

## **UPDATE OF REGIONAL WEATHER AND SMOKE HAZE FOR DECEMBER 2014**

### **1. Review of Regional Weather Conditions in November 2014**

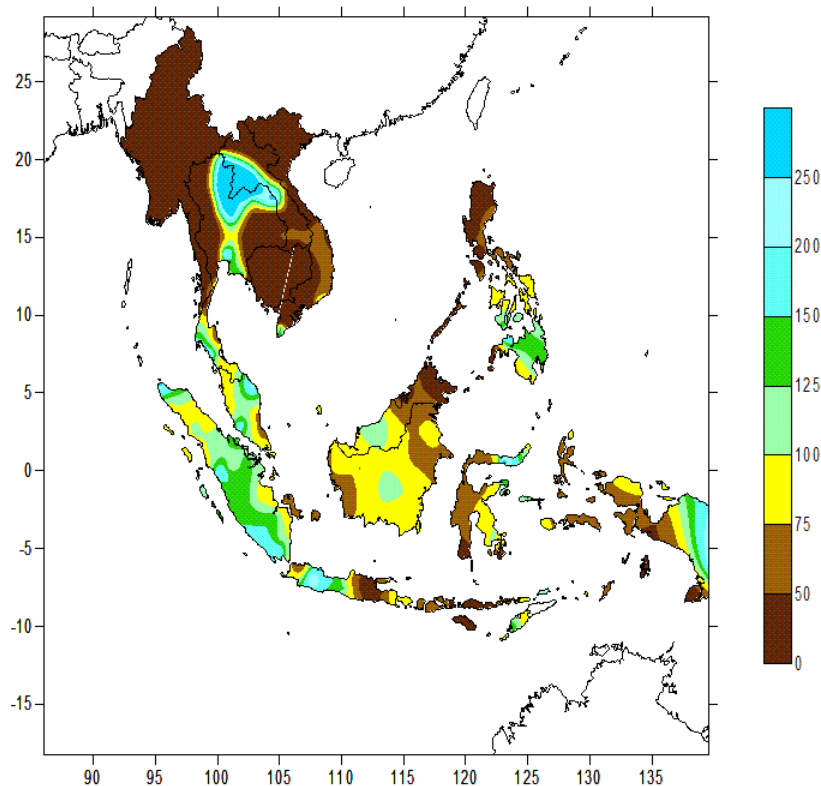
1.1 Inter-Monsoon conditions prevailed over the region for most parts of November 2014 before giving way to Northeast Monsoon conditions in late November 2014. The generally light and variable low level winds strengthened to blow predominantly from the northeast or northwest with the onset of the Northeast Monsoon season.

1.2 In November 2014, two tropical cyclones - 'Nuri' and 'Sinlaku' affected the equatorial region. 'Nuri' developed to the east-southeast of Guam in late October 2014 and intensified into Super Typhoon strength in early November 2014 before weakening and dissipating over the north-eastern Pacific Ocean on 6 November 2014. Tropical Storm 'Sinlaku' developed off the east coast of the Philippines in late November 2014. It intensified as it track northwestwards across the Philippines, and into over the South China Sea before dissipating as it made landfall over the south central coast of Vietnam on 30 November. 'Sinlaku' brought heavy rains and strong winds to areas along its path.

1.3 As the region transitioned from the Inter-Monsoon to the Northeast Monsoon season, increased rainfall was experienced in the southern ASEAN region. In the second half of November 2014, increased convective activity in the South China Sea brought heavy rainfall to the eastern coastal states of Peninsular Malaysia which led to floods in Kelantan and Terengganu. For the northern ASEAN region, there was a decrease in rainfall and drier and cooler conditions were experienced.

1.4 In November 2014, many parts of the southern ASEAN region such as Sumatra and Peninsular Malaysia received more than 100% of normal rainfall. Less than 75% of normal rainfall was received in most parts of the northern ASEAN region while southern Philippines received more than 125% of normal rainfall. The regional rainfall distribution for November 2014 is shown in Fig. 1A.

