

Thirteenth Session of the ASEAN Climate Outlook Forum (ASEANCOF-13)

**November 2019, Thai Meteorological Department
in collaboration with the ASEAN Specialised Meteorological Centre (ASMC)**

Consensus Bulletin for December-January-February (DJF) 2019-2020 Season

INTRODUCTION

The ASEAN Climate Outlook Forum (ASEANCOF) is an avenue to collaboratively develop consensus-based seasonal climate outlooks and related information on a regional scale for Southeast Asia.

The forum outlook and its activities contribute significantly to one of the key roles of the ASEAN Specialised Meteorological Centre (ASMC), which is to conduct climate and seasonal prediction for ASEAN region through pooling the expertise of ASEAN National Meteorological Services.

The Thirteenth ASEANCOF (ASEANCOF-13) was organised by the Thai Meteorological Department in collaboration with Meteorological Service Singapore as host of the ASEAN Specialised Meteorological Centre. Representatives from National Meteorological and Hydrological Services (NMHSs) of ASEAN Member States created a consensus forecast for the boreal winter 2019-2020 in the ASEAN region. The consensus for December-January-February (DJF) 2019-2020 outlooks was achieved through the Thirteenth ASEAN Climate Outlook Forum and Training in Bangkok, Thailand from 18 to 21 November 2019. The consensus was made based on presentations and discussions on current conditions and predictions for the Southeast Asia region. In particular, the forum took into account the significant influence of the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) on the climate over Southeast Asia.

CONDITIONS AND OUTLOOK

Recent analysis of sea surface temperature (SST) anomalies over the equatorial Pacific indicate slightly above average SSTs across most of the Pacific Ocean. The ENSO neutral conditions have been present since July 2019. The international climate outlooks predict ENSO neutral conditions are likely to continue during DJF 2019-2020. The present positive Indian Ocean Dipole (IOD) is expected to weaken in DJF 2019-2020. The Northeast monsoon for the southern half of the region is expected to be delayed due to the strong positive IOD at the start of the season.

Taking into consideration the national level forecasts, the present state of the climate, and the forecasts available from GPCs and other global centres, the forum agreed on the following consensus-based outlook for DJF 2019-2020 for the Southeast Asia region:

RAINFALL

For the upcoming Northern Hemisphere winter season (December-January-February), near-normal conditions are expected over most parts of Mainland Southeast Asia, and parts of the equatorial region. However, there is a slightly enhanced probability of wetter than normal conditions over northern Vietnam, the eastern part of Malaysia, the eastern part of Celebes, Moluccas and northern part of Papua. There is a slightly increased probability of drier than normal conditions over the southern part of Myanmar, parts of Thailand (the northern, central, eastern and south-eastern of region), Philippines, northern and southern Sumatra, Java, the western part of Celebes, Bali, Nusa Tenggara, the southern part of Borneo and the southern part of Papua.

