



## **Seventh Session of the ASEAN Climate Outlook Forum (ASEANCOF-7)**

### **Consensus Bulletin for December-January-February 2016-2017 Season**

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#### **Introduction**

The Seventh ASEAN Climate Outlook Forum (ASEANCOF-7) was organised by the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) in cooperation with ASEAN Specialized Meteorological Center, with funding support from the United States Agency for International Development (USAID) through the World Meteorological Organization (WMO). As with previous ASEANCOF meetings, representatives from National Meteorological and Hydrological Services (NMHSs) of all 8 ASEAN Member countries: Brunei, Indonesia, Lao, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam convened to create a consensus forecast of winter monsoon 2016-17 (DJF) in the ASEAN region. In addition, experts from the WMO Global Producing Centres (GPCs): Japan Meteorological Agency (JMA), Climate Prediction Center (CPC, NOAA), Bureau of Meteorology (BOM), APEC Climate Center (APCC), European Centre for Medium-range Weather Forecast (ECMWF), China Meteorological Administration (CMA), and WMO Lead Center for Long Range Forecast Multi-Model Ensemble (WMO LC-LRFMME) also shared their respective outlooks and guided the forum through building a consensus statement in the region.

The ASEANCOF is an avenue to collaboratively develop a consensus-based seasonal climate outlooks and related information on a regional scale. 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 consensus outlook for the December-January-February 2016-2017 season for the ASEAN region benefits from the guidance of the WMO GPC model outputs, as well as other global

providers. In particular, use is made of the multi-model ensemble forecasts from WMO LC-LRFMME as well as country-level forecasts developed by the participating national experts. The forum reviewed the present climate conditions in the Southeast Asia region, and discussed the various global and regional climatic factors that will influence the DJF season in the area. 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 for DJF 2016-2017**

Observed sea surface temperatures (SST) in the tropical Pacific remain cooler than average since July-August-September 2016 season indicating La Niña-like conditions. However, recent analyses of atmospheric conditions remain within the neutral range.

A number of climate models slightly favor weak and short-lived La Niña to persist in DJF 2016-17. La Niña is characterized by persistent cooler tropical Pacific SST anomalies, SSTA ( $-0.5^{\circ}\text{C}$  or below) and stronger easterly winds over the tropical Pacific Ocean. While varying in local impacts, La Niña events are generally associated with wetter-than-average rainfall conditions over the ASEAN region, especially in the southern and eastern half of the region.

Negative IOD is weakening. The IOD is predicted to be in a weakly negative to neutral state in DJF 2016-17. Negative IOD is generally associated with warmer than usual SSTA in tropical eastern Indian Ocean in contrast with cooler than normal SSTA in tropical western Indian Ocean. While negative IOD can potentially reinforce the impacts of La Niña, climate models generally do not predict persistence in negative IOD values.

It is also predicted that the frequency of tropical cyclones in the Western North Pacific Region will be above average in DJF 2016-17. Meanwhile, tropical cyclone frequency in the Bay of Bengal will likely remain near average.

Finally, a number of climate models show that the northeast Monsoon is likely stronger than average. It is, however, noteworthy that the effects of this predicted strength in the monsoon could potentially be confined to the northern portions of the region.

Taking into consideration the national-level forecasts, the present status of the climate conditions affecting Southeast Asia, and the forecasts available from the GPCs and other global centres, the forum agreed on the following consensus-based outlook for the DJF 2016-17 season for the Southeast Asia region:

## **RAINFALL**

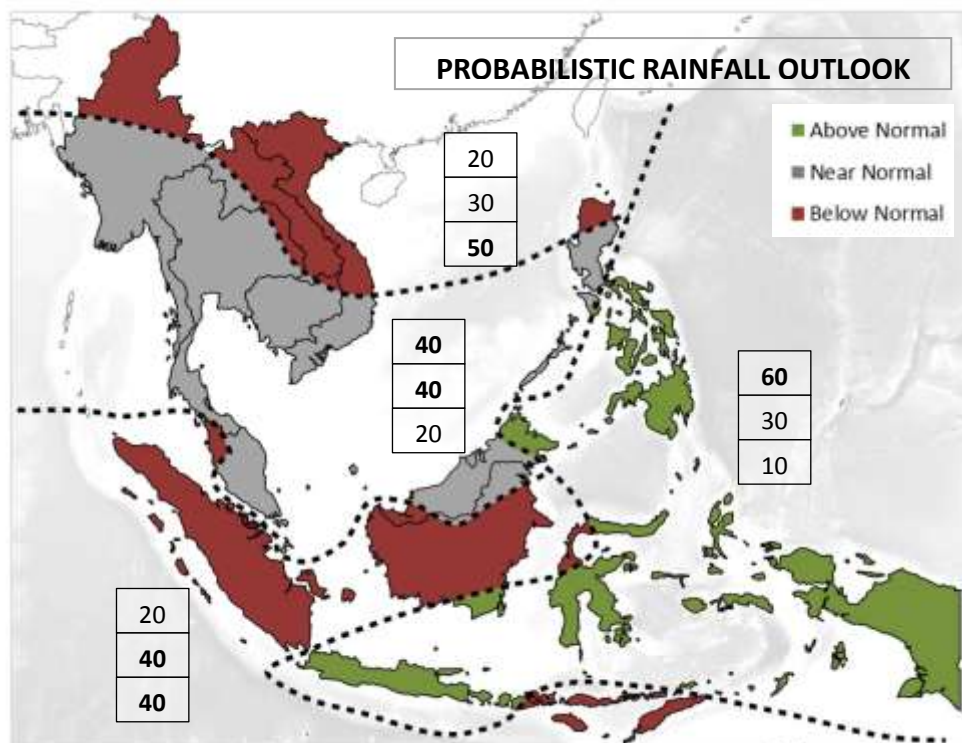
*For the upcoming Northern Hemisphere winter monsoon season (Dec-Jan-Feb 2016-17), there is a slightly enhanced probability of below normal rainfall over northern mainland Southeast Asia, near normal to above normal rainfall over central and western Southeast Asia, which includes most parts of Thailand, Cambodia, southern Myanmar, and western portion of the Philippines. Slightly enhanced probabilities of above normal rainfall are predicted over the rest of the Philippines and eastern Maritime Continent.*

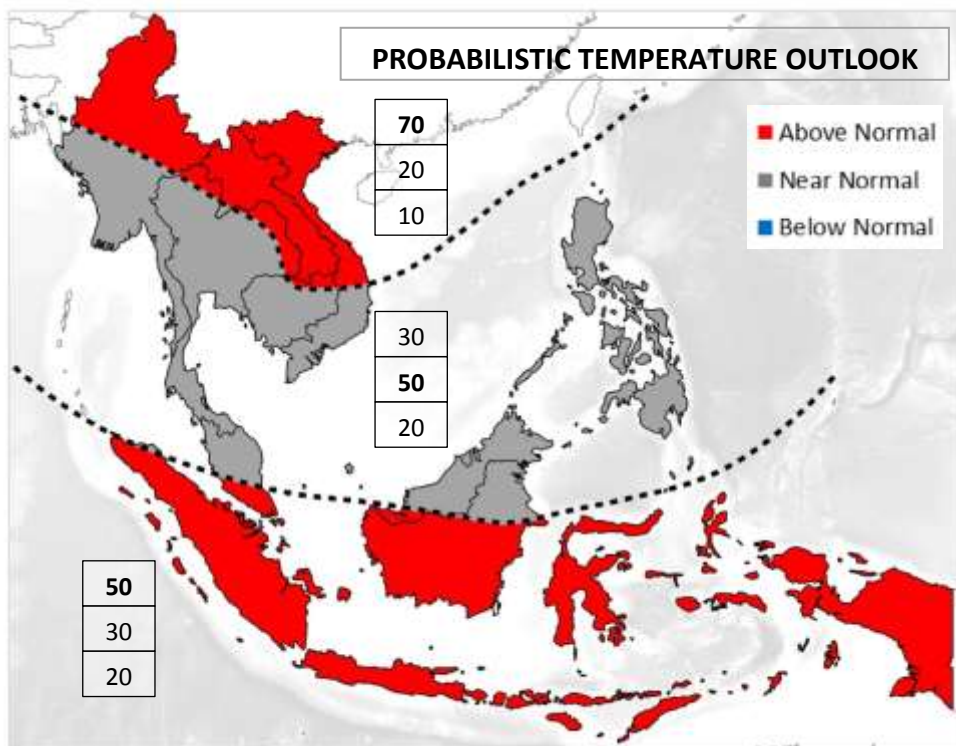
## **TEMPERATURE**

*Slightly above to above normal air temperatures are very likely to occur over much of Southeast Asia region for the upcoming Northern Hemisphere winter monsoon season (Dec-Jan-Feb), with the highest probabilities over the northern portions of Myanmar, Vietnam, and Lao. Near average air temperatures are predicted over Thailand and Philippines.*