## Percentage of Normal Rainfall for November 2014

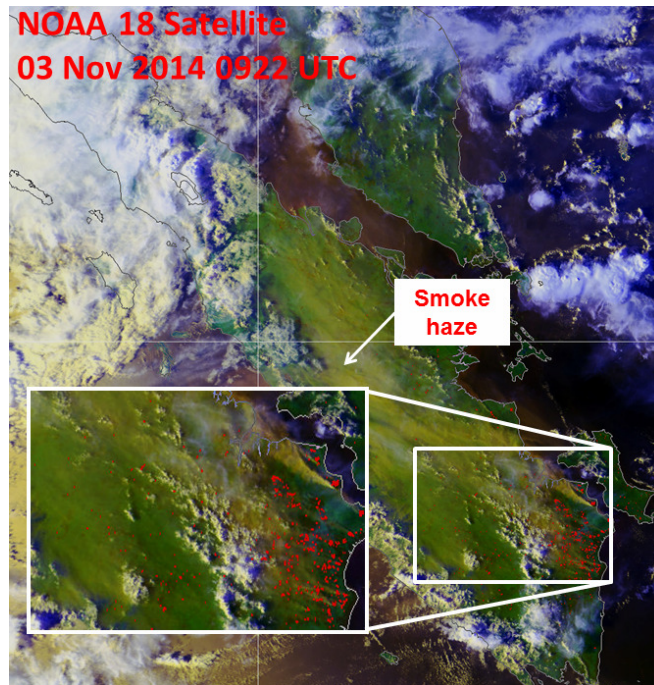


**Fig. 1A: Percentage of Normal Rainfall for November 2014**

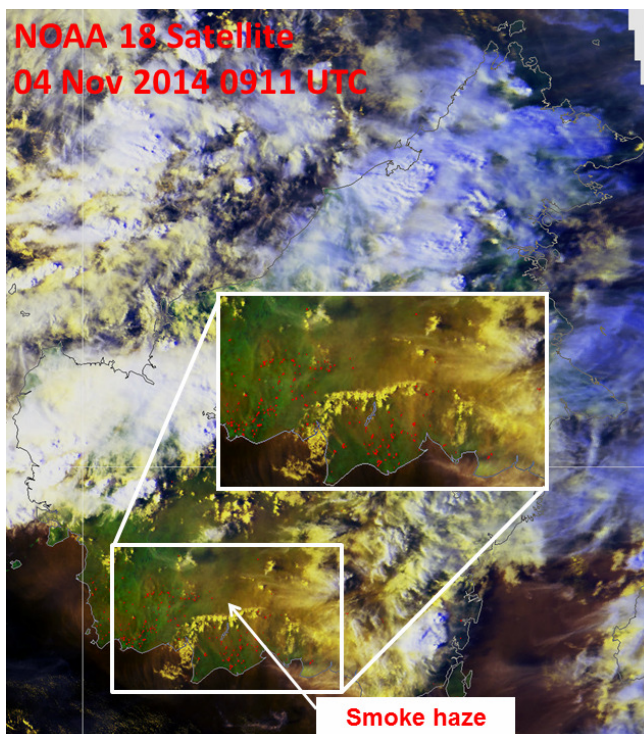
## 2. Review of Land/Forest Fires and Smoke Haze Situation

2.1 Hotspot activities in the northern ASEAN region remained mostly subdued in November 2014. However, the transition to the drier weather conditions at the end of the month led to sporadic surges in hotspot activities observed in parts of Cambodia, Thailand and Vietnam.

2.2 In the southern ASEAN region, a brief period of drier weather in the first week of November 2014 led to the emergence of scattered hotspot activities in southern Sumatra and Kalimantan. Moderate smoke haze was also observed to emanate from these hotspots which led to the deterioration of air quality and visibility in parts of southern Sumatra. From the second week of November 2014, increased showers helped to subdue the hotspot activities in southern Sumatra and Kalimantan. Satellite images depicting some of the hotspot activities in the ASEAN region in November 2014 are shown in Figs. 2A to 2E.

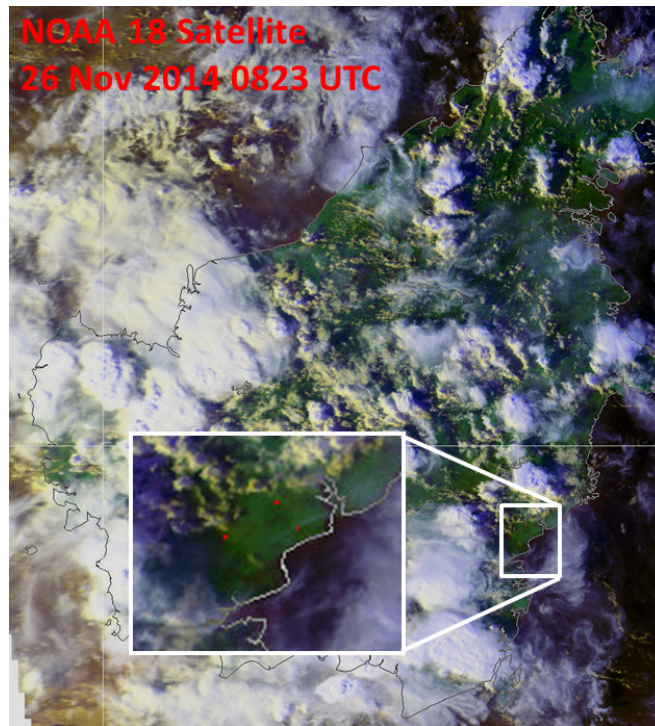


**Fig. 2A: NOAA-18 satellite picture on 3 November 2014 shows widespread smoke haze emanating from hotspots in southern Sumatra**

