderate smoke haze observed in West Kalimantan.

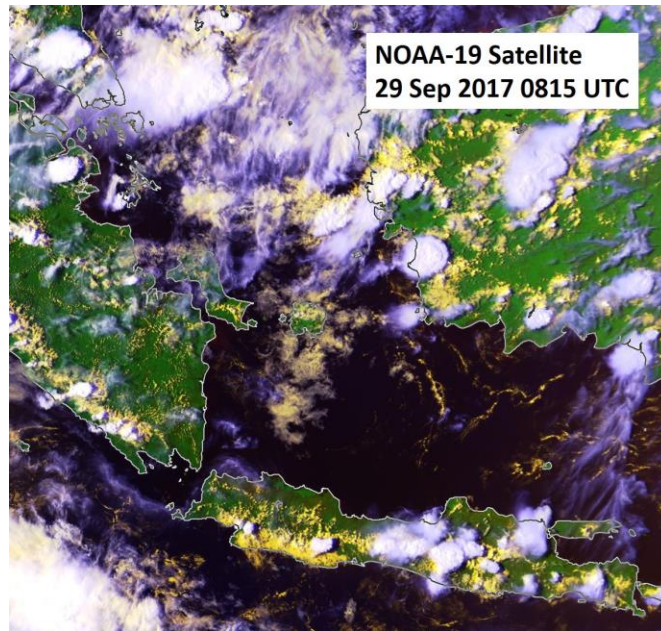


Figure 10: NOAA-19 satellite image on 29 September 2017 shows increased shower activities over the southern ASEAN region, particularly in Kalimantan and Java.

2.3 The hotspot distribution and daily hotspot charts for September 2017 are shown in Figure 11, Figure 12 and Figure 13.

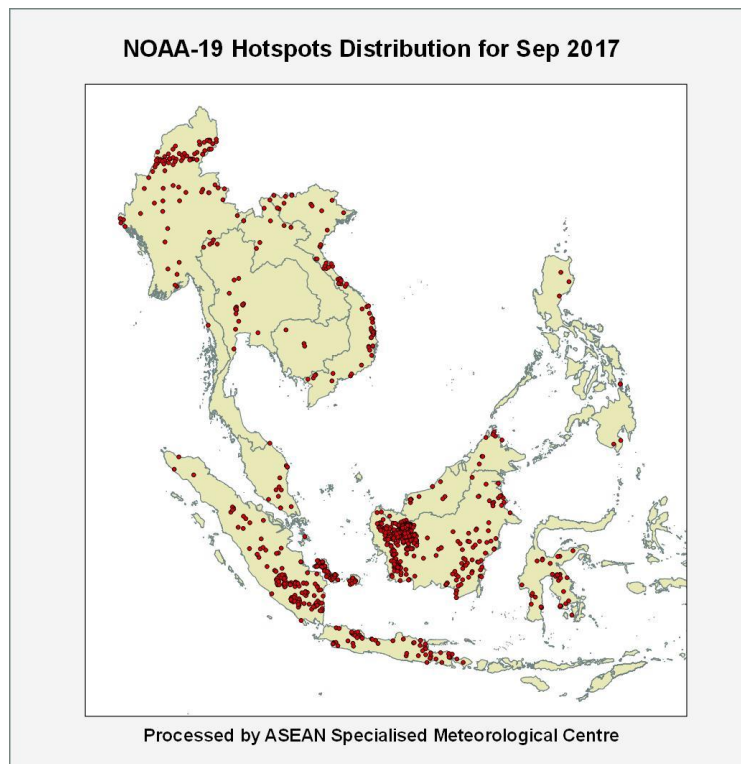


Figure 11: NOAA-19 hotspots distribution in September 2017.