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 winter monsoon outlook and further updates on the national scale, the relevant NMSs should be consulted (see Annex B). The review for the JJA 2016 consensus outlook from ASEANCOF-6 is included in Annex C for reference.

## Consensus Maps for DJF 2016-2017





## Acknowledgements

The forum would like to thank the National Meteorological Services of the ASEAN Member countries for conveying 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 WMO Secretariat for providing support and guidance for this bulletin.

## 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 ([CRU, UEA](#)). 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).

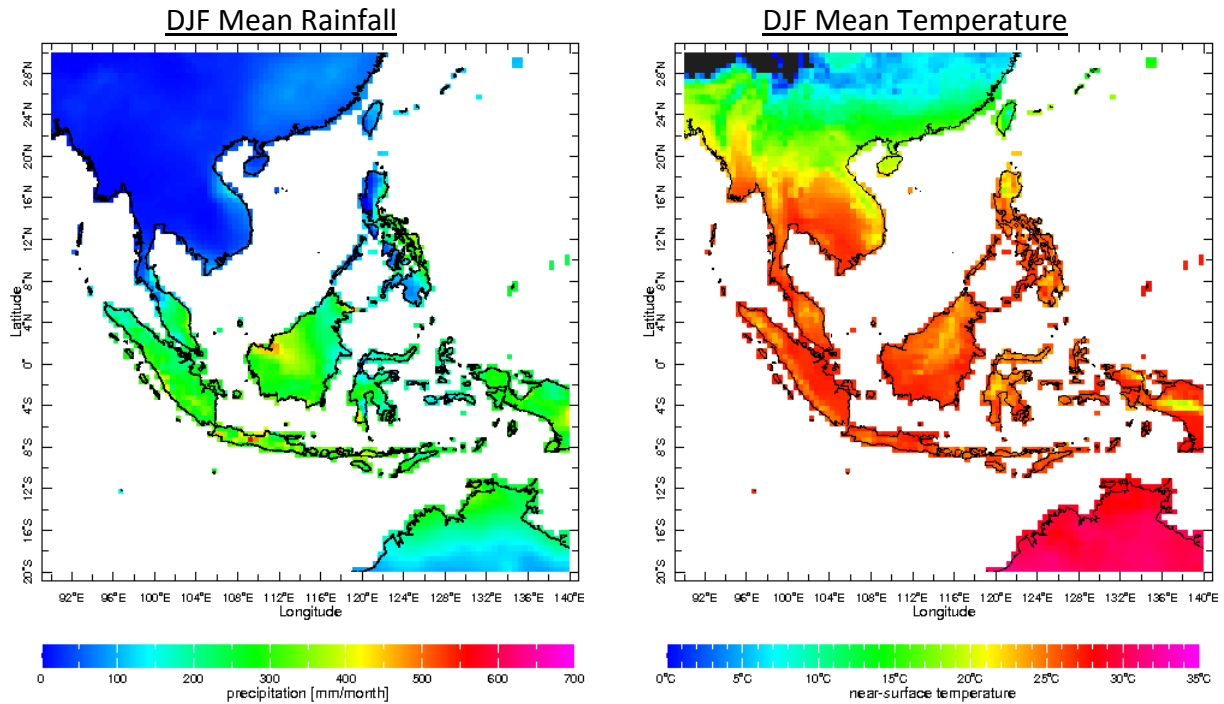


Figure A1: Rainfall mean climatology in mm/month (left) and the temperature mean climatology in degrees Celsius (right) for DJF from 1981-2010 from TS3p22 (CRU, UEA).