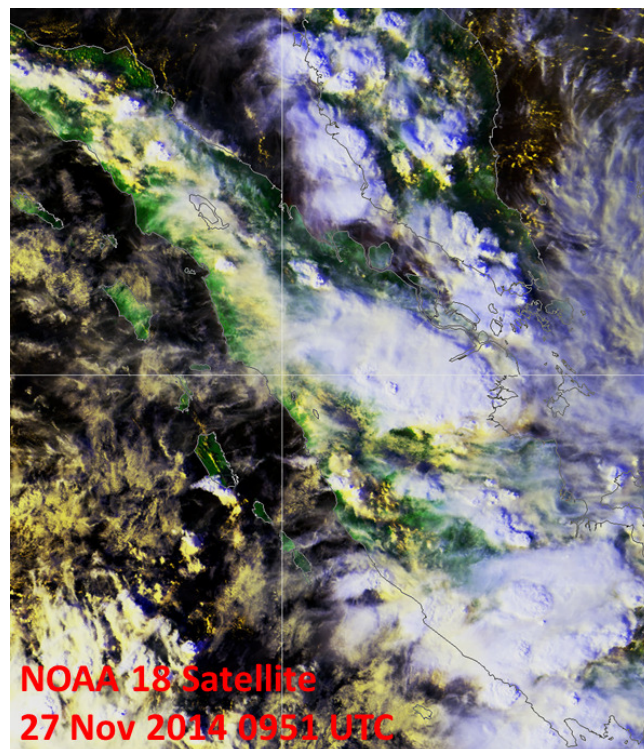


**Fig. 2B: NOAA-18 satellite picture on 4 November 2014 shows scattered hotspots with smoke plumes and moderate smoke haze in southern Kalimantan**

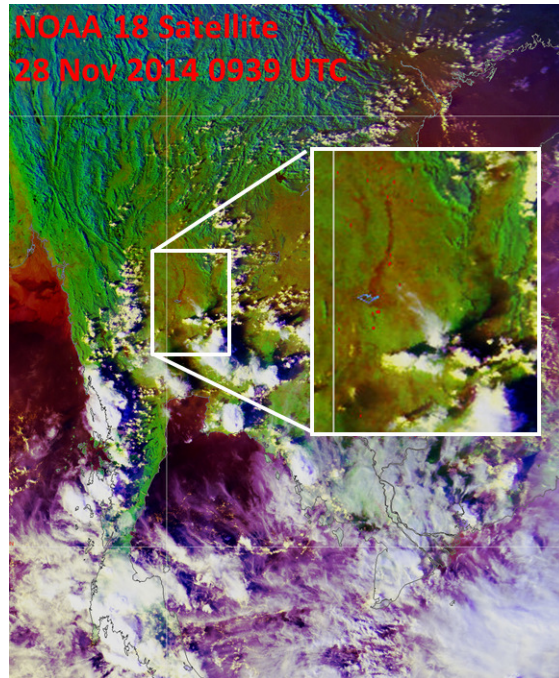




**Fig. 2C: NOAA-18 satellite picture on 26 November 2014 shows few sporadic hotspot activities in Borneo with the increase in showers**

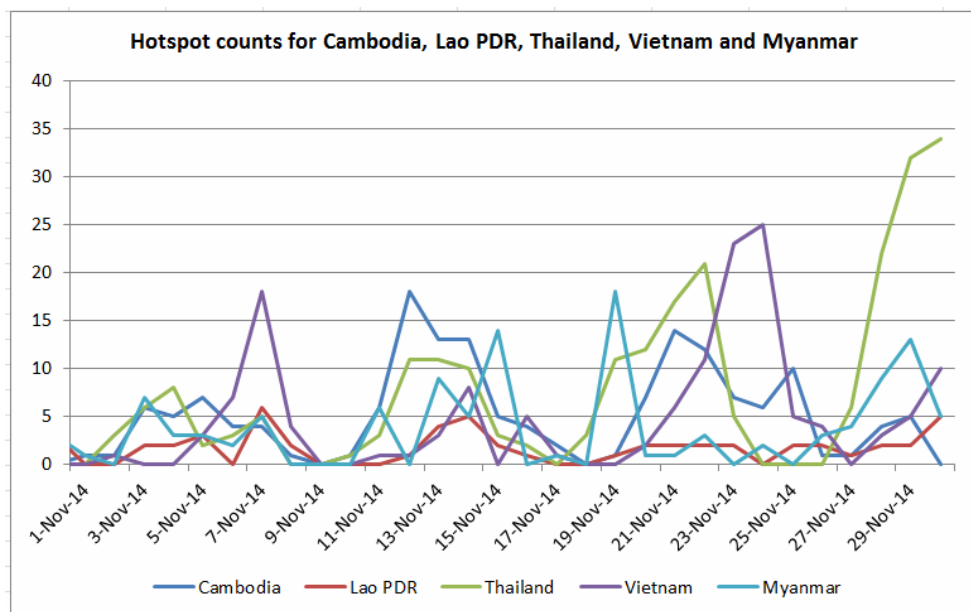


**Fig. 2D: NOAA-18 satellite picture on 27 November 2014 shows subdued hotspot activities in Sumatra due to the return of shower activities**