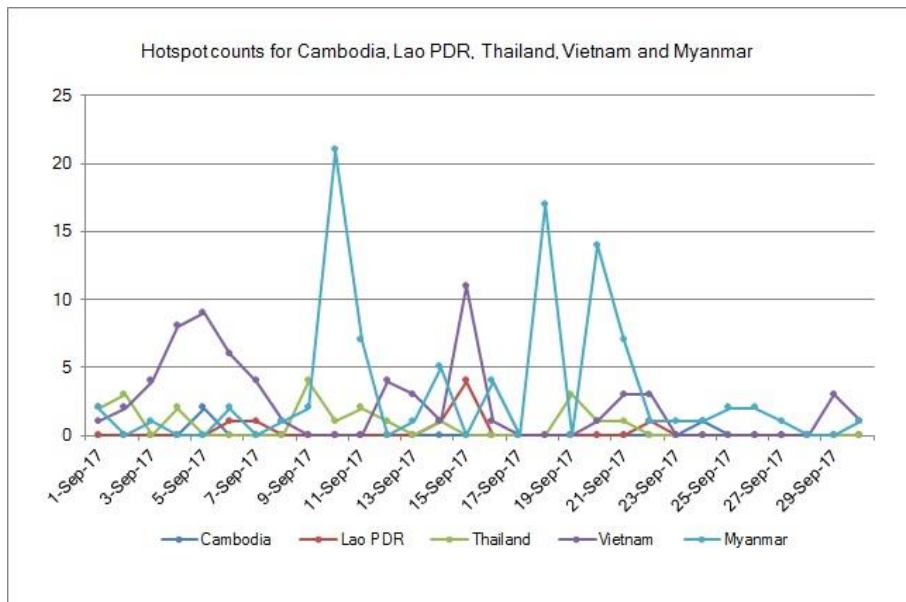


Figure 12: Hotspot Counts in Cambodia, Lao PDR, Thailand, Vietnam and Myanmar in September 2017.

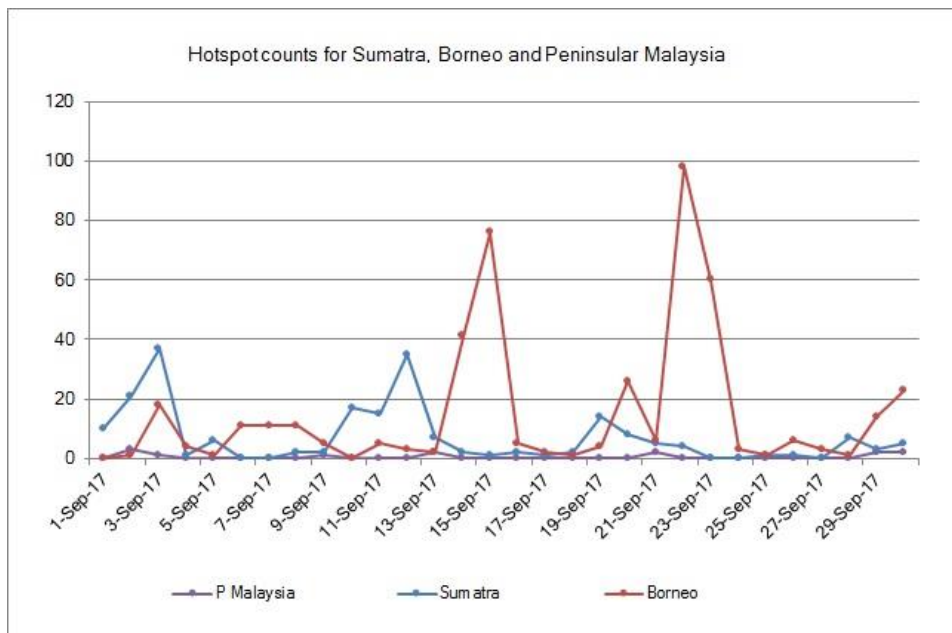


Figure 13: Hotspot Counts in Sumatra, Borneo and Peninsular Malaysia in September 2017.

