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வளிமண்டலவியல் திணைக்களம்
DEPARTMENT OF METEOROLOGY
இலங்கை இலங்கை SRI LANKA

Consensus Seasonal Weather Outlook
April, May and June (AMJ)
Seasonal Rainfall for Sri Lanka

This forecast was prepared using

- The prevailing global climate conditions.
- Forecasts from different climate models from around the world.
 - Statistical downscaling of GCM output using CPT

Issued by Centre for Climate Change Studies (CCCS)

And

Research Division

(a) Prevailing global climate conditions

ENSO-neutral conditions continued during March, with near-average sea surface temperatures (SSTs) across the central equatorial Pacific and above-average SSTs in the eastern Pacific (Fig. 1). The low-level easterly winds were slightly enhanced over the western tropical Pacific and were weaker than average over the eastern Pacific. Also, upper-level westerly winds were anomalously easterly over portions of the western and eastern Pacific. Overall, the ocean and atmosphere system is consistent with ENSO-neutral conditions.

Most models predict the continuation of ENSO-neutral (3-month average Niño-3.4 index between -0.5°C and 0.5°C) through the early Northern Hemisphere summer (May-July; Fig. 3). Thereafter, there are increasing odds for El Niño toward the second half of 2017 (50-55% chance from approximately July-December). In summary, ENSO-neutral conditions are favored to continue through at least the Northern Hemisphere spring 2017, with increasing chances for El Niño development into the fall (www.cpc.ncep.noaa.gov).

Recent forecasts from coupled models suggest neutral IOD conditions to continue during the April and June 2017 (Fig 3 lower).

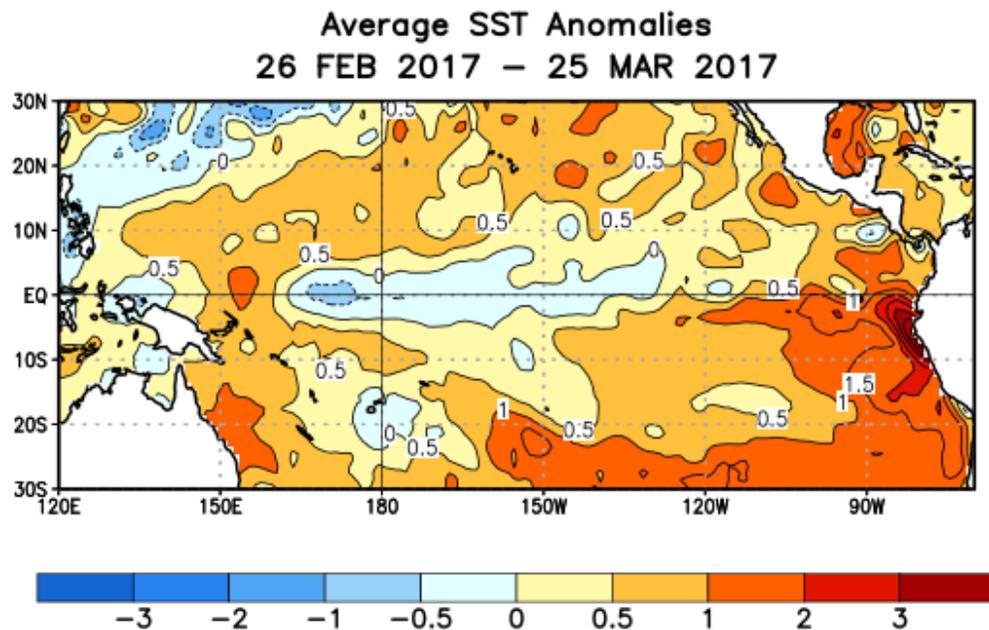


Fig 1: Observed Average sea surface temperature (SST) anomalies ($^{\circ}\text{C}$)

Weekly SST Anomalies (DEG C)

