SECOND SESSION OF ASEAN CLIMATE OUTLOOK FORUM (ASEANCOF-2)

29 MAY 2014, VIA VIDEOCONFERENCING HOSTED BY
CENTRE FOR CLIMATE RESEARCH SINGAPORE (CCRS),
METEOROLOGICAL SERVICE SINGAPORE (MSS) on behalf of the
ASEAN SPECIALISED METEOROLOGICAL CENTRE (ASMC)

Consensus Statement and Meeting Report for JJA 2014

1. Introduction

The second session of ASEANCOF (ASEANCOF-2) was held via video conferencing hosted by the Centre for Climate Research Singapore (CCRS), of the Meteorological Service Singapore (MSS), on 29 May 2014 from 0600 – 0830 UTC. This was held on behalf of the ASEAN Specialised Meteorological Centre (ASMC) and attended by representatives from the ASEAN countries of Brunei, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

ASEANCOF-2 started with a review of the previous consensus seasonal outlook for DJF 2013 issued in Singapore in December 2013 (Section 2). This was followed by individual presentations from ASEAN countries on their national climate outlooks for JJA 2014 and the bases for such predictions. The Forum then reviewed the current state and predictions of large-scale circulation features such as the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) (Section 3). There were also discussions on the potency of the tropical storm system in the upcoming season. The Global Producing Centres' (GPCs) forecasts for JJA 2014 from the WMO-LC-LRMME (WMO Lead Centre) website were then considered as inputs to the expert assessment leading to the final consensus outlook (Section 4).

Significance of the Southwest (Boreal Summer) Monsoon Season

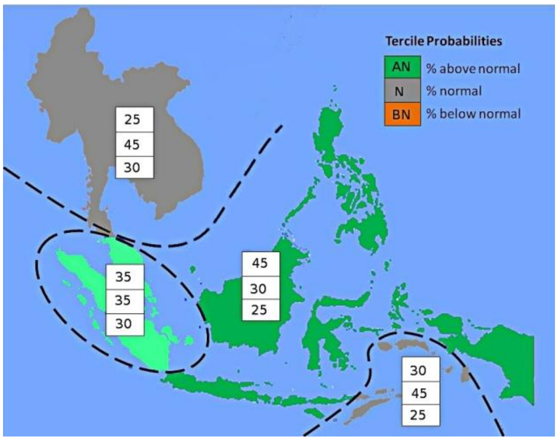
The Southwest Monsoon season is caused by land-sea thermal contrast between the Southeast Asia and the Indian subcontinent landmasses and the surrounding seas, which then brings moist air inflow from the ocean over land. The season is characterised by wet conditions over Mainland Southeast Asia and the Philippines during the period from mid-May to October each year, with the onset and cessation of the season varying based on location (Lau and Yang 1997). Over the Maritime Continent (excluding Philippines), this time of the year is generally described by drier conditions but with significant local variations in the annual cycle due to complex distribution of land, sea and terrain(Chang, et al. 2005). Considering regional socio-economic impacts arising from damaging floods and droughts, the variability and predictability of this season is crucial for the region's natural resources and disaster risk management.

In terms of large-scale circulation features, this season is also the time when tropical cyclones (TCs) become more active (Chan 2005), and during this period TCs contribute partially to the intense rainfall in parts of the region (Nguyen-Thi, et al. 2012, Jiang and Edward 2010). El Niño conditions, which is expected to develop in the second half 2014, also have influence on the weather conditions in the region. During El Niño events, the southern parts of the region tend to get drier, and could lead to droughts and widespread fire activity (van der Werf, et al. 2004). Studies have shown that El Niño also have influence on TC activity in the region (e.g. Wang and Chan 2002; Singh, Khan and Rahman 2000), which makes this season an even more challenging and interesting season to predict.