TEMPERATURE

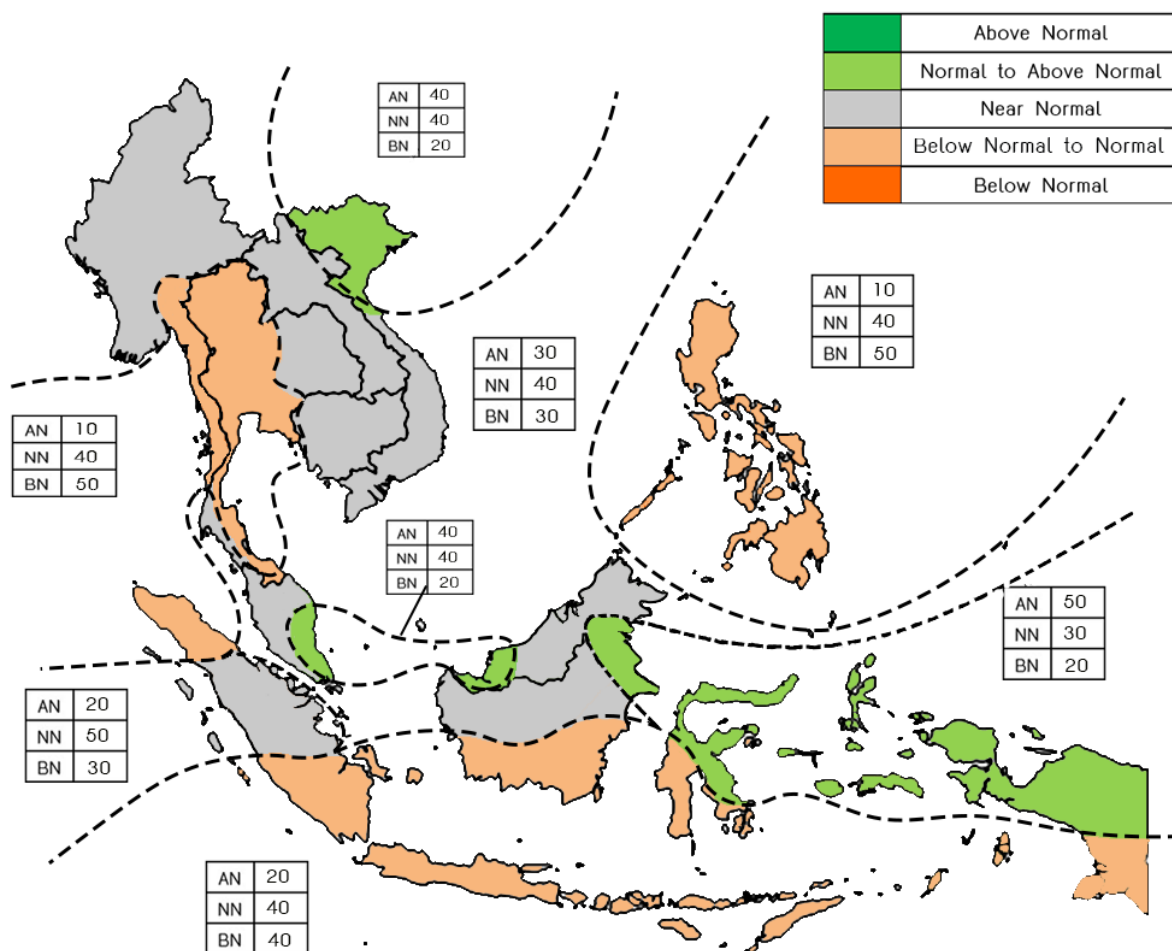
Above normal temperatures are expected for most of Southeast Asia, apart from eastern and southern Myanmar, northern Thailand and northern Sumatra, where near normal temperatures are expected. For the regions with expected above normal temperature, the highest probability is over northern Vietnam, Lao PDR, Cambodia, northern Thailand and southern Myanmar.

Refer to **Annex A** for reference on what is meant by “above, near, or below normal” in the outlook. For more information on the Northern Hemisphere summer monsoon outlook and further updates on the national scale, the relevant NMSs should be consulted (see **Annex B**).