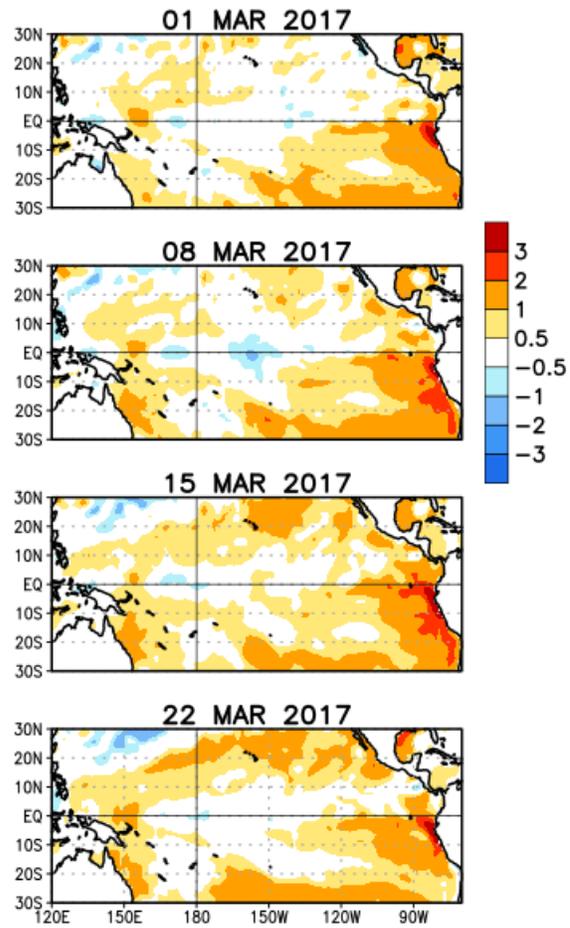


Fig 2 :Weekly Observed Average sea surface temperature (SST) anomalies (°C)

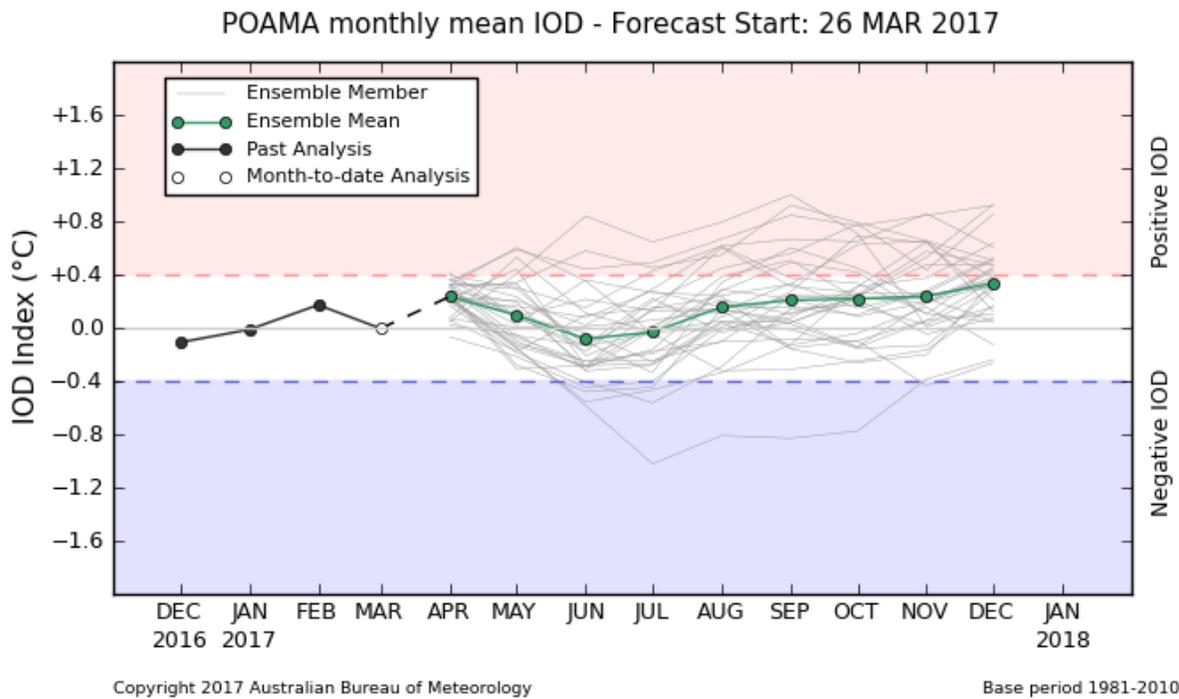
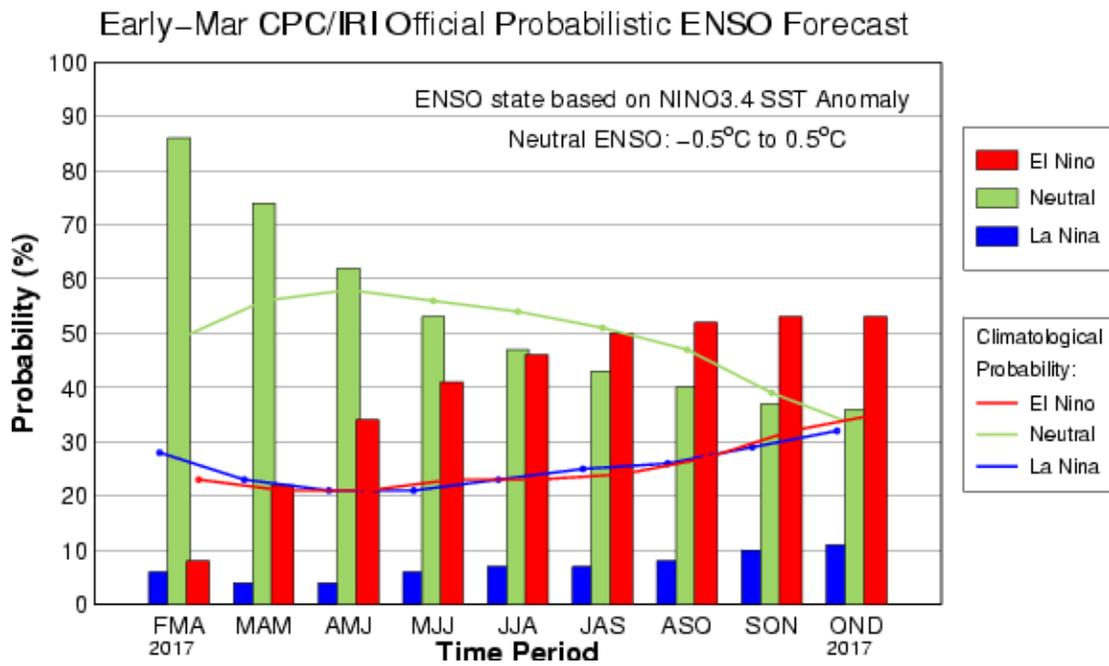