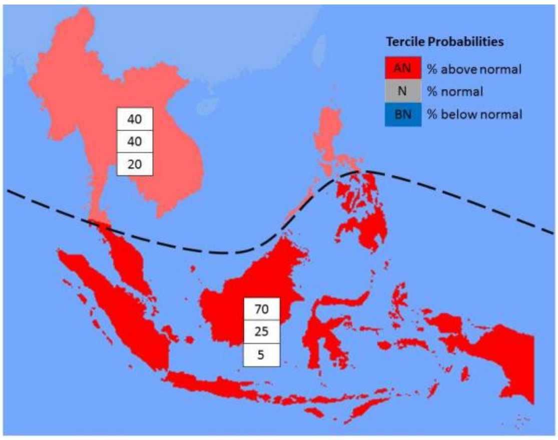
2. Review of DJF 2013 consensus seasonal outlook

Following was the consensus outlook for DJF 2013:

> ***For the upcoming boreal winter (December-January-February) season, normal to above normal rainfall is expected over most of the southern parts of Southeast Asia. On the other hand, over the northern parts of Southeast Asia, which is a climatologically dry region during the Northern Hemisphere winter season, normal to slightly below normal rainfall can be expected.***



> ***Generally, above normal temperature conditions are expected over the whole Southeast Asia region for boreal winter, with enhanced probabilities over the southern parts of the region. Normal to slightly above normal temperature conditions can be expected over northern parts.***



Based on temperature observations from NOAA NCDC (GHCN-M version 3.2.2) (Figure 1), the temperature forecast was correct in capturing the general warming of the region during DJF 2013. The only exception is in the northern part of Mainland Southeast Asia (northern Thailand, Laos and Vietnam) where cooler than average conditions were observed but not captured by the consensus outlook.

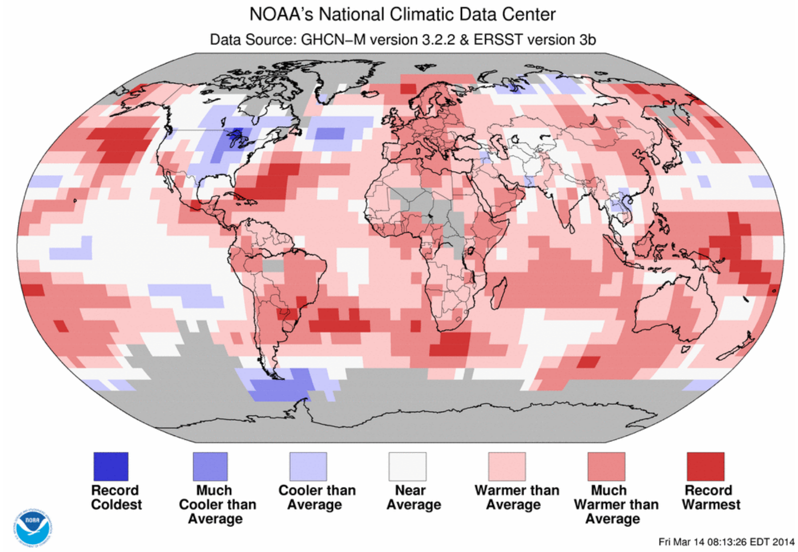


Figure 1: Global land and ocean temperature percentiles for Dec 2013 - Feb 2014 from NOAA NCDC (image credit: NOAA).

For rainfall, the outlook predicted for normal to slightly below normal conditions over Mainland Southeast Asia and this prediction is reasonable based on the near average to drier than average rainfall conditions observed in NOAA's dataset (Figure 2). As other parts of Southeast Asia are not well represented in this dataset, reference is made also to rainfall anomaly charts from IRI Map room (Figure 3). While this is represented in anomaly format and not in percentiles as depicted in the consensus outlook, some indication of normal to above normal rainfall over most of the southern parts of Southeast Asia is observed in the dataset that is broadly consistent with the outlook issued. The only exceptions are over Sulawesi and the western side of Borneo islands where negative rainfall anomaly was observed for DJF 2013.