3. Outlook of El Niño/La Niña and Indian Ocean Dipole

3.1 International climate centres have projected that the sea surface temperature would continue to cool in the second half of 2017. During this period, latest experts' consensus favour neutral conditions or weak La Niña conditions.

3.2 Typically, El Niño brings drier-than-normal rainfall conditions to most parts of Southeast Asia during the Southwest Monsoon season. During La Niña events, the opposite, i.e. wetter-than-normal condition, normally occurs. Locally specific impact differs from place to place and for different seasons.

3.3 In September 2017, the Indian Ocean Dipole (IOD) index remained in the neutral state (Figure 14). In the next few months, international climate models forecast the IOD to remain neutral.

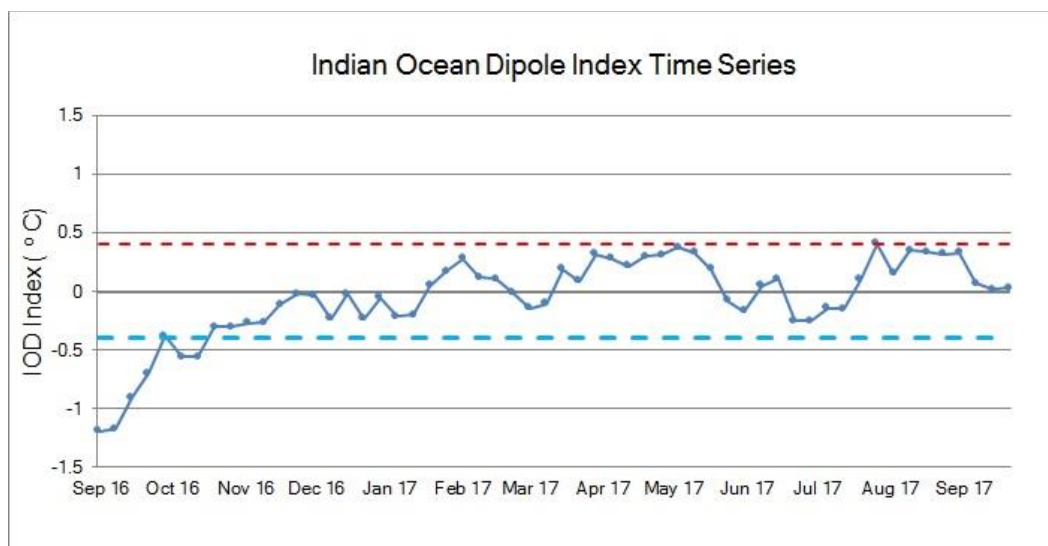


Figure 14: Indian Ocean Dipole (IOD) index time series. The IOD index was at neutral levels in September 2017. (Source: Bureau of Meteorology, Australia)

4. Outlook

4.1. The Southwest Monsoon conditions in the ASEAN region are expected to transition to inter-monsoon conditions in the second half of October 2017 before the onset of the Northeast Monsoon season around late November 2017.

4.2. In the northern ASEAN region, the prevailing rainy season is expected to gradually ease in the coming weeks before the onset of the traditional dry season or Northeast Monsoon season later in the year. During the transition period, hotspot activities are expected to remain subdued but a gradual increase in hotspot activities is expected towards the end of the year.