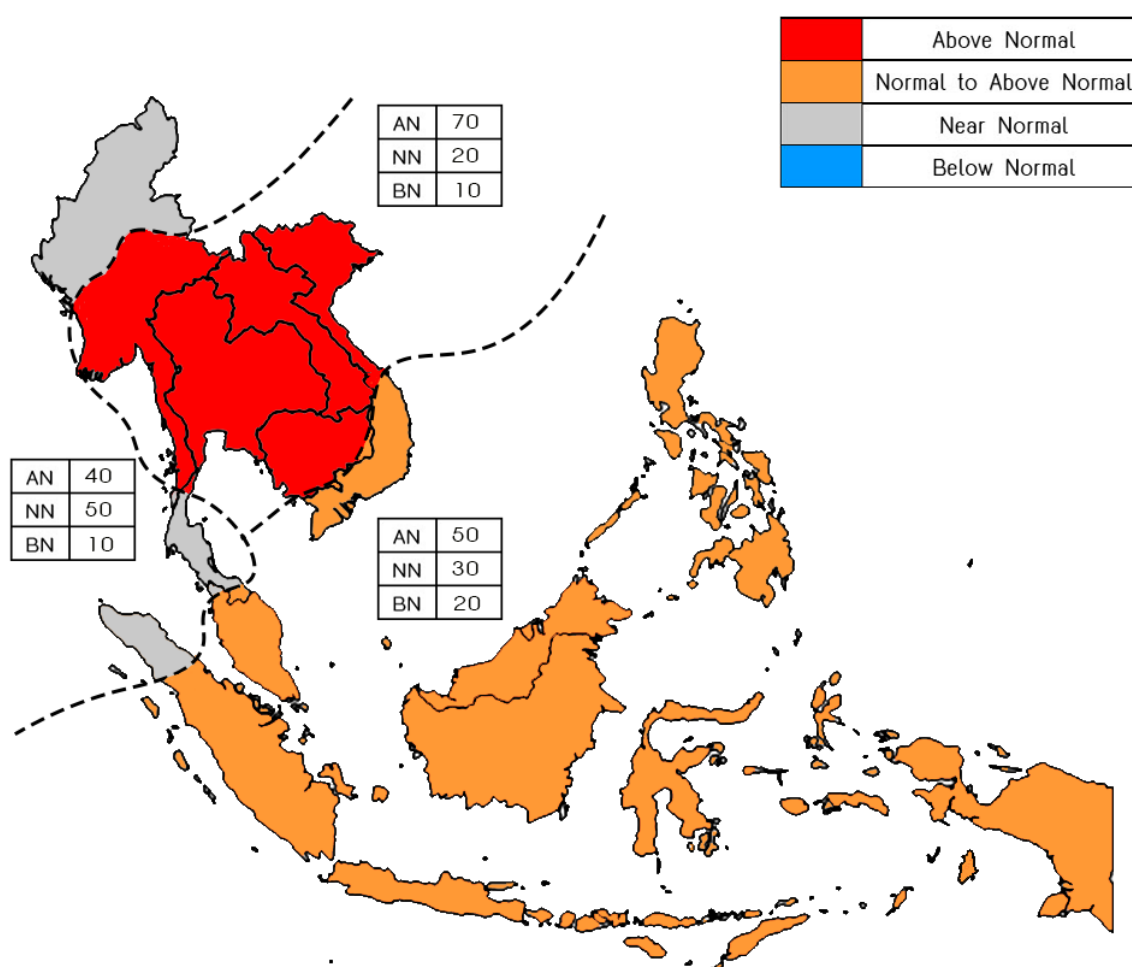
CONSENSUS MAPS FOR DJF 2019-2020

The following maps provide the probabilistic outlooks for DJF 2019-2020 season in terms of tercile categories of “Above Normal” (AN: upper tercile), “Near Normal (NN: middle tercile) and “Below Normal” (BN: lower tercile).

PROBABILISTIC RAINFALL OUTLOOK



PROBABILISTIC TEMPERATURE OUTLOOK



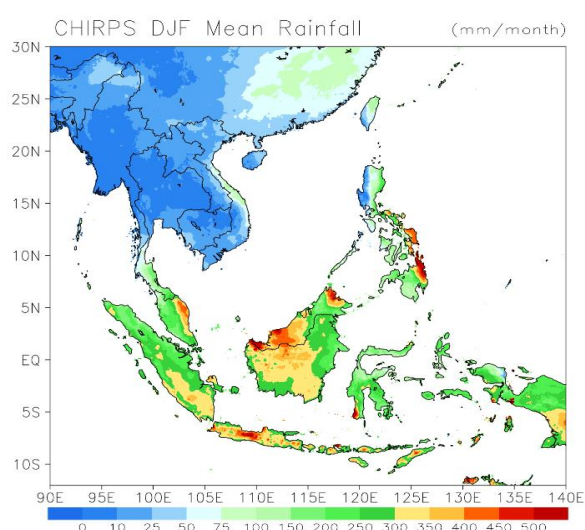
ACKNOWLEDGEMENTS

The Forum would like to convey its appreciation to the National Meteorological Services of the ASEAN Member States for sharing their national-level forecasts, the Global Producing Centres and other participating international climate modelling centres for their products and expertise made available for this Climate Outlook Forum. The Forum would also like to thank the ASEAN Secretariat, the WMO Secretariat, and the local organising committee from TMD for the administrative and funding support provided to the meeting.

ANNEX A: RAINFALL AND TEMPERATURE TERCILE CLIMATOLOGIES

The following figures are rainfall and temperature mean and tercile boundary climatologies to reference against the consensus outlook. Only a single source of data for each variable is provided (CHIRPS for rainfall, and GHCN, CRU-UEA for temperature). For more representative climatologies, reference should be made also against observational datasets known to better characterize local patterns (e.g. quality-controlled station data from the respective National Meteorological Services).