Fig 3: ENSO forecast from Climate Prediction Center (CPC)/ IRI Forecast(above) andIOD forecast from Australian Bureau of Meteorology (below).

(b) Forecasts from different climate models from around the world.

(b.1) For AMJ season

Figure 4 shows the probabilistic multi model ensemble forecast using dynamical models from 12 global producing centers (GPC) for AMJ season. There is higher probability of receiving below normal rainfall for AMJ season over Sri Lanka (Fig. 4). Out of 12 GPC individual forecasts 8 GPC forecasts give below normal rainfall (Fig 5). Two GPC forecasts give above normal rainfall and there is no signal for AMJ season over Sri Lanka from 2 GPC forecast outputs..

Probabilistic Multi-Model Ensemble Forecast

/GPC_seoul/GPC_washington/GPC_tokyo/GPC_exeter/GPC_moscow/GPC_beijing
/GPC_melbourne/GPC_pretoria/GPC_montreal/GPC_ecmwf

Precipitation : AMJ2017

(issued on Mar2017)

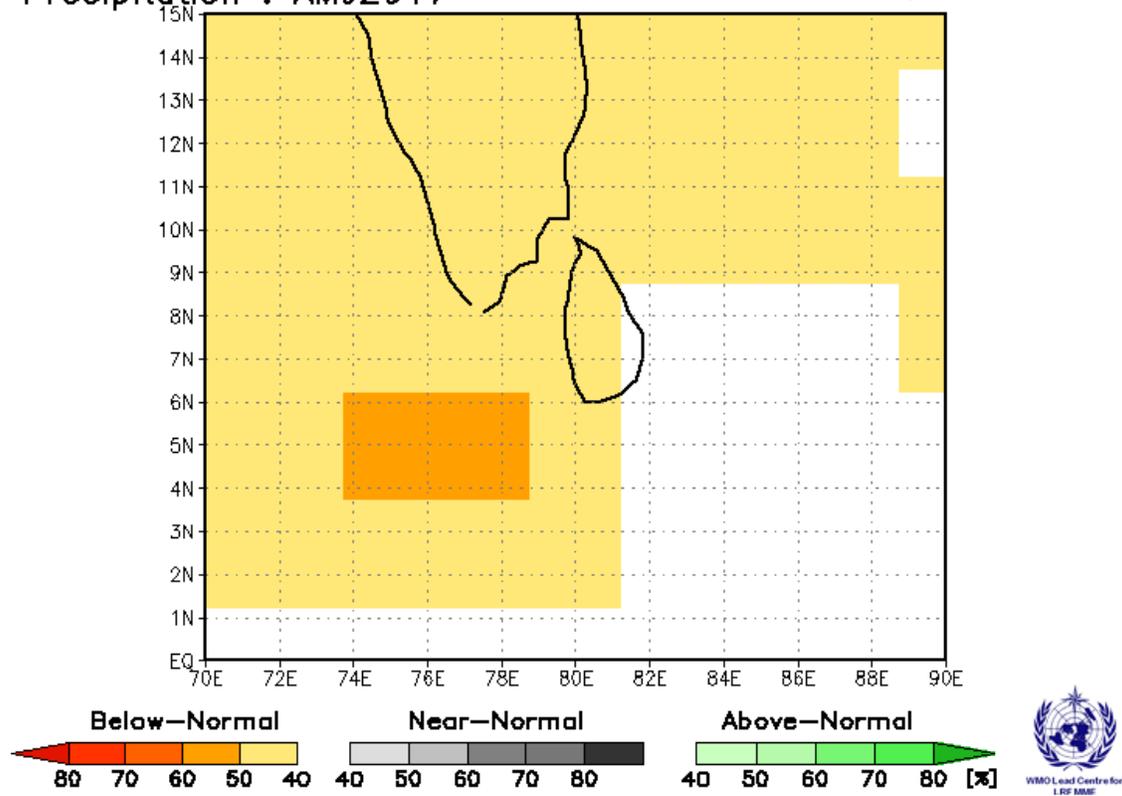


Fig 4 : Probabilistic multi model ensemble forecast for AMJ using dynamical models from 10 WMO global producing centers (GPC).