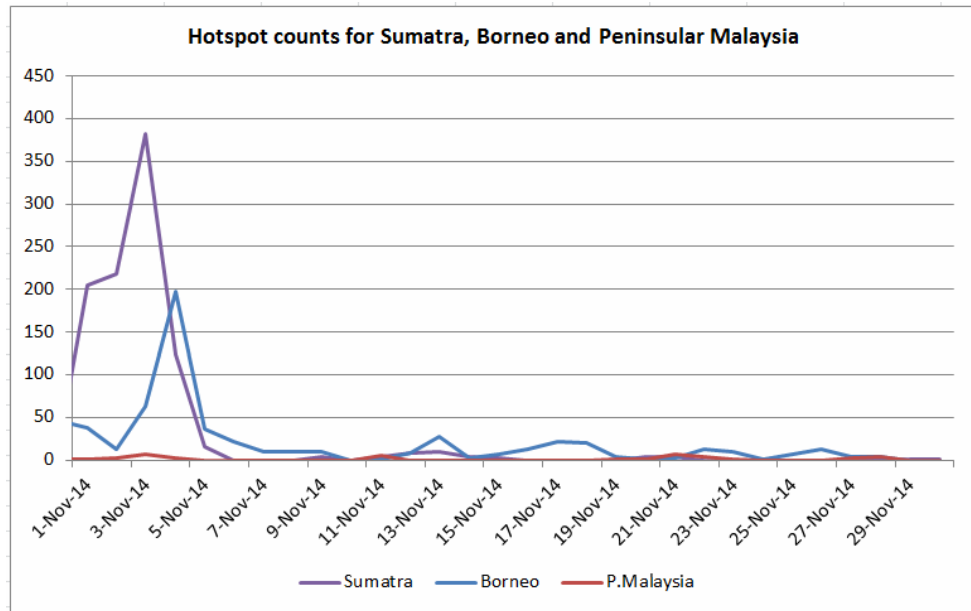


**Fig. 2E: NOAA-18 satellite picture on 28 November 2014 shows the emergence of hotspots in the northern ASEAN region**

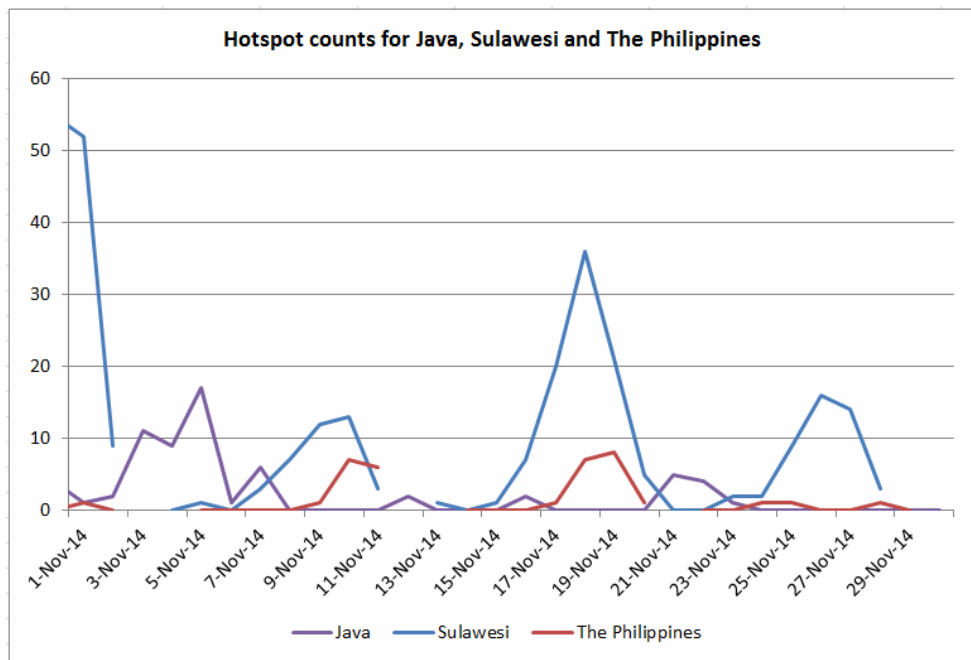
2.3 The hotspot charts for November 2014 for  
 a) Cambodia, Myanmar, Thailand, Lao PDR and Vietnam;  
 b) Sumatra, Borneo and Peninsular Malaysia; and  
 c) Java, Sulawesi and the Philippines  
 are shown in Figs. 2F to 2H respectively.