DJF Mean Rainfall



DJF Mean Temperature

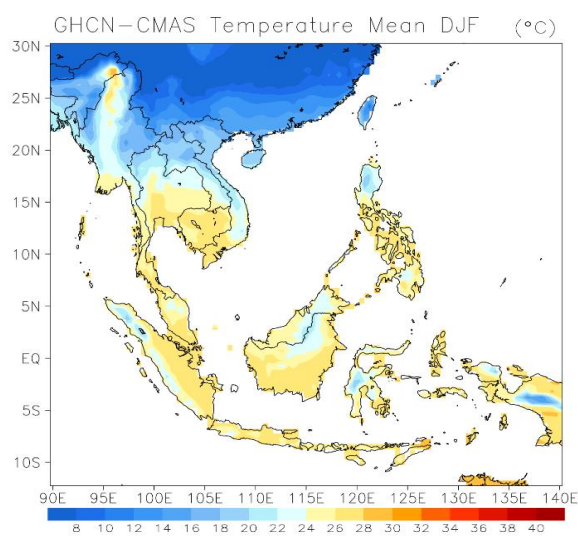
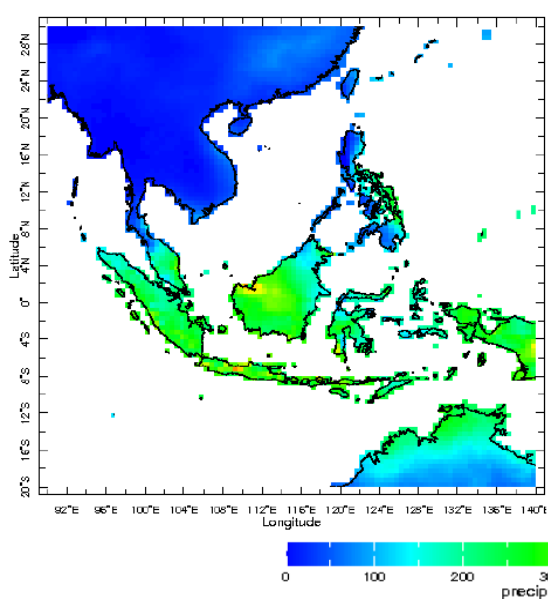


Figure A1: Rainfall mean climatology in mm/month (left, CHIRPS) and the temperature mean climatology (right, GHCN-CAMS) for DJF from 1981-2010

DJF Lower Tercile Rainfall ("Below Normal")



DJF Upper Tercile Rainfall ("Above Normal")

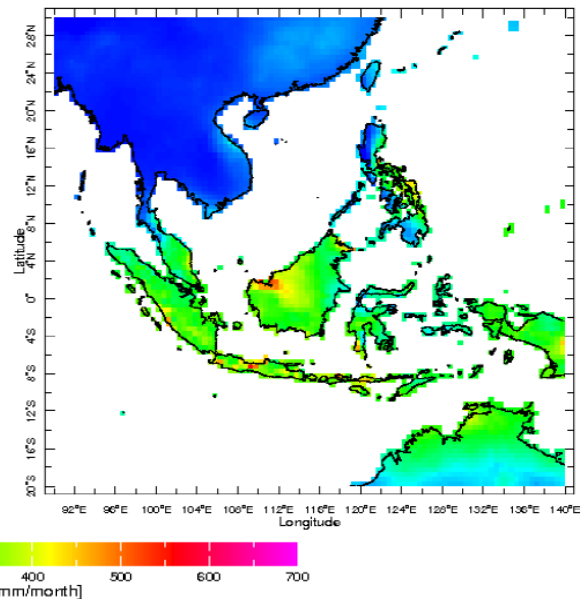
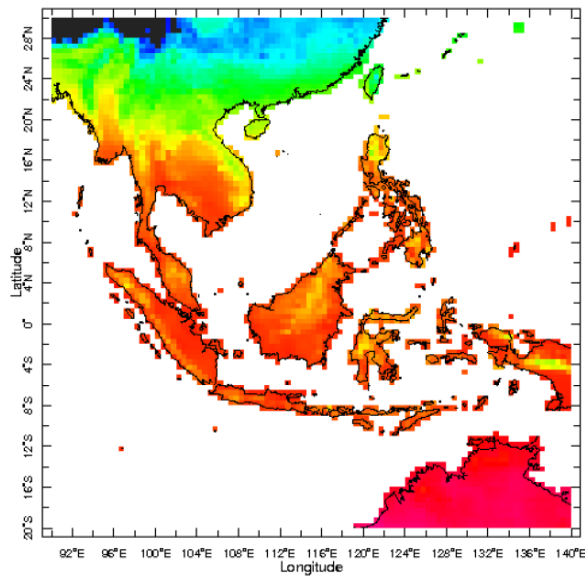


