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வளிமண்டலவியல் திணைக்களம்
DEPARTMENT OF METEOROLOGY
ශ්‍රී ලංකාව இலங்கை SRI LANKA

Consensus Seasonal Weather Outlook

January, February and March (JFM)

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

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And

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(a) Prevailing global climate conditions

La Niña conditions persisted during December, with negative sea surface temperature (SST) anomalies present across most of the central and eastern equatorial Pacific (Figs. 1). During mid-December 2016 the tropical Pacific SST anomaly was near -0.5C, the threshold for weak La Niña (Fig 1). Also, most of the atmospheric variables across the tropical Pacific have been consistent with weak La Niña conditions. The upper and lower atmospheric winds have been suggestive of a strengthened Walker circulation, and the cloudiness and rainfall have also been consistent with weak La Niña conditions. The collection of ENSO prediction models indicates SSTs near the threshold of La Niña persisting through mid-winter, then weakening to cool-neutral by later winter. The multi-model averages favor borderline Neutral-La Niña conditions (3-month average Niño-3.4 index less than or equal to -0.5°C) persisting during the Northern Hemisphere fall and continuing into the winter (Figs. 3).

The multi-model averages favor ENSO neutral conditions January – March (JFM) 2017 (Fig. 3). In summary, La Niña conditions are present, with a transition to ENSO-neutral favored during January – March 2017 (www.cpc.noaa.gov).

La Niña is anticipated to affect precipitation in Sri Lanka during the upcoming months . La Nina condition favors above normal precipitation in Sri Lanka in the month of January and February (Fig 2).