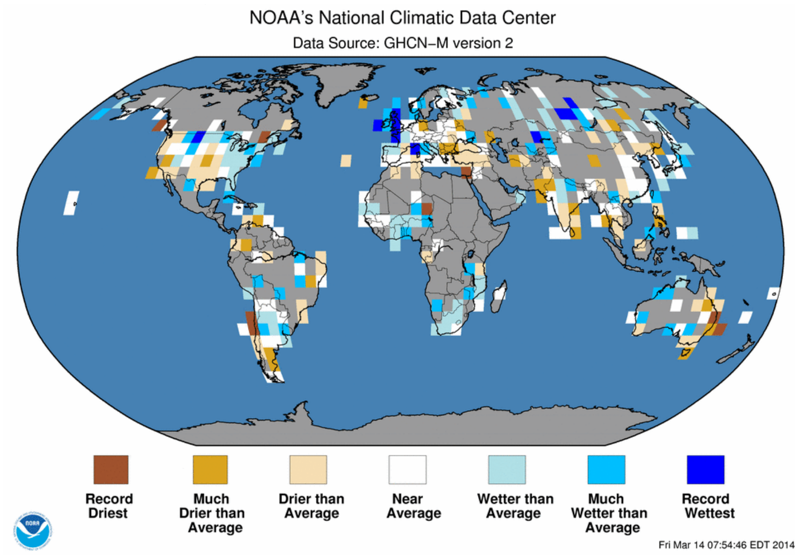


Figure 2: Global land only precipitation percentiles for Dec 2013 - Feb 2014 from NOAA NCDC (image credit: NOAA).

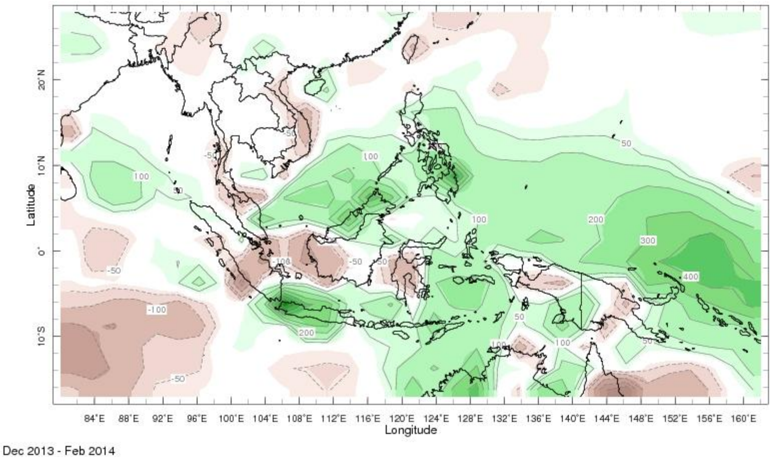


Figure 3: DJF 2013 rainfall anomaly over Southeast Asia based on NOAA NCEP CAMS_OPI dataset (image credit: IRI map)

3. Evaluation of current climate indices

While ENSO-neutral conditions continue, the past few months have seen persistent warming of the sea-surface and sub-surface temperatures across the equatorial Pacific Ocean (Figure 4). These changes are accompanied by low-level (850 hPa) westerly wind anomalies and upper-level (200 hPa) easterly anomalies, as well as consistent increase in cloudiness near the Date Line. Based on these observations and model predictions from various global climate centres, the likelihood of El Niño developing is high during the remainder of the year. If El Niño were to occur, the main impact would be felt in the southern and eastern halves of the region where it would be drier. The impact varies based on location, time of the year, and certainly the strength of the El Niño itself. A majority of the models from the IRI/CPC multi-model forecasts predict weak to moderate El Niño conditions (based on the Niño3.4 index). However, a larger spread of the Niño3.4 values is predicted by the individual members of the models from EUROSIP (Figure 5). The IOD, on the other hand, is expected to remain neutral or slightly positive towards the end of the year (Figure 6) and thus not expected to have any significant impact on regional rainfall or temperature conditions.