**Fig. 2F: Hotspot Counts in Cambodia, Lao PDR, Thailand, Vietnam, Myanmar for November 2014**



**Fig 2G: Hotspot Counts in Sumatra, Borneo and Peninsular Malaysia for November 2014**



**Fig. 2H: Hotspot Counts in Java, Sulawesi, Philippines for November 2014**

### 3. Status of El Niño/La Niña\*

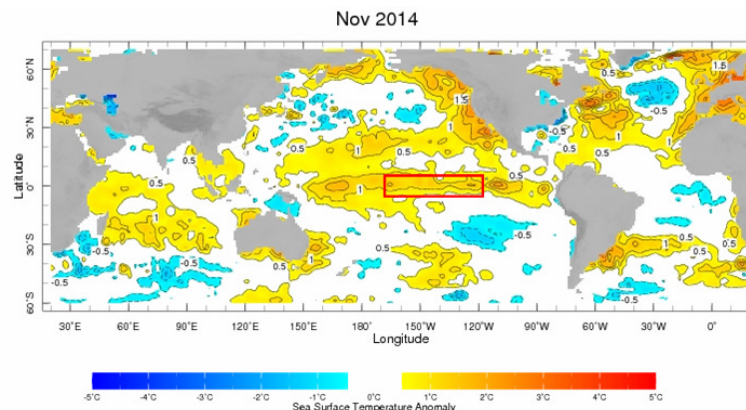
3.1 The past two months have seen steady warming of the tropical Pacific Ocean resulting in the sea-surface temperatures (SST) reaching weak El Niño levels (Fig. 3A and Fig. 3B). However the atmosphere above it has yet to respond fully, with only some atmospheric indicators (e.g. large-scale change in upper and low level winds) reaching El Niño levels. As other indicators of atmospheric response to El Niño such as cloudiness and rainfall are still within neutral thresholds, the El Niño Southern Oscillation (ENSO) is not yet considered to be fully established.

3.2 Climate model outlook (Fig. 3C) and expert assessment suggest further intensification of conditions likely. As such, El Niño is predicted to become fully established before the end of February 2015 with about 70% chance of a weak El Niño event occurring (Fig. 3D).

3.3 Typically the impact from El Niño for the Southeast Asia region is drier than average rainfall conditions, especially for the southern and eastern parts during June to October (Fig. 3E). More locally-specific impact differs from place to place and for different seasons.

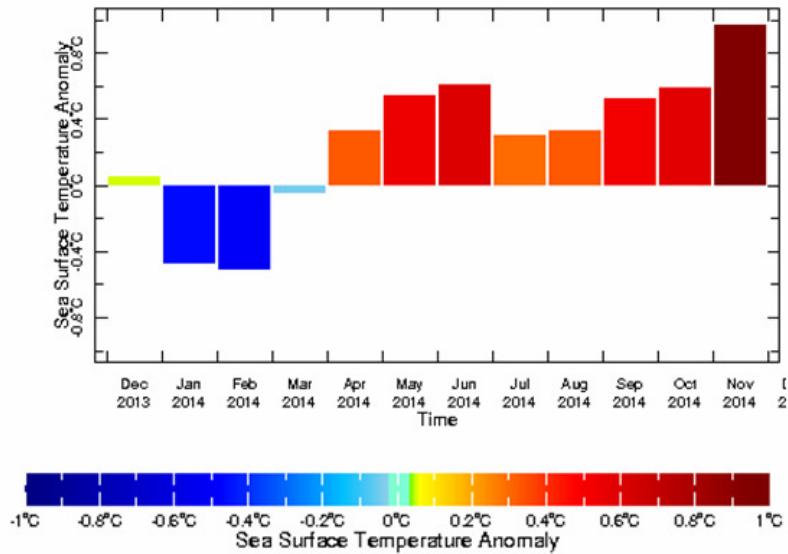
3.4 As we are within the Northeast Monsoon season (Dec – Feb), where El Niño is not known to have much impact on the western part of the Maritime Continent (Fig. 3F), the possibility of a weak El Niño developing in the next one to two months do not pose significant risks of extended periods of drier and warmer conditions in this part of Southeast Asia.

\* For El Niño/La Niña updates, ASMC assesses information provided by the World Meteorological Organization (WMO) and various international climate centres, such as the Climate Prediction Center (CPC) US, the Bureau of Meteorology (BoM) Australia, as well information from the International Research Institute for Climate and Society (IRI) which contains model outputs from various other centres around the world. For more information on El Niño/La Niña, please refer to the [FAQs website](#).