Recent forecasts from coupled models suggest neutral IOD conditions during the month of January , February and March 2017 (Fig 3 lower).
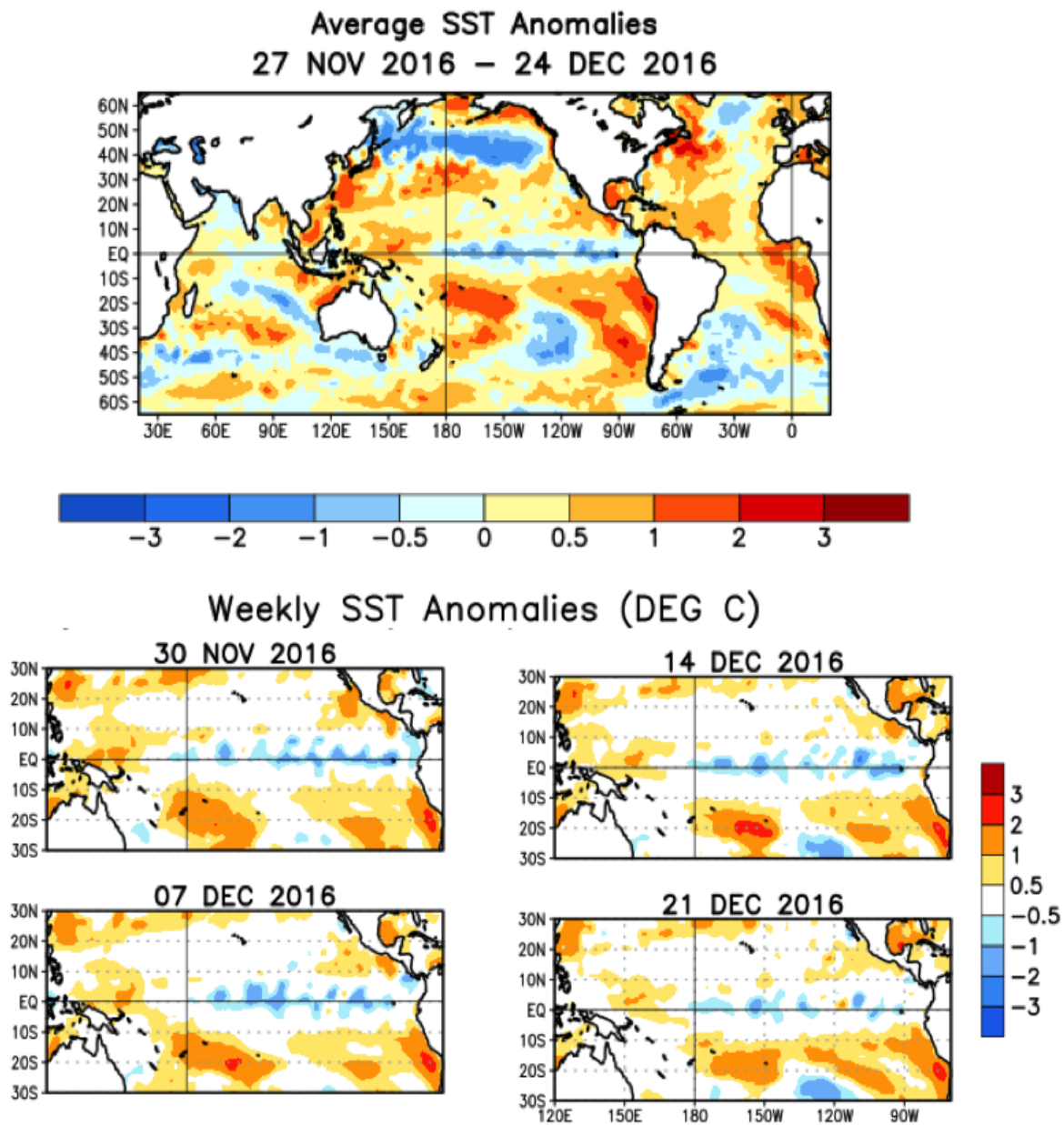
Fig 1: Monthly and weekly Observed Average sea surface temperature (SST) anomalies (°C)
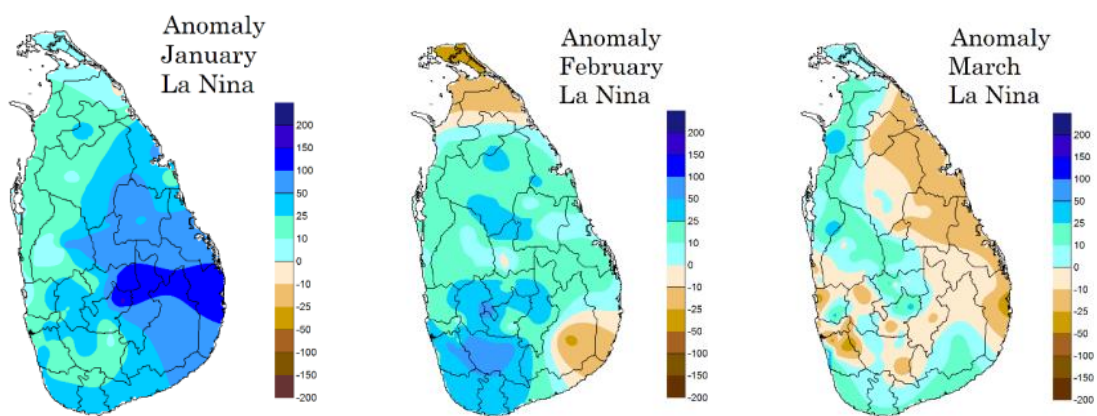
Fig 2: Anomaly composites maps of January, February and March precipitation for La Nina years
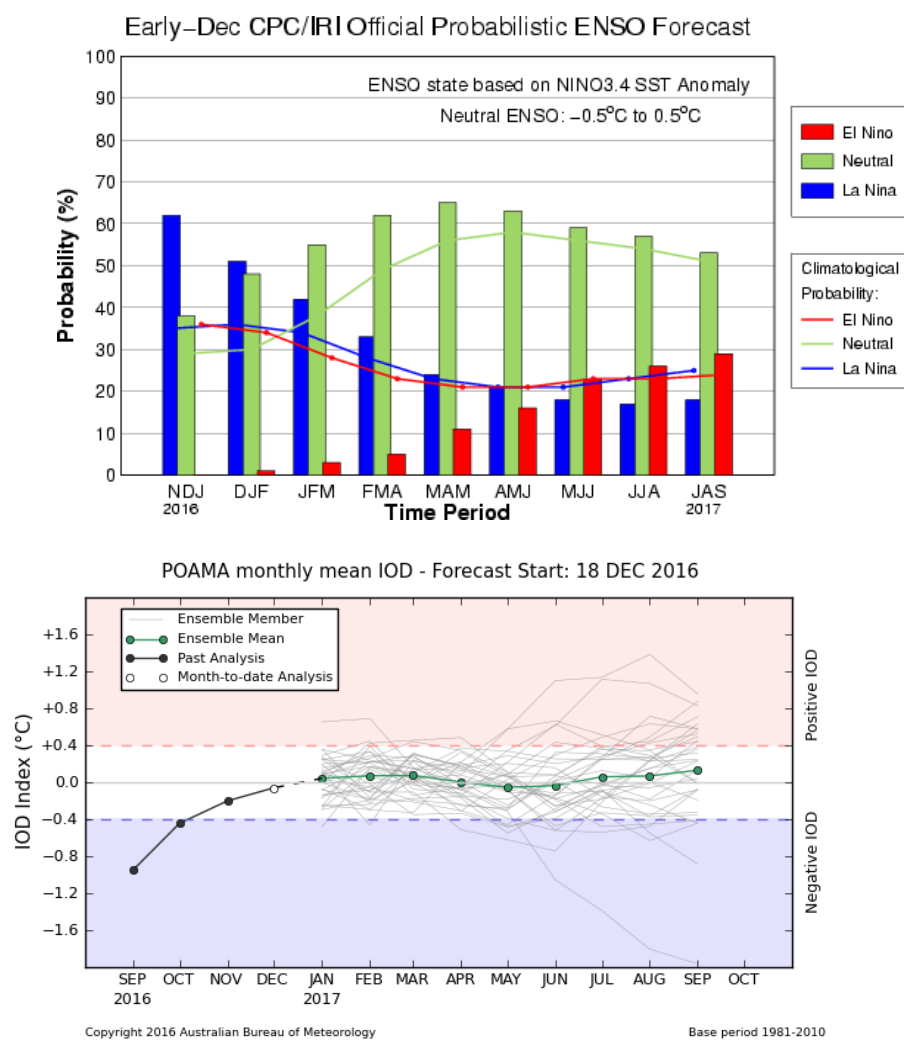

