

1. Review of Regional Weather Conditions for Second Fortnight of January 2019

1.1 Northeast Monsoon conditions prevailed in the second fortnight of January 2019. Northeasterly and easterly winds prevailed over the northern ASEAN region and South China Sea due to a persistent high pressure system over north Asia. There were anomalously strong northwesterly and northeasterly winds over the southern ASEAN region with the monsoon trough situated south of the Equator.



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

1.2 Dry weather persisted over the Mekong sub-region, except for isolated showers over coastal Viet Nam on a few days due to strengthening of winds over the South China Sea. Above-average rainfall was observed over the Philippines and parts of the southern ASEAN region.

1.3 The daily average rainfall and the percentage of average rainfall for the second fortnight of January 2019 are shown in Figure 2 and Figure 3 respectively.





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



Figure 3 Percent of average rainfall for 16 – 31 January 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)

1.4 The anomalously strong northwesterly and northeasterly winds in the southern ASEAN region could also be attributed to Tropical Cyclone Riley that developed over the Indian Ocean, northwest of Western Australia on 24 January 2019. Tropical Cyclone Riley subsequently tracked southwestwards and gradually weakened over the Indian Ocean by 30 January 2019. During this period, upstream wind-flow feeding into Tropical Cyclone Riley contributed to the scattered shower activities over the southern ASEAN region. The track of tropical cyclone Riley from 24 January 2019 to 30 January 2019 is shown in Figure 4.



Figure 4 Track for Typhoon Riley (24 Jan – 30 Jan 2019)

1.5 The sea surface temperatures (SST) over the tropical Pacific Ocean remained slightly warmer than average, although they have cooled slightly over the past fortnight. Overall positive SST anomalies are weak and returning to neutral. The prevailing atmospheric conditions such as



cloudiness remained neutral, and the trade winds have weakened across the central and western Pacific.

1.6 The Madden Julian Oscillation $(MJO)^1$ strengthened and propagated through Phase 4 - 7² during the fortnight. MJO Phase 4 typically brings wetter weather mainly over the south and southwestern part of the ASEAN region, and has weaker influence over the Philippines and the surrounding areas. MJO signals in Phases 6 – 7 typically bring drier conditions to the region. However, there was no dominant factor influencing the rainfall pattern over the region attributable to the MJO signals.



Figure 1 The MJO phase diagram for December 2018-February 2019 (green for January). 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 Under the prolonged dry weather over the Mekong sub-region, persistent hotspots and smoke haze continued to be observed over Cambodia and parts of Thailand. The hazy conditions became more extensive with accumulation of smoke haze under light wind conditions toward the end of the fortnight. Some of the smoke haze from these hotspots were blown toward neighbouring countries. Isolated hotspots with smoke plumes were also observed in Lao PDR, Myanmar and Viet Nam. In the southern ASEAN region, hotspot activities remain subdued.

2.2 Figures 6 and 7 show satellite images over the ASEAN region in the second fortnight of January 2019.

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



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 6 Smoke haze from persistent hotspots in Mekong sub-region (marked by blue dotted lines)



Figure 7 Smoke haze from persistent hotspots in Mekong sub-region (marked by blue dotted lines)