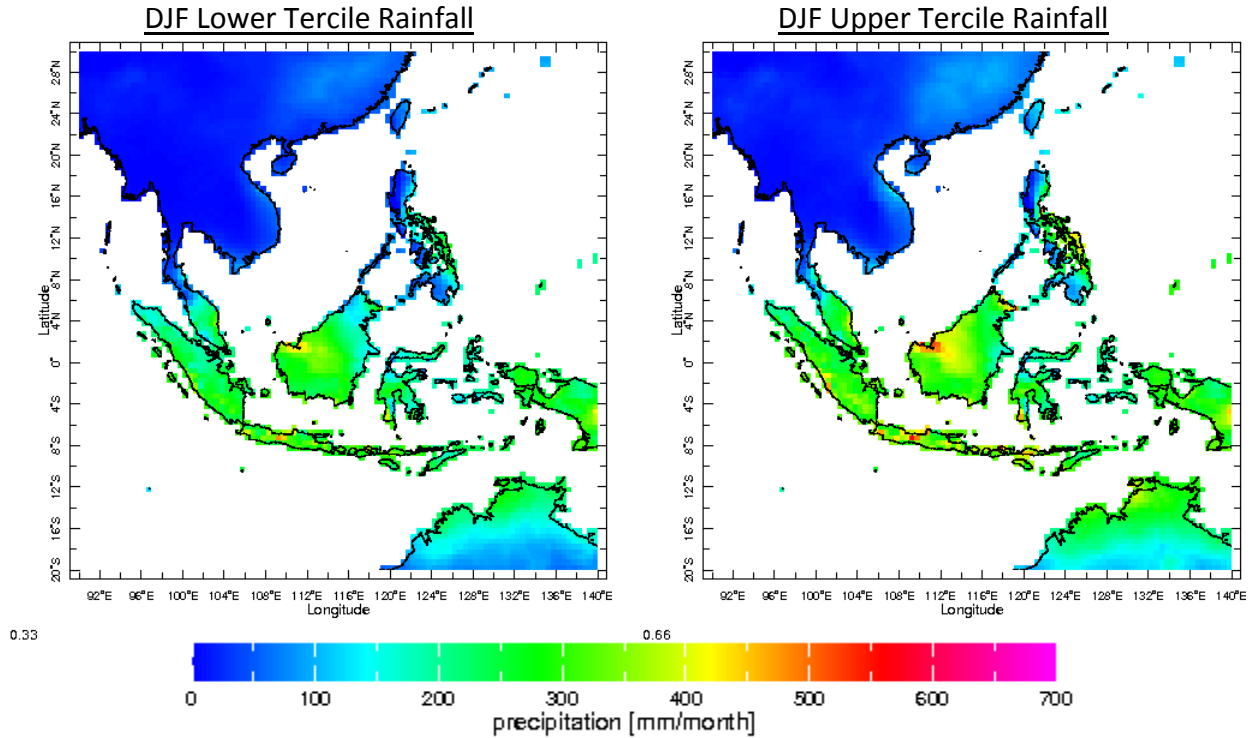


Figure A2: Rainfall climatologies of the lower tercile boundary (left) and the upper tercile boundary (right) for DJF from 1981-2010 from TS3p22 (CRU, UEA) in mm/month.