Fig 3: ENSO forecast from Climate Prediction Center (CPC)/ IRI Forecast (above) and IOD forecast from Australian Bureau of Meteorology (below).

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

(a.1) For JFM season

Figure 4 shows the probabilistic multi model ensemble forecast using dynamical models from 12 global producing centers (GPC) for JFM season. There is no signal for JFM season over Sri Lanka (Fig. 4).Out of 12 GPC individual forecasts 3 GPC forecasts give below normal rainfall and 4 GPC forecasts give above normal rainfall (Fig 5) for JFM 2017. There is no signal for JFM season over Sri Lanka from 5 GPC forecast outputs. Accordingly there is no clear signal for JFM season 2017. Climatological probability can be expected for JFM 2017.
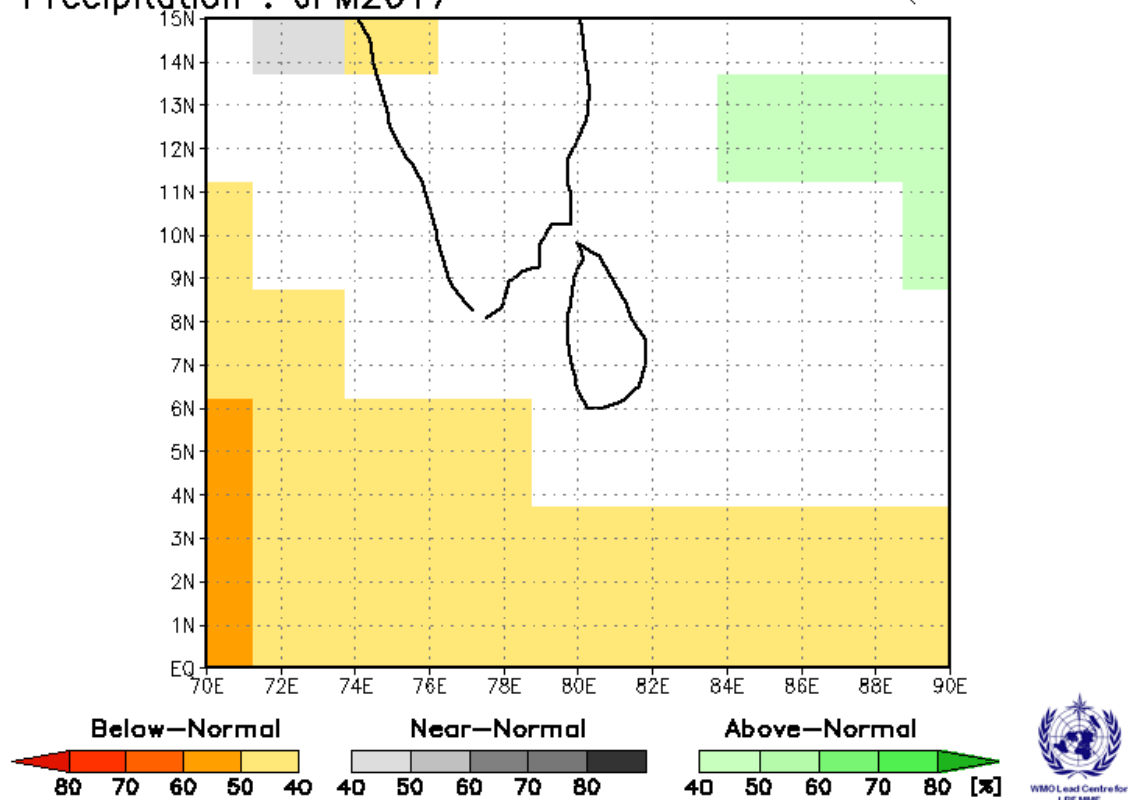