lat=0 15
lon=70 90

Precipitation : AMJ2017

(issued on Mar2017) [Unit: mm/day]

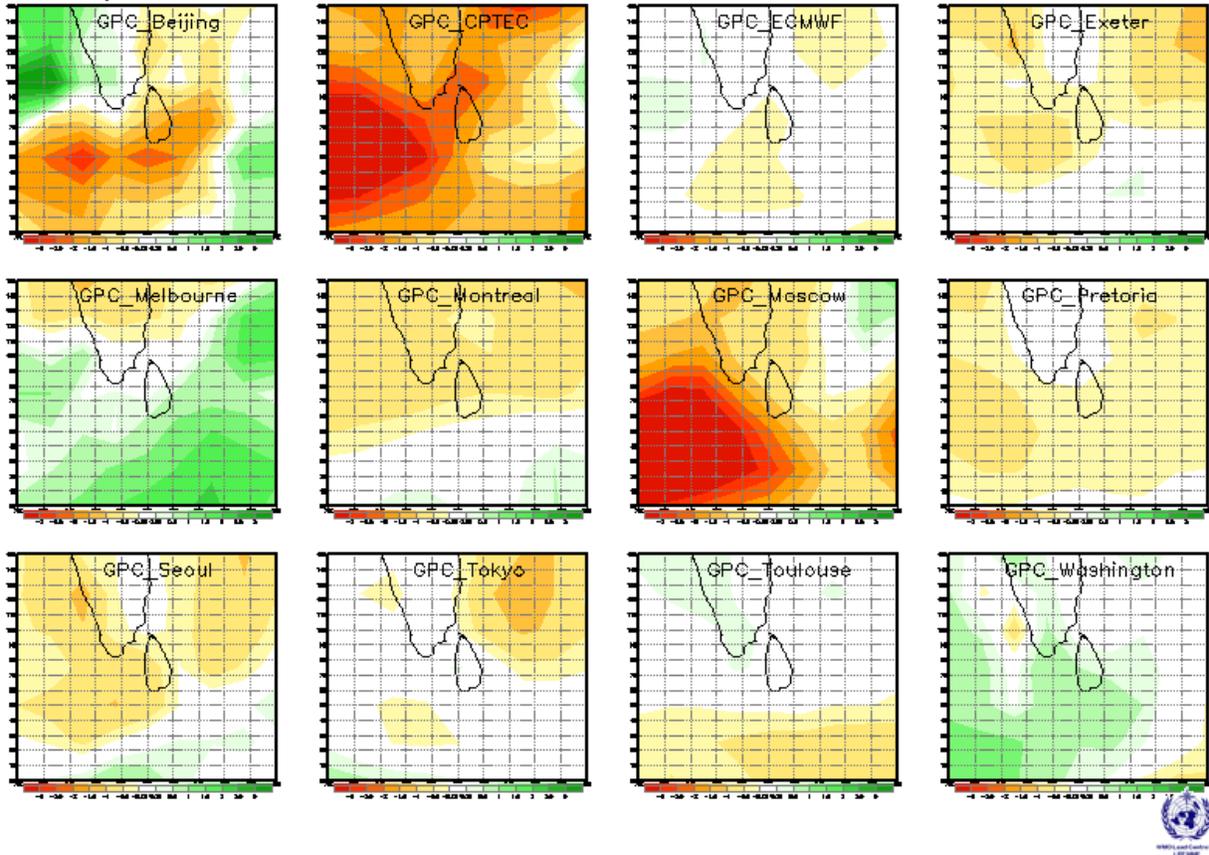


Fig 5 : Individual forecast for AMJ season by dynamical models from 12 WMO global producing centers (GPC).

(a.2) Forecast for April, May and June 2017

Figure 6 shows the probabilistic multi model ensemble forecast using dynamical models from 12 global producing centers (GPC) for, April, May and June 2017. There is a higher probability of receiving below normal rainfall for month of April, and May and there is no signal for June 2017 for Sri Lanka (Fig 6). It indicates that there are equal chances of receiving below normal, near normal and above normal rainfall for June 2017.

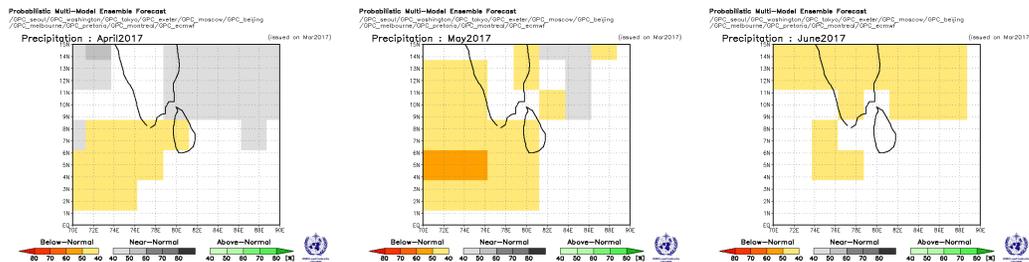


Fig 6: Probabilistic multi model ensemble forecast for April (left), May (middle) and June 2017 (right) using dynamical models from 10 WMO global producing centers (GPC).