Figure A2: Rainfall climatologies of the lower tercile boundary (left) and the upper tercile boundary (right) for DJF from 1981-2010 from TS3p22 (CRU, UEA) in mm/month

Annex A: Rainfall and Temperature Tercile Climatologies

DJF Lower Tercile Temperature ("Below Normal")



DJF Upper Tercile Temperature ("Above Normal")

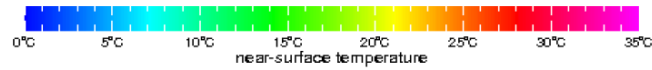
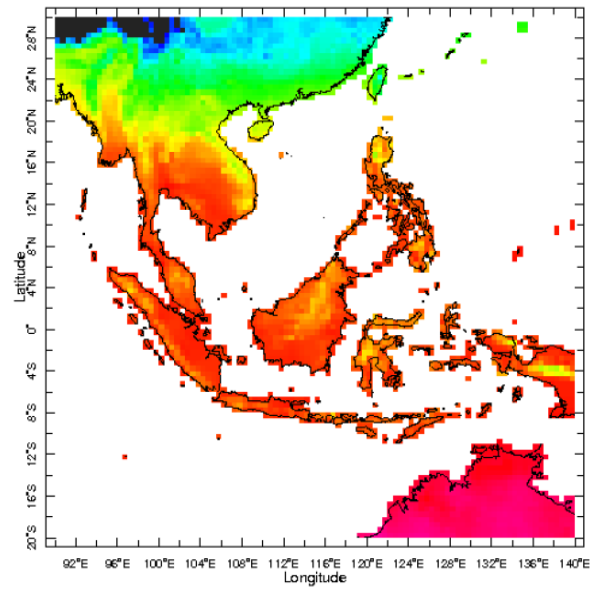


Figure A3: Temperature climatologies of the lower tercile boundary (left) and the upper tercile boundary (right) for DJF from 1981-2010 from (CRU, UEA)

ANNEX B: NATIONAL METEOROLOGICAL SERVICES' CONTACT INFORMATION

- Brunei Darussalam Meteorological Department (BDMD)

<http://www.met.gov.bn/weather>

- Department of Meteorology, Cambodia

<http://www.cambodiameteo.com/map?menu=3&lang=en>

- Badan Meteorologi, Klimatologi dan Geofisika, Indonesia (BMKG)

<http://www.bmkg.go.id>

- Department of Meteorology and Hydrology (DMH), Lao PDR

<http://dmhlao.etllao.com/>

- Malaysian Meteorological Department (MMD)

<http://www.met.gov.my/>

- Department of Meteorology and Hydrology (DMH), Myanmar

<http://www.dmh.gov.mm/>

**- Philippines Atmospheric, Geophysical and Astronomical Services Administration
(PAGASA)**

<http://www.pagasa.dost.gov.ph/>

- Meteorological Service Singapore (MSS)

<http://www.weather.gov.sg/home/>

- Thai Meteorological Department (TMD)

<http://www.tmd.go.th/en/>

- National Center for Hydro-Meteorological Forecasting (NCHMF), Vietnam

<http://www.khituongvietnam.gov.vn/kttvsite/>

ANNEX C: REVIEW OF JJA 2019 CONSENSUS OUTLOOK

SUMMARY

The rainfall and temperature outlooks were representative of the actual conditions over most parts of Southeast Asia. Much of the region experienced above-normal temperature, and below-normal temperature in only a few places. Near-to-below normal rainfall was observed in most parts of Southeast Asia, with a few regions recording normal to above-normal rainfall. Notable events include both droughts and floods, as well as strong wind.