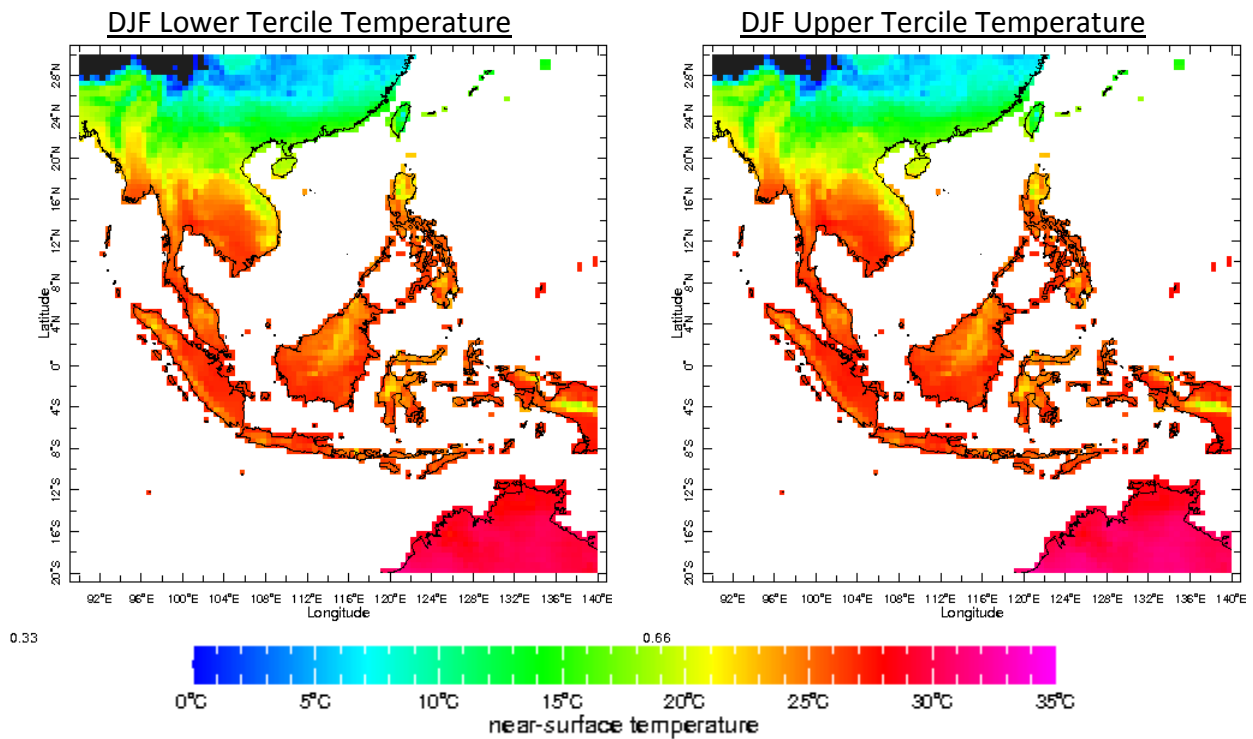


Figure A3: Temperature climatologies of the lower tercile boundary (left) and the upper tercile boundary (right) for DJF from 1981-2010 from TS3p22 (CRU, UEA).

## **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**

<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.nchmf.gov.vn/Web/en-US/43/Default.aspx>

## Annex C: Review of Consensus Outlook JJA 2016

The following was the consensus outlook for JJA 2016:

### **RAINFALL**

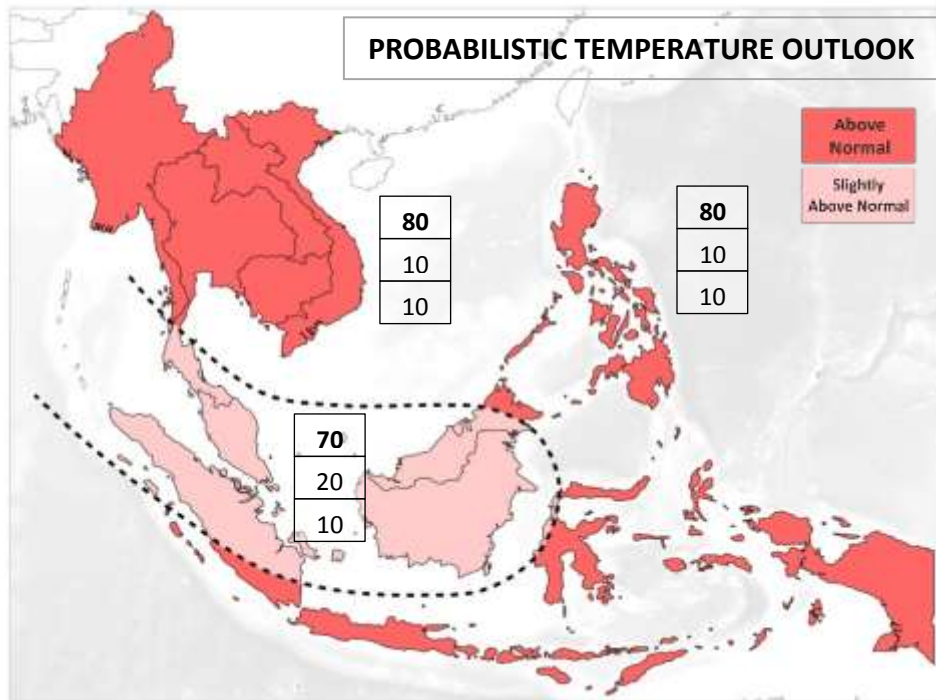
*For the upcoming Northern Hemisphere summer monsoon season (June-July-Aug), there is a slightly enhanced probability of above normal rainfall over the Maritime Continent, which includes most parts of Borneo, Singapore, and southern Sumatra. Slightly enhanced probabilities of below normal rainfall are predicted over northern Philippines. Elsewhere over the region, there are slightly enhanced probabilities for near normal rainfall.*