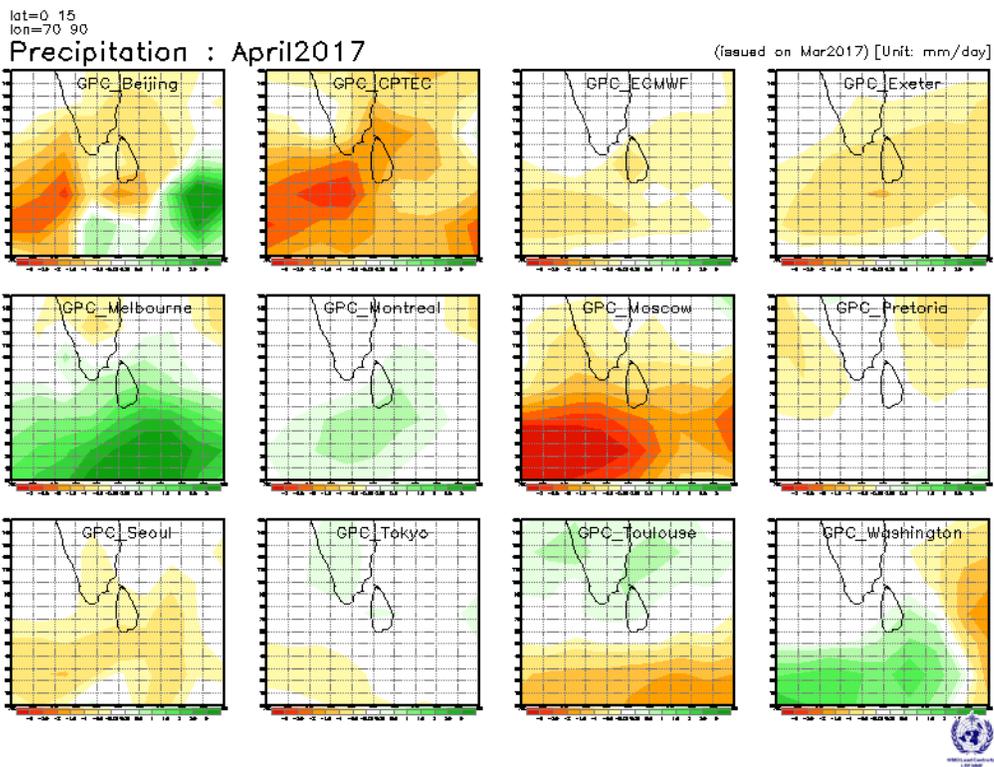


Fig 7 : Individual forecast for April 2017 by dynamical models from 12 WMO global producing centers (GPC).

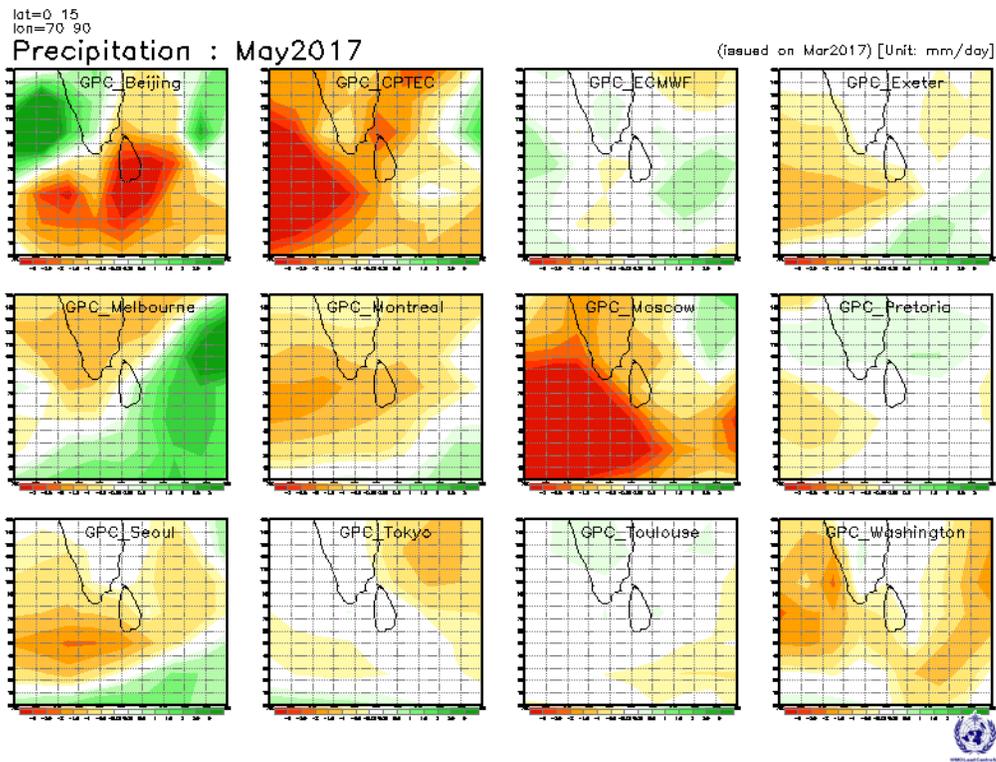


Fig 8 : Individual forecast for May 2017 by dynamical models from 12 WMO global producing centers (GPC).