Sea surface temperature anomalies (SSTA) in the tropical Pacific Ocean have been near-average since July 2019, prior to which borderline or weak El Niño to ENSO-neutral conditions were observed. The Indian Ocean reflected a dipole mode, which was the western tropic Indian Ocean presented above-average and the south eastern presented below-average SSTA. Based on the conditions, the Dipole Mode Index (DMI) was presented as a positive IOD and the below-normal rainfall conditions were expected over the southern and eastern Maritime Continent.

JJA 2019 RAINFALL OUTLOOK

For the upcoming Northern Hemisphere summer monsoon season (June-July-August), below normal conditions are expected over most parts of the Southeast Asia. However, there is a slightly enhanced probability of wetter than normal conditions over western and southern Myanmar and parts of Sumatra, Northern Celebes, Moluccas, and Papua islands of Indonesia).

As was seen using the CHIRPS data, much of outlooks were in good agreement with the CHIRPS gridded product in **Figure 1** including Lao PDR, Central and Eastern Thailand, Central and Southern Thailand, Indonesia (North Sumatera, Java, Borneo, Central Celebs), Lao PDR, parts of Malaysia (Peninsular Malaysia and Sarawak), parts of Myanmar (Western and Southern Myanmar) and part of Philippines (Mindanao). A few regions received more rainfall than predicted by the dominant tercile category, including the eastern side of the northern and north-eastern region of Thailand, parts of Myanmar (Bago and Yakin), part of southern Vietnam, part of Philippines (Luzon) as well as Sabah. Drier than expected conditions occurred in Myanmar (Northern, Central and Western) and parts of Philippines (Maluku and Papua). The occurrence of below-normal rainfall over northern Mainland Southeast Asia and Indonesia may be associated with the weak/borderline El Niño and positive IOD phenomena.

Annex C: Review of JJA 2019 Consensus Outlook

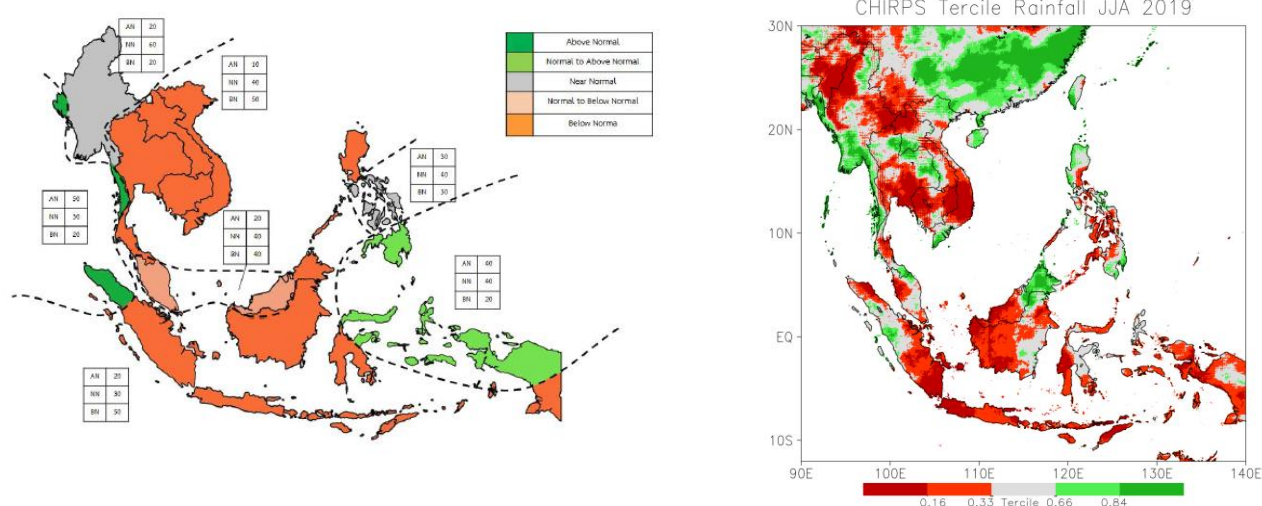


Figure 1: JJA 2019 Rainfall outlook (left) with observed rainfall from CHIRPS (right; Funk et al., 2014)

JJA 2019 TEMPERATURE OUTLOOK

Above normal temperatures are expected over much of central and eastern Southeast Asia, including parts of Peninsular Malaysia, Singapore, central and western Indonesia. Normal to above normal temperature are expected elsewhere, including Philippines, Moluccas and Papua islands of Indonesia.