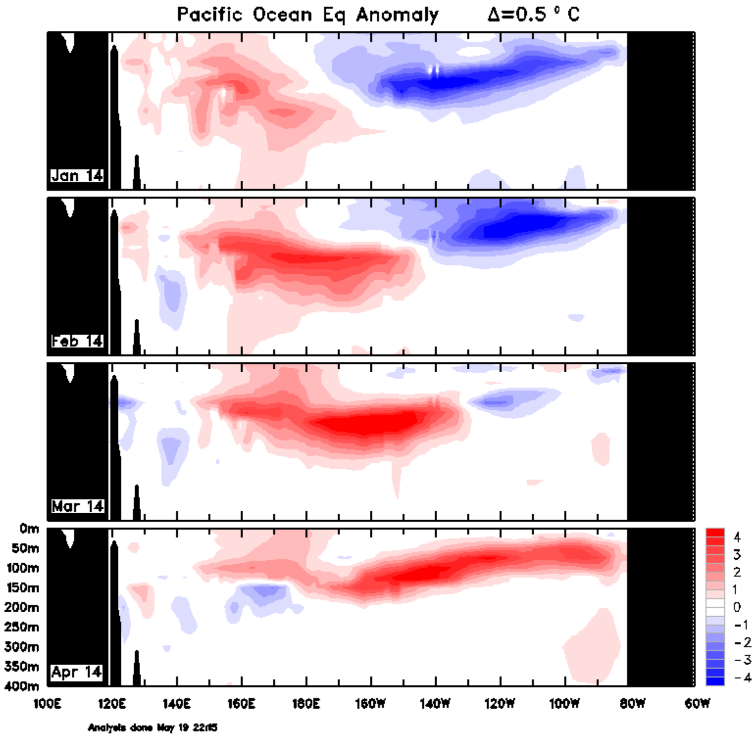


Figure 4: Sub-surface temperature anomalies of the equatorial Pacific Ocean, where warmer than average waters have started to appear in recent months (image credit: [BoM]).

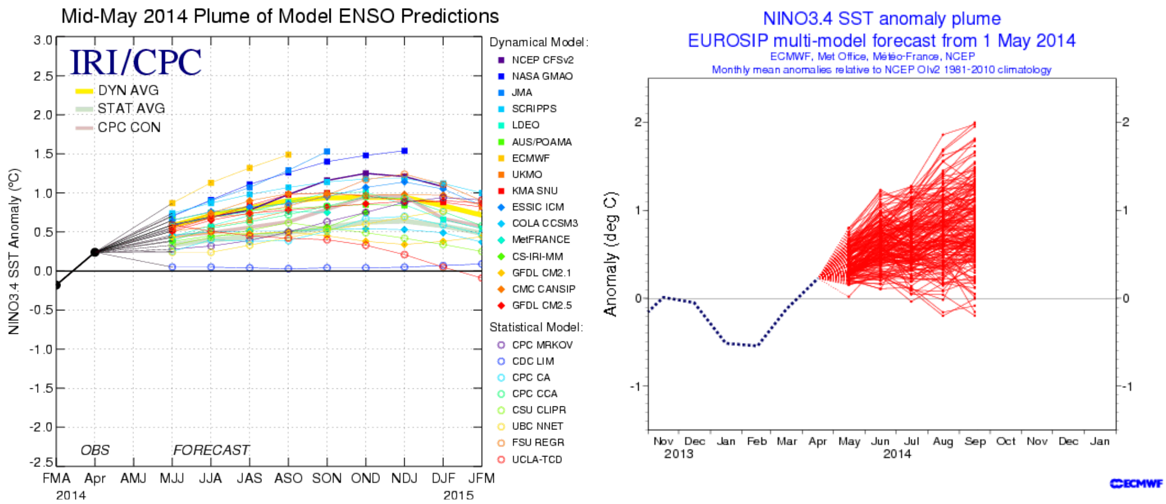


Figure 5: (Left) Multi-model ensemble forecasts of Niño3.4 SST anomaly index indicating values of between 0.5 to slightly above 1.0, i.e. weak to moderate El Niño conditions from IRI/CPC which uses the averages of individual ensemble members in each model (image credit: [IRI/CPC]). (Right) A larger spread of the index is predicted from the EUROSIP multi-model forecasts which use individual ensemble members of the models considered (image credit: [EUROSIP]).