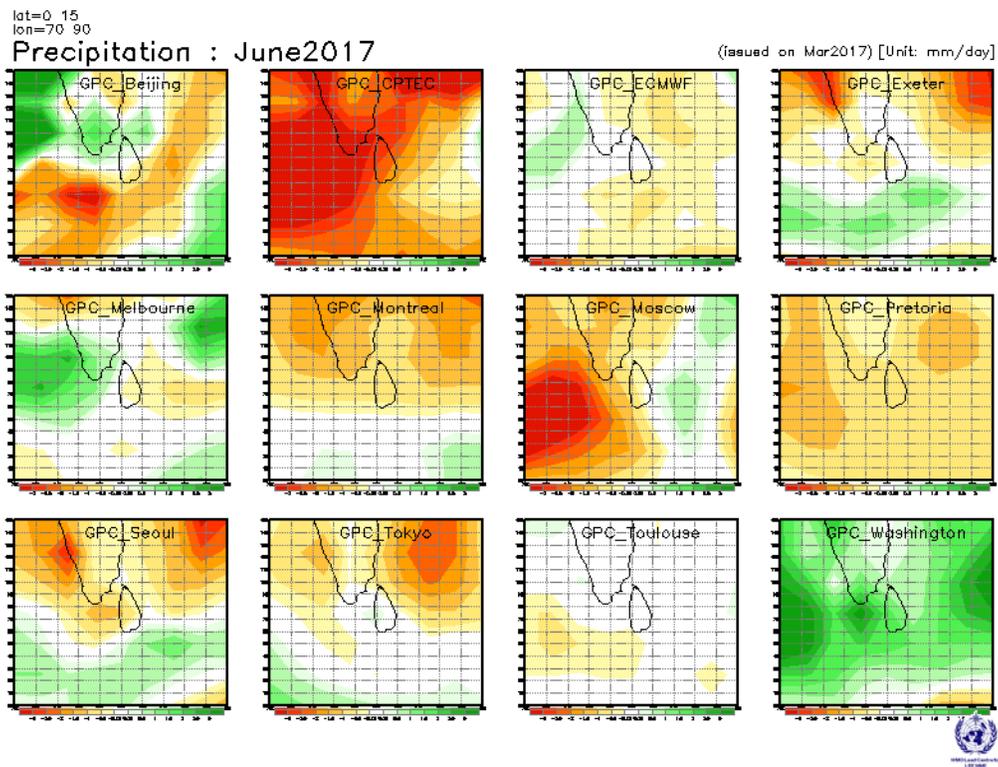


Fig 9 : Individual forecast for June 2017 by dynamical models from 12 WMO global producing centers (GPC).

Figures 7, 8 and 9 show the probabilistic forecast from individual global producing centers (GPC) centers for April, May and June 2017 respectively. Out of 12 GPC forecasts 6 GPC forecasts provide below normal rainfall, for April (Fig 7). There is no signal for April over Sri Lanka from 2 GPC forecast outputs. Six GPC forecasts provide above normal rainfall for April. Accordingly below normal rainfall can be expected for April.

Out of 12 GPC forecasts 7 GPC forecasts give below normal rainfall for May 2017 (Fig 8). Out of 12 GPC forecasts 1 GPC forecasts provide above normal rainfall, for May 2017. There is no signal for May 2017 over Sri Lanka from 4 GPC forecast outputs. Accordingly below normal rainfall can be expected for May 2017.

Out of 12 GPC forecasts 5 GPC forecasts give below normal rainfall for June 2017 (Fig 9). Only 1 GPC forecasts give above normal rainfall for June 2017. There is no signal for June 2017 over Sri Lanka from 6 GPC forecast outputs. Accordingly there is no signal for June 2017.

(c) Statistical downscaling of CFSv2 global forecast output

(c.1) Probabilistic Forecast for AMJ season2017 using Climate Predictability tool (CPT)

The probabilistic rainfall forecast for AMJ 2017 for Sri Lanka by downscaling CFSv2 SST using CPT is given below.