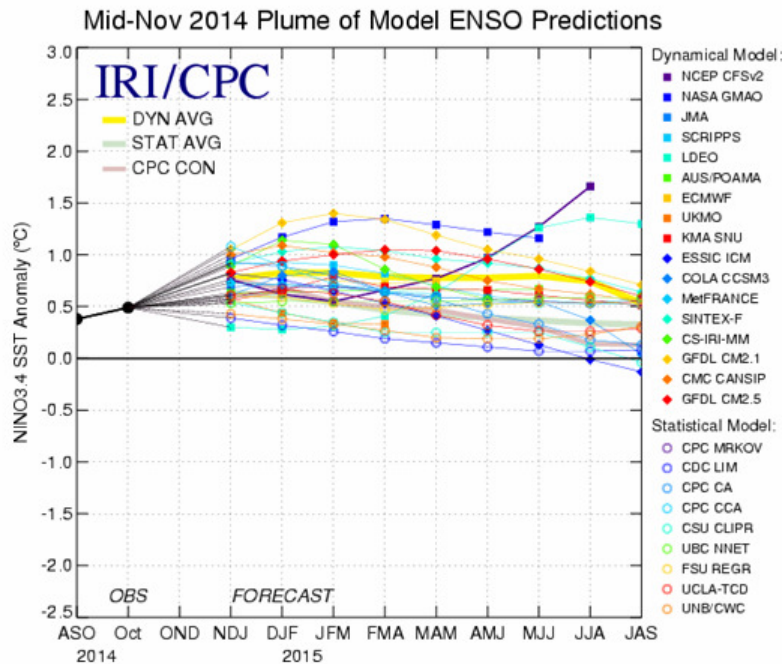


**Fig. 3A: Warming of the tropical Pacific Ocean is sustained over the Niño3.4 region (red box, 120°W-170°W and 5°S-5°N) for November (image credit: IRI Map Room). Yellow shades show regions of relative warming, while blue shades show regions of relative cooling with respect to 1971-2000 climatology for that month.**



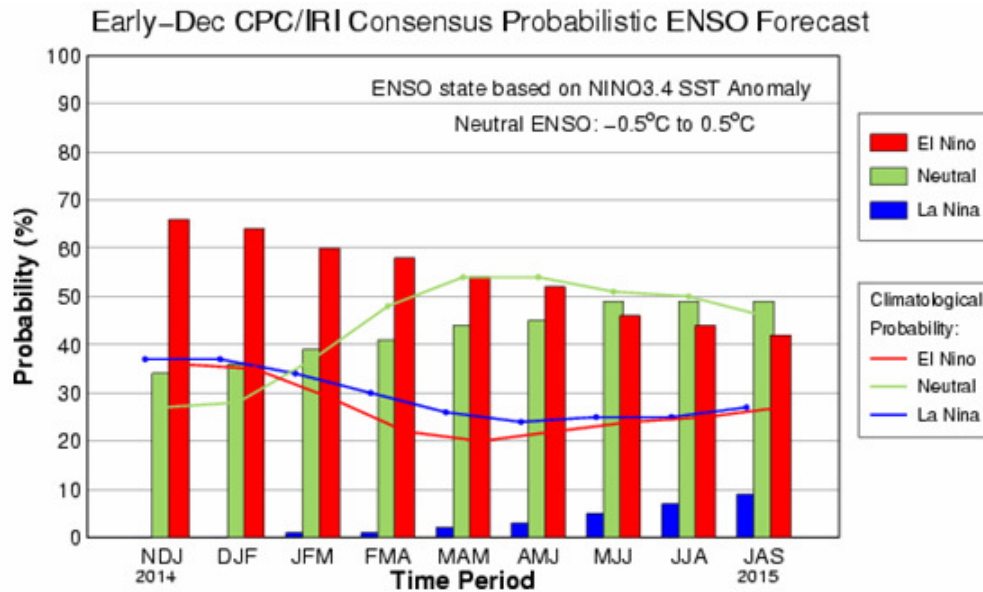


**Fig. 3B: Monthly sea-surface temperature anomaly over the tropical Pacific Ocean over the Niño3.4 region (120°W-170°W and 5°S-5°N) from December 2013 (bottom) to November 2014 (top) (image credit: IRI Map Room). Sustained warming has been observed since April 2014 (red box). It is only recently that the 3-month average value has hit above 0.5, which is a threshold set to indicate El Niño conditions.**