### **TEMPERATURE**

*Above normal temperatures are very likely over much of the Southeast Asia region for the upcoming Northern Hemisphere summer monsoon season (June-July-Aug), with the highest probabilities over the Philippines and mainland Southeast Asia.*

## Consensus Maps for JJA 2016

In review, temperature outlook for JJA 2016 was largely consistent with observations in the region, which experienced above normal conditions in general (Figure 1).





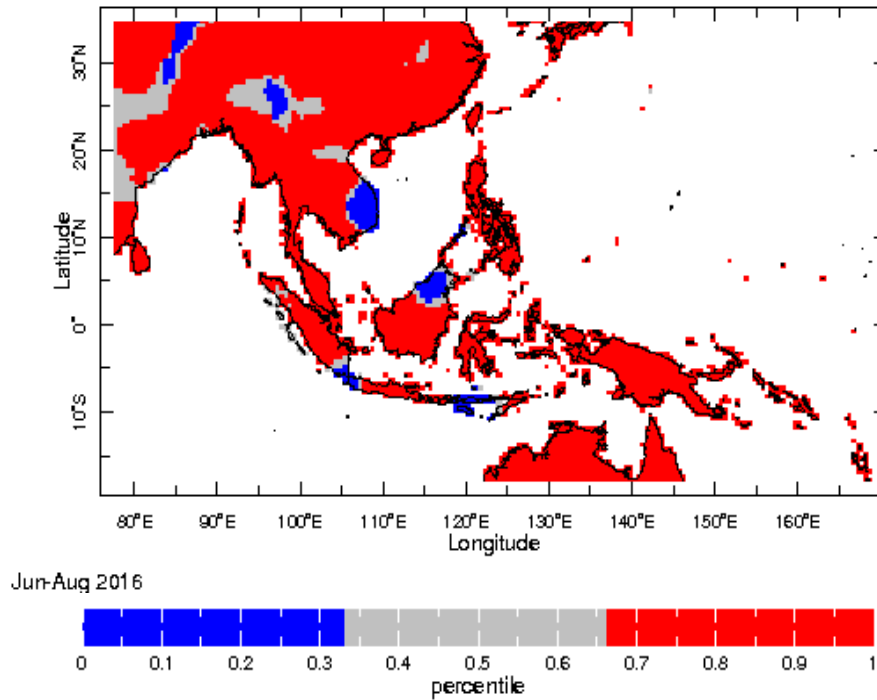
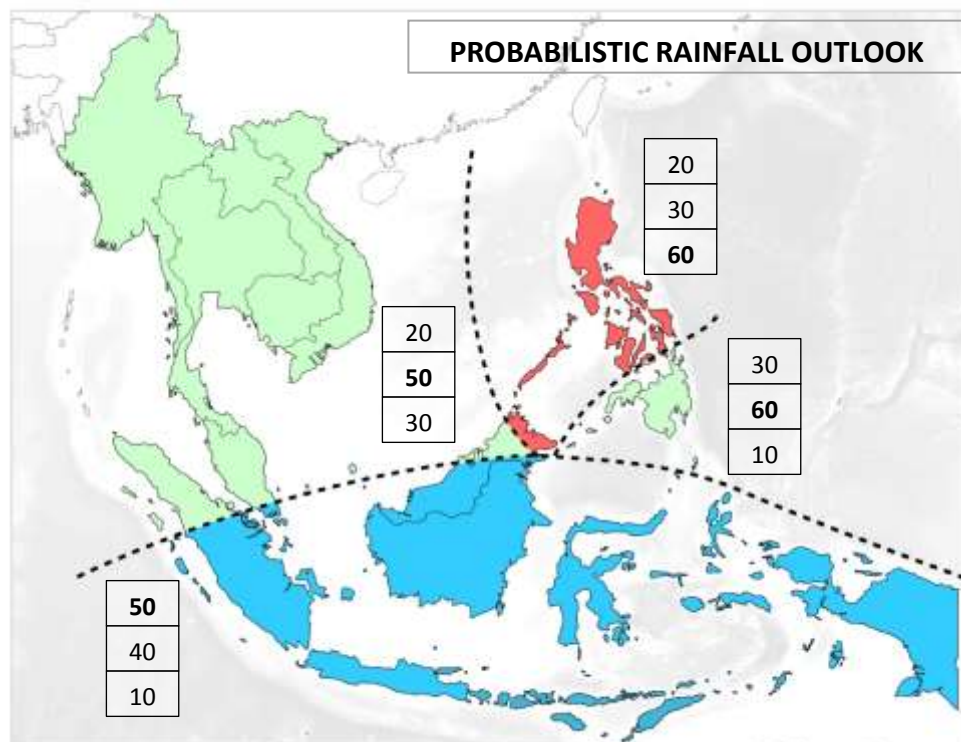