Fig 4 : Probabilistic multi model ensemble forecast for JFM using dynamical models from 12 WMO global producing centers (GPC).
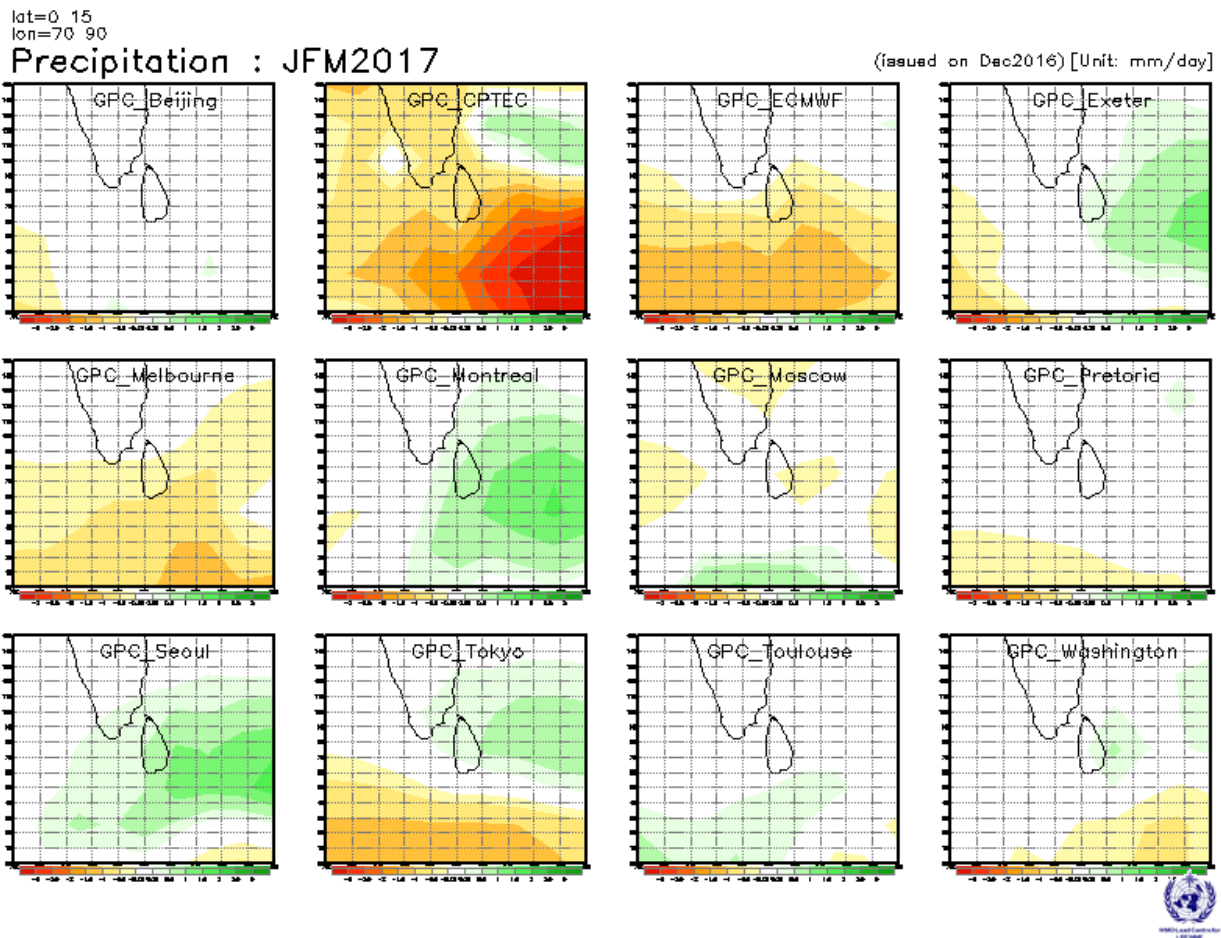
Fig 5 : Individual forecast for JFM season by dynamical models from 12 WMO global producing centers (GPC).