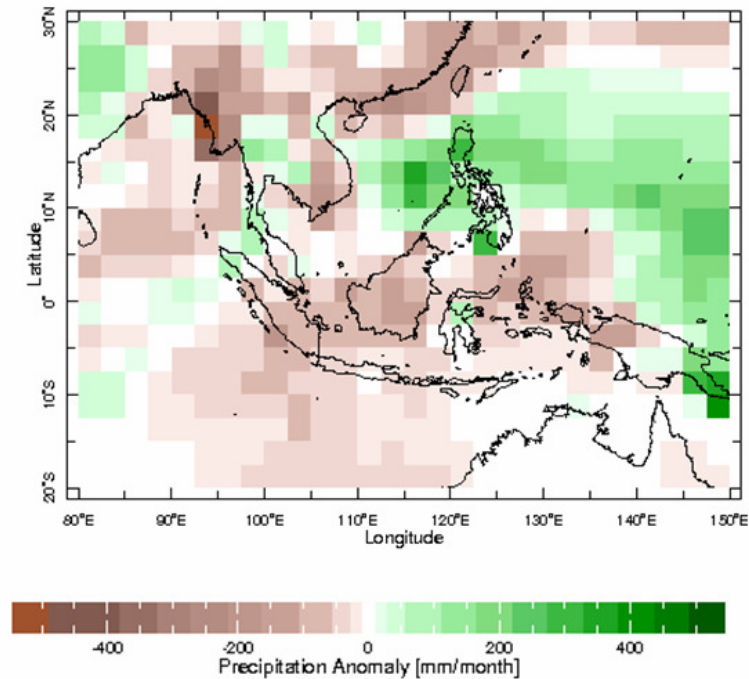


**Fig. 3C: Forecasts of El Niño strength (in terms of the Niño3.4 index) for the remaining 3-month season of 2014 and 1st half of 2015 from various seasonal prediction models of international climate centres. Temperature anomalies above 0.5°C indicate El Niño conditions, below -0.5°C indicate La Niña conditions, and in between indicate neutral conditions, i.e. neither El Niño nor La Niña. Model outlooks and expert opinions suggest a weak El Niño strength to be likely if it occurs (image credit: IRI-CPC).**

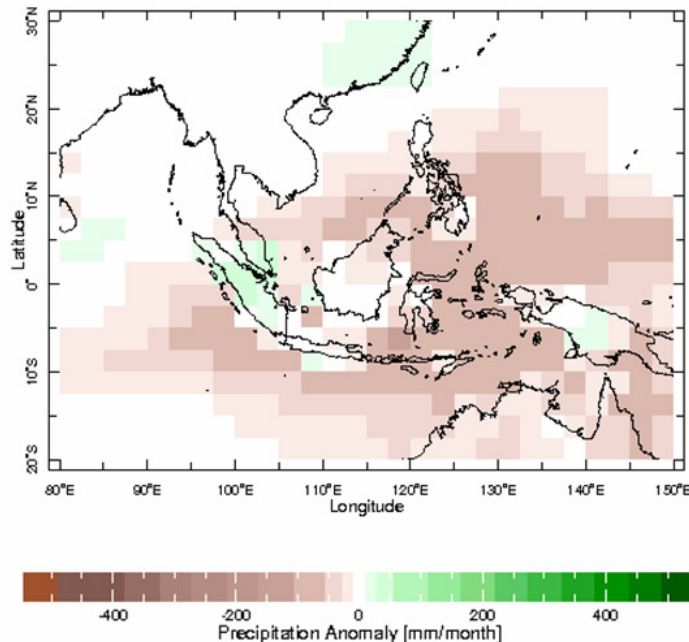




**Fig. 3D:** Probability of El Niño (red), La Niña (blue) and neutral conditions (green) in the remaining 3-month season of 2014 and 1st half of 2015. For DJF (December-February) season, there is over 60% chance of El Niño developing based on the percentage of models showing El Niño conditions (image credit: IRI-CPC).



**Fig. 3E:** June to October rainfall anomaly composite for El Niño years (1982, 1986, 1987, 1991, 1994, 1997, 2002, 2004, 2006, and 2009) showing drier than average conditions (brown shades) mostly in the southern half of the region (image credit: IRI Data Library).



**Figure 3F: December to February rainfall anomaly composite for El Niño years (1982, 1986, 1987, 1991, 1994, 1997, 2002, 2004, 2006, and 2009) showing drier than average conditions (brown shades) constrained to mostly the southern and eastern Maritime Continent (image credit: IRI Data Library).**