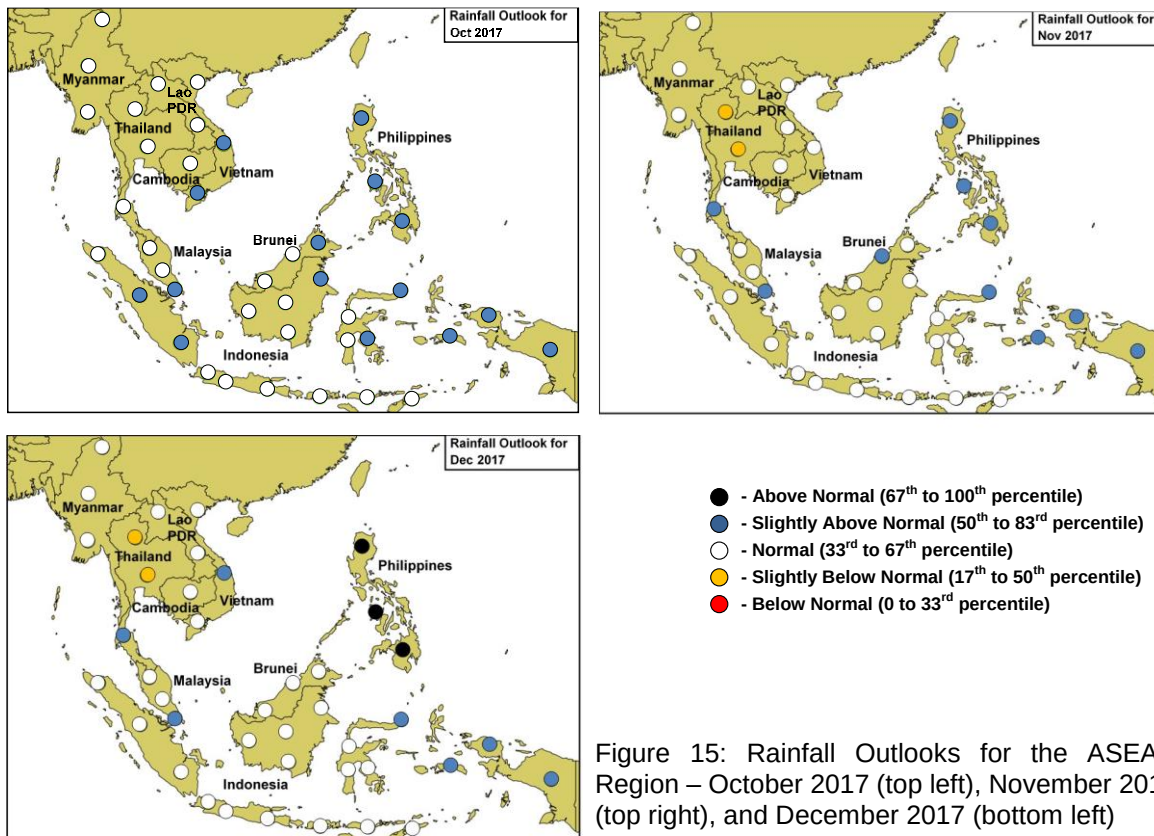
4.3. In the coming weeks for the southern ASEAN region, an increase of shower activities are expected, particularly over Java and the eastern parts of Indonesia. However, there could still be brief periods of dry weather conditions which could lead to an escalation in hotspot activities. Vigilance should therefore be maintained for any surge in the hotspot activities during periods of drier weather.

4.4. In the third week of October 2017, well above-normal rainfall is expected for Vietnam, Philippines and the surrounding region of Java Sea. However, for parts of Sumatra, Malaysia, Singapore and Brunei, drier than usual conditions can be expected as a tongue of dry air mass from the Indian Ocean is expected to blow over the region. For the last week of October 2017, normal to slightly wetter than usual conditions are forecast for the region.

4.5. By late-November and early-December 2017, the strengthening of a high pressure system in north Asia is expected would signal the start of the Northeast Monsoon season. A strengthening of the northeasterly winds can be expected, and the monsoon rain band is forecast to migrate

further south. The northern ASEAN region will experience cool and dry weather conditions, while persistent and widespread shower activities are expected to prevail over the southern ASEAN region.

4.6. For the upcoming October-November-December season, above-normal rainfall is expected for the Philippines. Near-normal rainfall is forecast for most parts of the Mekong sub-region, except in Thailand where slightly-below normal is expected in October 2017, and slightly above-normal rainfall are expected in the last two months of 2017. In the southern ASEAN region, near-normal to slightly above-normal rainfall are forecast. The rainfall outlooks for October, November and December 2017 are shown in Figure 15.



====