The district wise average rainfall is given in the column 2 of the table 1. Chance (probability) of receiving below/about/above average is given in the columns 3, 4, and 5 respectively in the table 1. Colombo, Kalutara, Galle, Matara, Gampaha, Puttalam, Kurunegala, Kegalle, Ratnapura, and Kandy districts have more chance (higher probability) of receiving slightly below average rainfall during AMJ season 2017. There is a probability of receiving slightly above average rainfall for all other districts during AMJ 2017.

District	Average rainfall (mm) –AMJ	Probability %		
		Below	Normal	Above
Colombo	942.5	50	25	25
Kalutara	1233.9	50	25	25
Galle	1019.5	50	25	25
Matara	763.9	50	25	25
Hambantota	245.9	25	25	50
Ampara	167.8	25	25	50
Batticaloa	144.0	25	25	50
Trincomalee	144.8	25	25	50
Mullaithivu	150.7	25	25	50
Jaffna	98.5	30	25	45
Killinochchi	121.8	25	25	50
Mannar	166.2	25	25	50
Puttalam	314.1	40	30	30
Gampaha	804.8	50	25	25
Kegalle	1142.6	50	25	25
Ratnapura	939.2	50	25	25
Monaragala	281.8	25	25	50
Badulla	360.7	25	25	50
Pollonnaruwa	197.8	25	25	50
Vavuniya	187.9	25	25	50
Anuradapura	213.8	25	25	50
Kurunegala	434.2	45	25	30
Matale	314.0	25	25	50
Kandy	561.1	45	25	30
Nuwaraeliya	776.2	30	25	45

Table 1

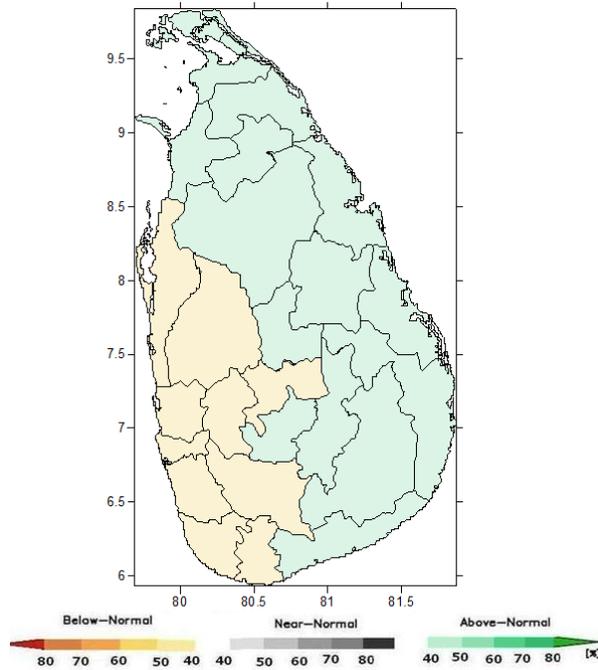


Fig 10. Probabilistic rainfall forecast for April-June2017 using CPT

(d) (c.2) (c.1) **Probabilistic Forecast for AMJ season 2017 using RIMES FOCUS System**

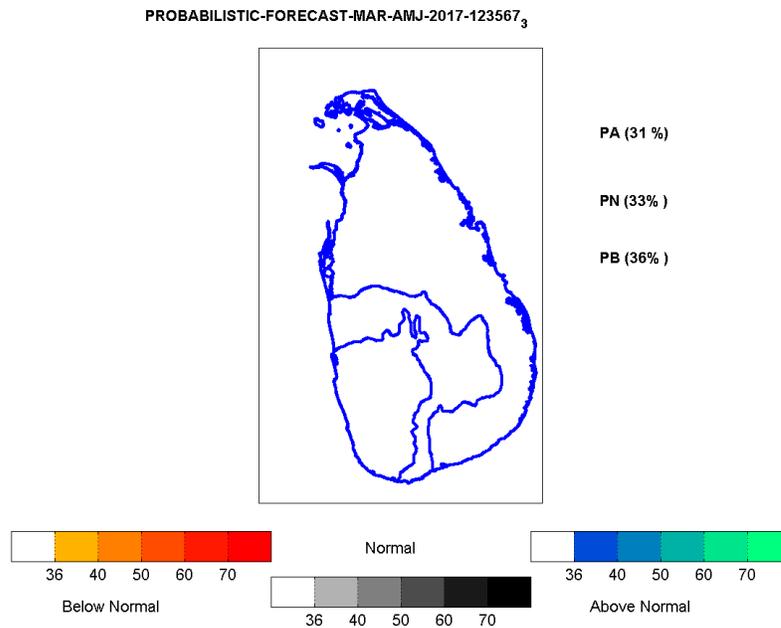


Fig 11. Probabilistic rainfall forecast for April-June2017 using RIMES FOCUS System

The probabilistic rainfall forecast for AMJ 2017 for Sri Lanka by downscaling for 3 climatic zones (Fig 11) indicates no signal for the wet zone, dry zone and intermediate zone.