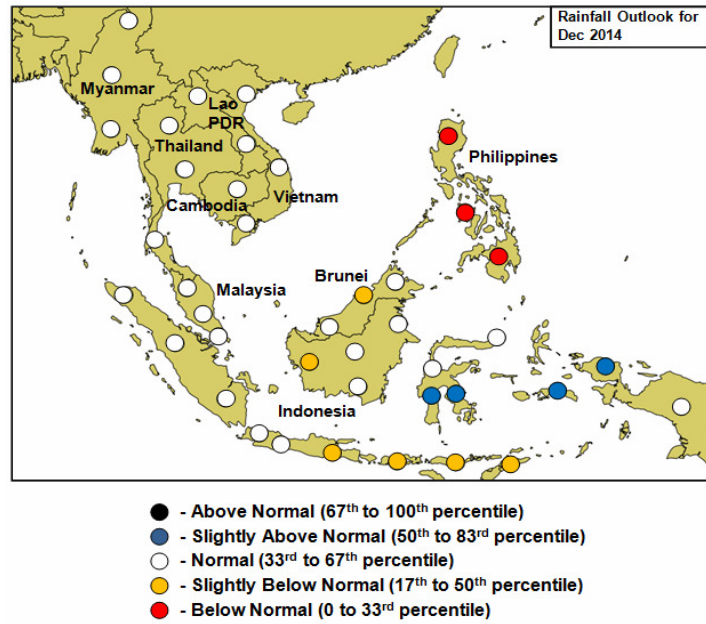
## 4. Outlook

4.1 The prevailing Northeast Monsoon conditions are expected to become more established in the coming weeks.

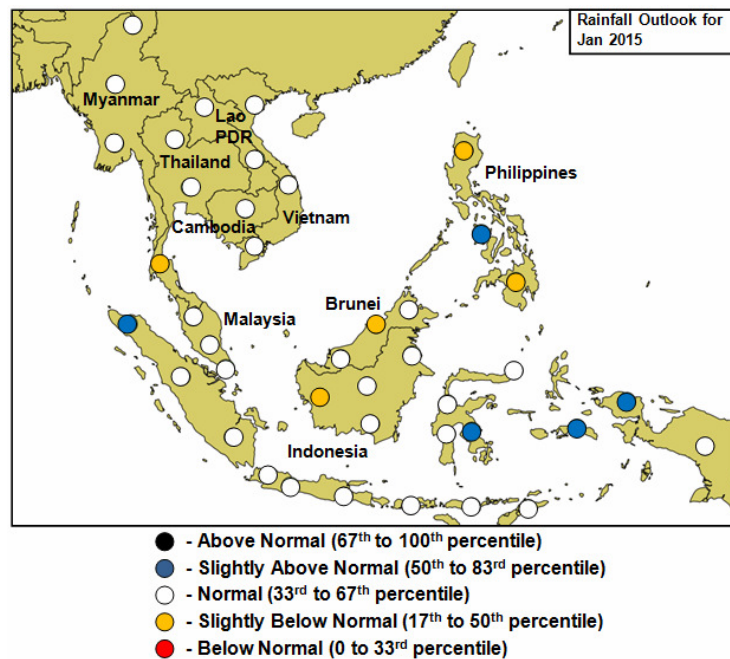
4.2 In the southern ASEAN region, the traditional wet season is expected to persist into early 2015. During the rainy season, the southern ASEAN region can expect a few spells of prolonged moderate to heavy rain with occasional windy conditions. In the northern ASEAN region, cooler and drier conditions are expected over the next few months as the traditional dry season becomes established.

4.3 The shower activities in the southern ASEAN region is expected to subdue hotspot activities, in particular over Sumatra and Borneo. Due to wetter weather conditions expected for the next few months, the likelihood of transboundary haze affecting the southern ASEAN region is low. For the northern ASEAN region, drier weather conditions over the next few months could lead to a gradual increase in the hotspot activities in the Mekong sub-region.

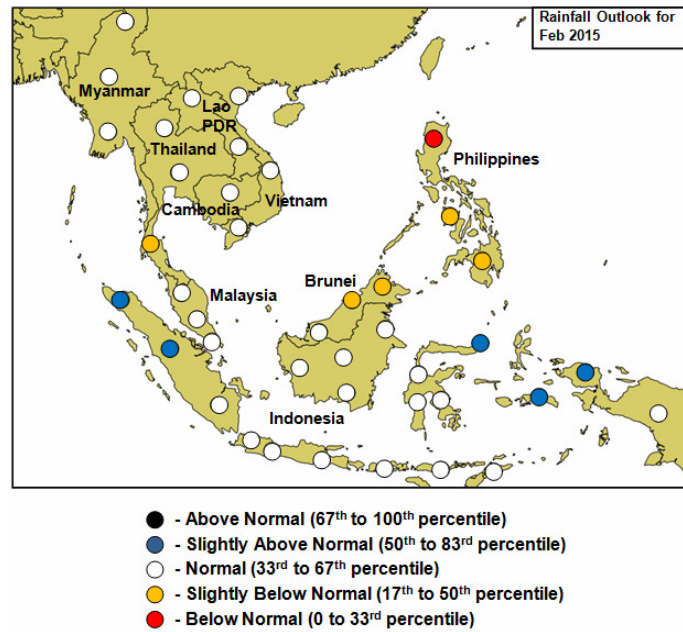
4.4 Many parts of the ASEAN region can expect slightly below average to slightly above average rainfall during the December-January-February period, except for the Philippines where slightly below to below average rainfall is expected for December 2014 and February 2015. The rainfall outlook for the ASEAN region for December 2014 to February 2015 is shown in Figs. 4A – 4C.



**Fig. 4A: Rainfall Outlook for the ASEAN Region (Dec 2014)**



**Fig. 4B: Rainfall Outlook for the ASEAN Region (Jan 2015)**



**Fig. 4C: Rainfall Outlook for the ASEAN Region (Feb 2015)**