Figure 1: Temperature tercile categories with blue shaded areas showing below normal, grey showing near normal and red showing above normal conditions for JJA 2016. Image credit: GHCN-CAMS.

For rainfall, the outlook was consistent with above normal conditions experienced in the Maritime Continent (most parts of Indonesia). Elsewhere in the region, rainfall observations show mixed categories (less spatially coherent) and reflects the difficulty in making seasonal predictions on finer spatial scale in that region for the season concerned.



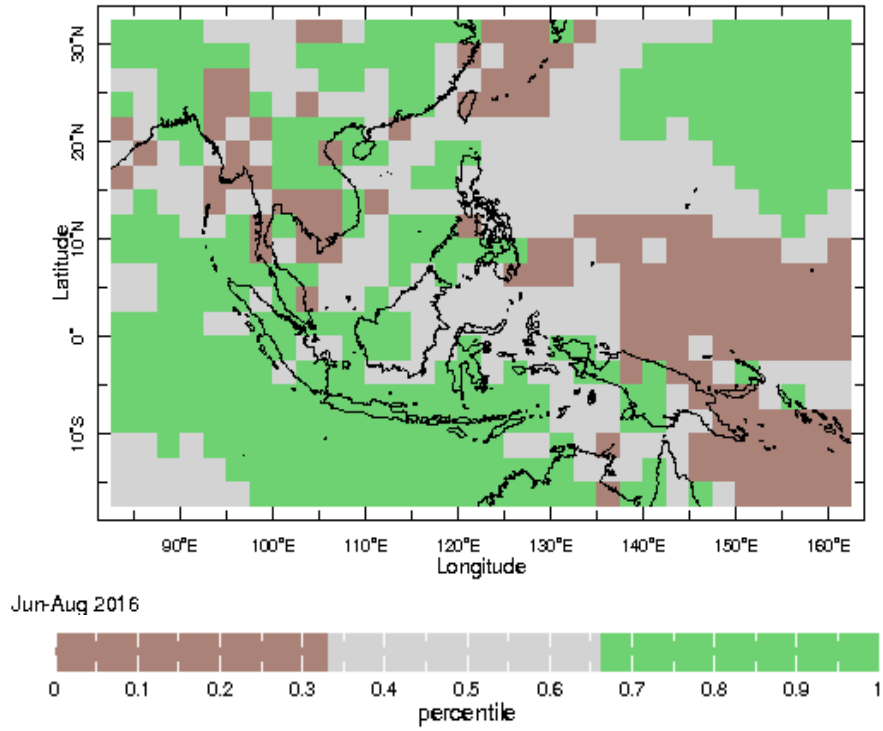


Figure 2: Rainfall tercile categories with brown shaded areas showing below normal, grey showing near normal and green showing above normal conditions for JJA 2016. Image credit: CAMS-OPI.