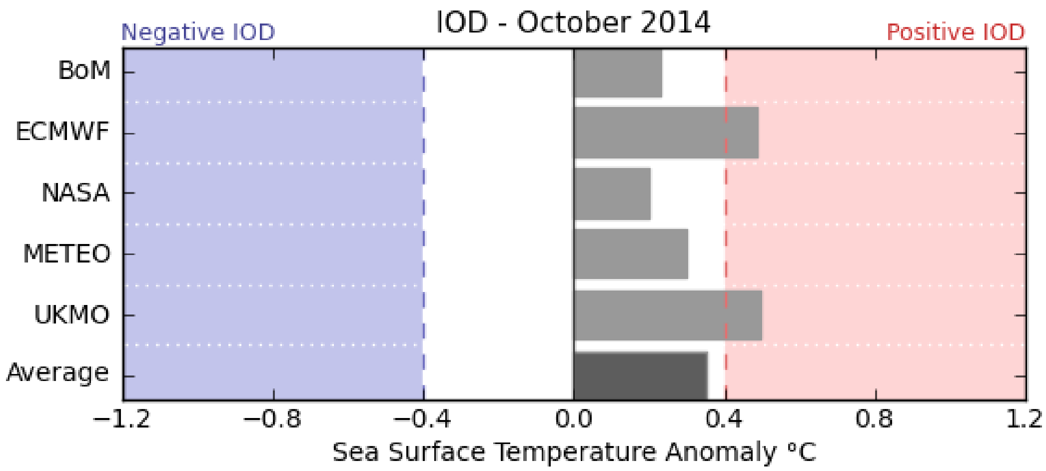


Figure 6: Multi-model ensemble forecasts of IOD index, indicating neutral and slightly positive IOD in general towards the end of 2014 (image credit: BoM).

4. Consensus outlook for the Southwest Monsoon rainfall and temperature over Southeast Asia

Inputs into the consensus outlook include national-level forecasts using dynamical models, statistical models and analogue techniques, as well as the global dynamical forecasts from the WMO-LC-LRFMME. For the June to August period, most models show consistent SST warming over the central and eastern equatorial Pacific Ocean. Some models differ in the SST predictions over the eastern Indian Ocean, notably Tokyo and Washington, in that they predict less warm SST patterns compared to other models such as the ECMWF and Exeter. This difference could possibly explain the slightly different model rainfall response in the forecasts between the different models over Sumatra and Peninsular Malaysia.

The WMO-LC-LRFMME, the APCC, and the IRI multi-model forecasts showed considerable large-scale consistency in rainfall and precipitation over the region, possibly in response to the developing El Niño conditions in the coming months. In general, a majority of the models are predicting below normal rainfall conditions for the southern half of the region. Over the central and eastern parts of Mainland Southeast Asia, there is also some hint of possible drier conditions but the signal is less clear. For the western Pacific region and eastern Bay of Bengal, the models in general predict above normal rainfall conditions. As for temperature, models predict warming of Southeast Asia region, with higher probability of warming occurring for the region covering Peninsular Malaysia, Borneo and Sumatra. These predictions are broadly consistent with the national-level climate outlooks provided. Using these forecasts as a basis, and incorporating national-level outlooks, the following forecasts were drafted and then finalised following email exchanges. The forecasts, with tercile probabilities assigned, are illustrated in Figure 7 and Figure 8 below.