Summary

SUMMARY of MODEL FORECAST for AMJ season for SRI LANKA					
Season	WMO LC MME	WMO GPC	RIMES FOCUS	CPT	Final
For AMJ season	BN	BN	No Signal	BN Southwest Quarter and Puttalam and Kurunegala Districts, AN elsewhere	BN Southwest Quarter, No signal elsewhere
For April 2016	BN	BN	No Signal	BN	BN
For May 2016	BN	BN			BN
For June 2016	No signal	No signal			Climatological Probability

BN: Below Normal **N:** Normal **AN:** Above Normal **CP:** Climatological Probability

Table 2 : Summary of Model forecasts for Sri Lanka

ENSO-neutral and IOD neutral conditions are predicted during AMJ season.

Global models predict below normal Rainfall for AMJ season 2017. Downscaling of global climate models predicted below average rainfall in Colombo, Kalutara, Galle, Matara, Gampaha, Puttalam, Kurunegala, Kegalle, Ratnapura, and Kandy districts and above average rainfall for all other districts during AMJ 2017 .

Considering prevailing global climatic conditions, and global model predictions, below normal rainfall can be expected in the southwest quarter and in Puttalam, Kurunegala districts and there is no clear signal elsewhere for AMJ season 2017 (Fig 12).

However, the predictability is limited to some extent due to the lower skill in forecasts made at this time of the year and strong day to day atmospheric variability. The seasonal predictability of the AMJ season over Sri Lanka is also influenced by the Madden Julian Oscillation (MJO), which represent the major global scale intraseasonal variability pattern.

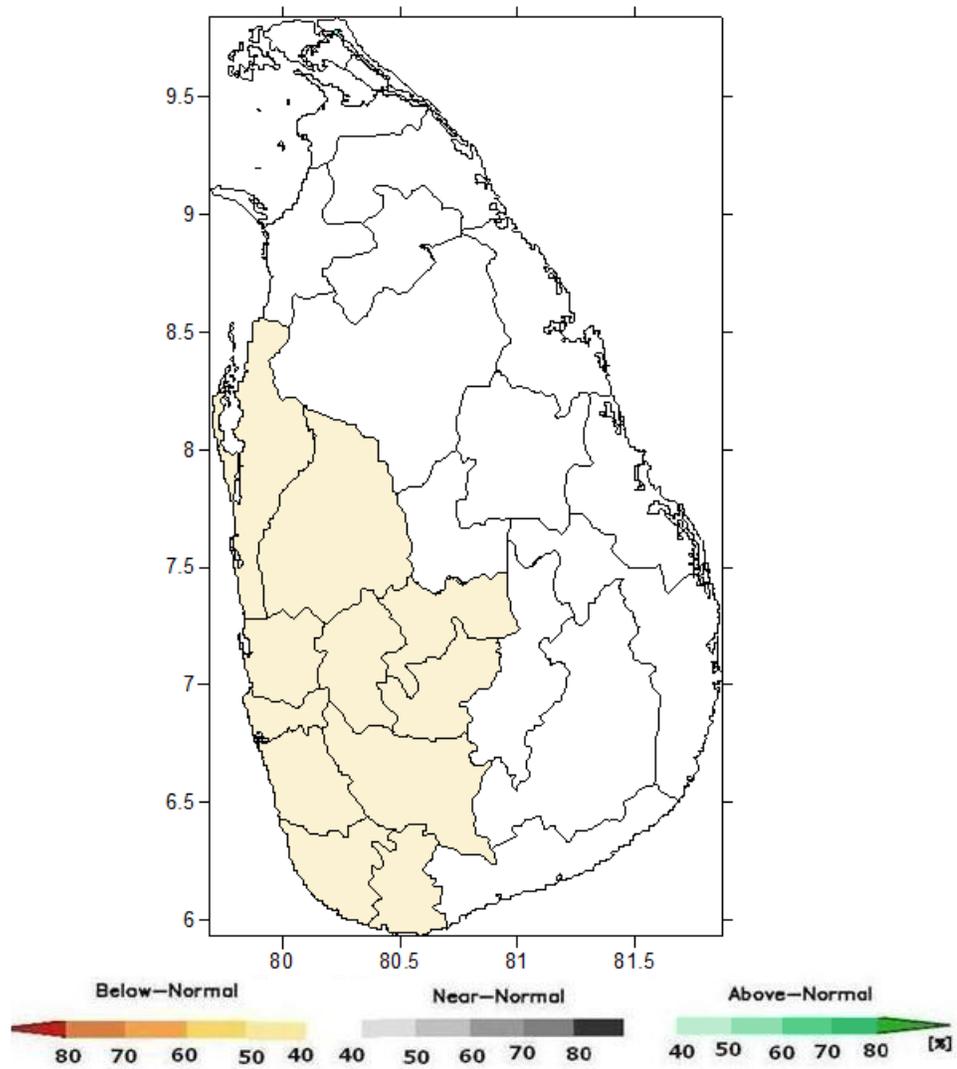


Fig 12. Consensus Probabilistic rainfall forecast for April-June 2017