The Southeast Asia region experienced above-normal temperature as showed in the GHCN-CAMS data and generally consistent the JJA 2019 Temperature outlook (**Figure 2**). The gridded product observed above-normal temperatures over most of the ASEAN regions, except for southern Vietnam, parts of southern Lao PDR, eastern Cambodia, Sabah, parts of southern Indonesia and parts of Philippines that experienced below-normal conditions, while Maluku Islands and parts of Celebes experienced near-normal conditions.

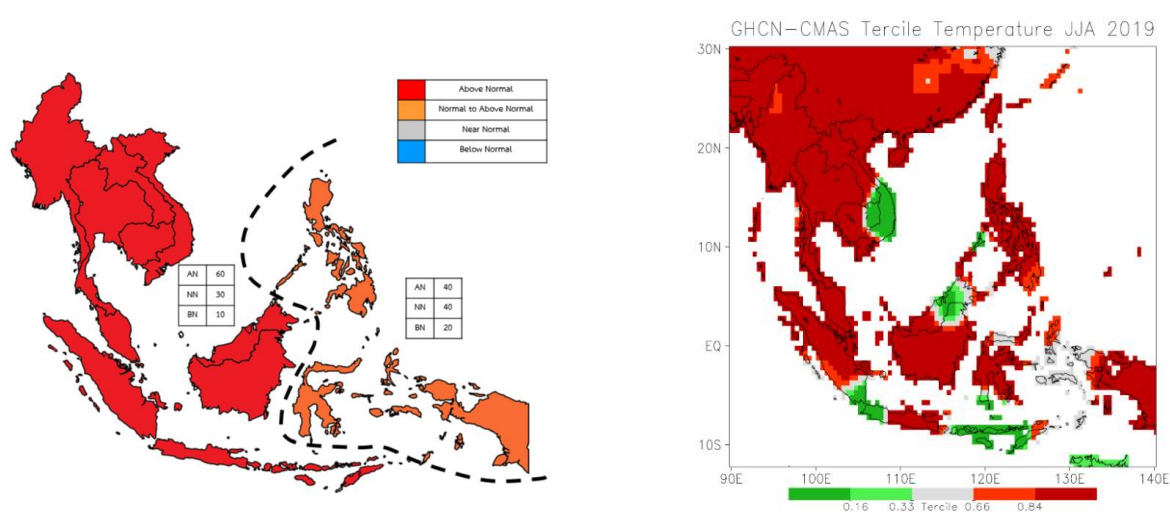


Figure 2: JJA 2019 Temperature outlook (left) and observed temperature from GHCN-CAMS (right; Fan, Y., and H. van den Dool., 2008)

SIGNIFICANT EVENTS

Notable events that occurred during JJA 2019 in Southeast Asia include long dry season in Indonesia causing drought in Java, Bali and Nusa Tenggara, which affected thousands hectares of rice field. Meanwhile, in August, heavy rainfall with flooding occurred in Myanmar and new highest daily rainfall records were established. Also, the tropical storm “Podul” hit Thailand and the Philippines during late August and brought torrential rain and prolong flooding in the northern and north-eastern region of Thailand. Besides, the northern state of Malaysia was affected by strong wind due to Typhoon “Lekima” in August.

REFERENCES

CHIRPS: Funk, C. C, Peterson, P. J., Landsfeld, M. F., Pedreros, D. H., Verdin, J. P., Rowland, J. D., Romero, B. E., Husak, G. J. Michaelsen, J. C., and Verdin, A. P. (2014) A quasi-global precipitation time series for drought monitoring: U. S. Geological Survey Data Series 832, 4 p., dx.doi.org/10.3133/ds832.

GHCN-CAMS: Fan Y., H. van den Dool (2004), Climate Prediction Center global monthly soil moisture data set at 0.5° resolution for 1948 to present, J. Geophys. Res., 109, D10102, doi:10.1029/2003JD004345.

GHCN-CAMS: Fan, Y., and H. van den Dool (2008), A global monthly land surface air temperature analysis for 1948-present, J. Geophys. Res., 113, D01103, doi:10.1029/2007JD008470.