For the upcoming Southwest Summer Monsoon (June-July-August) season, normal to below normal rainfall is expected over most of the southern parts of Southeast Asia as well as the central and eastern parts of Mainland Southeast Asia. Elsewhere, generally normal to above normal rainfall can be expected.

Above normal temperature conditions are generally expected over the whole Southeast Asia region for summer monsoon, with higher probabilities of above normal temperature over the southern parts of the region.

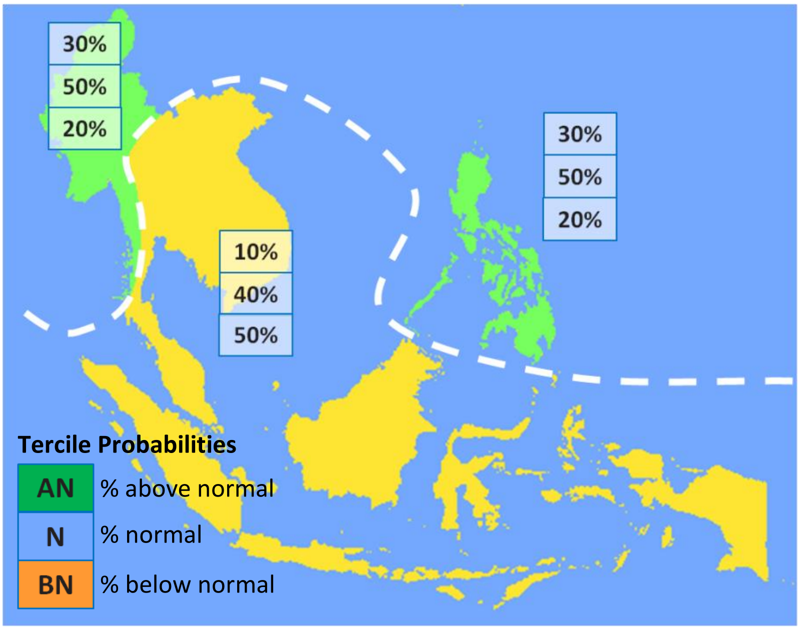


Figure 7: Consensus rainfall outlook for June 2014 to August 2014 over Southeast Asia.

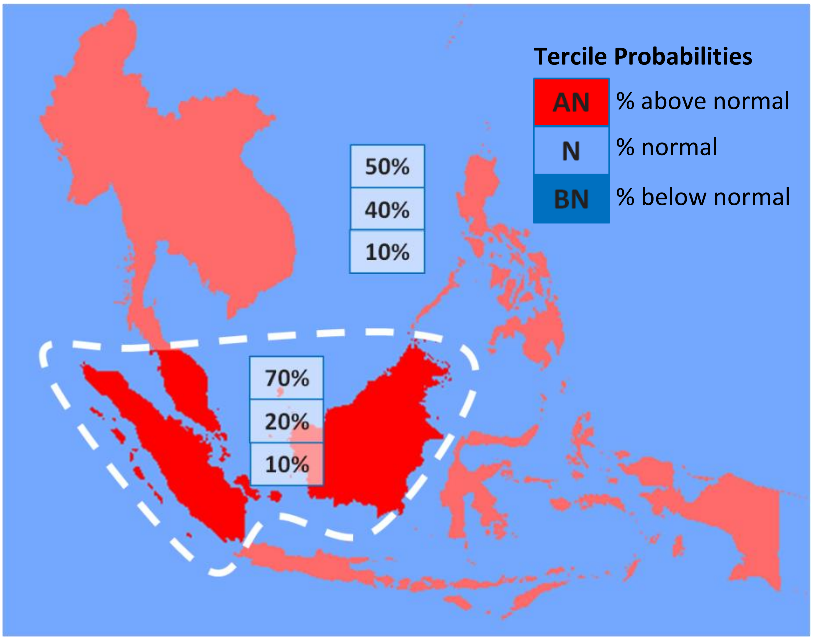


Figure 8: Consensus surface temperature outlook for June 2014 to August 2014 over Southeast Asia.

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