(a.2) Forecast for January, February and March 2017

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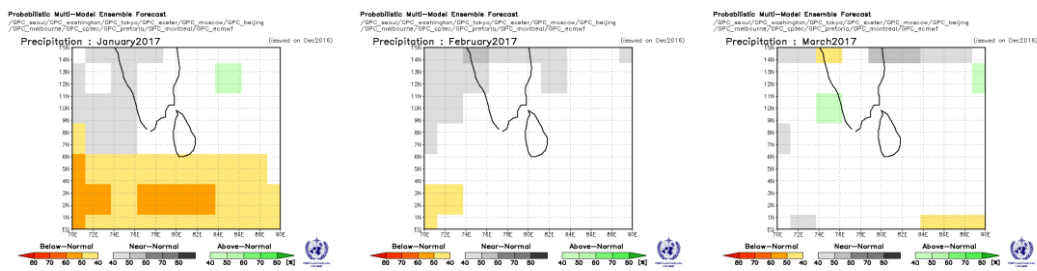

Fig 6:Probabilistic multi model ensemble forecast for January (left), February (middle) and March 2017 (right) using dynamical models from 12 WMO global producing centers (GPC).
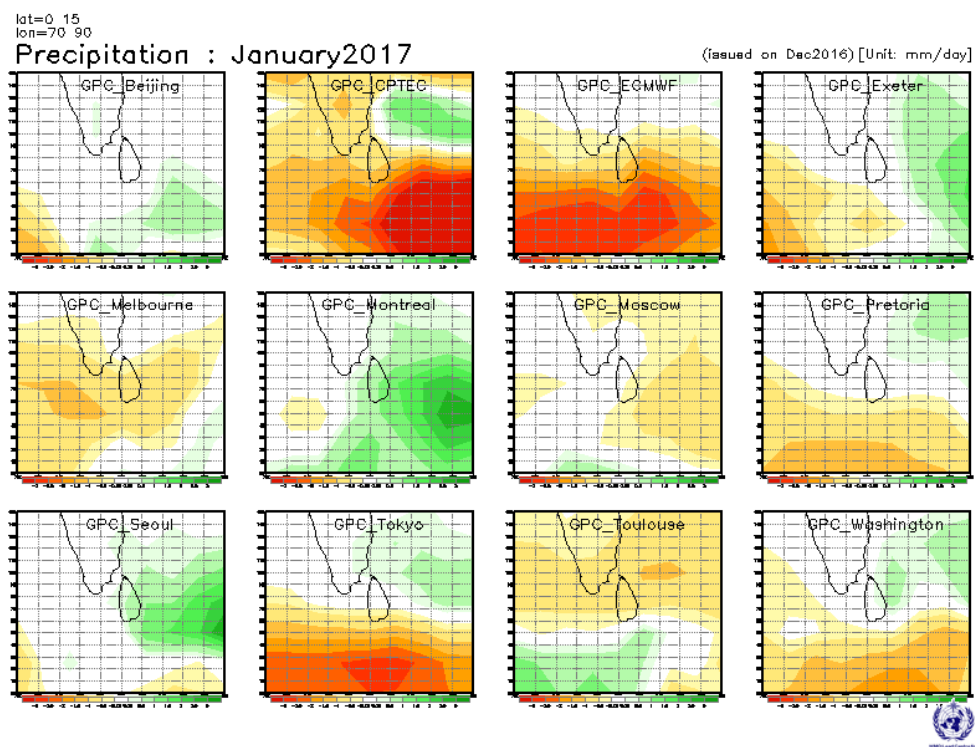
Fig 7 : Individual forecast for January by dynamical models from 12 WMO global producing centers (GPC).
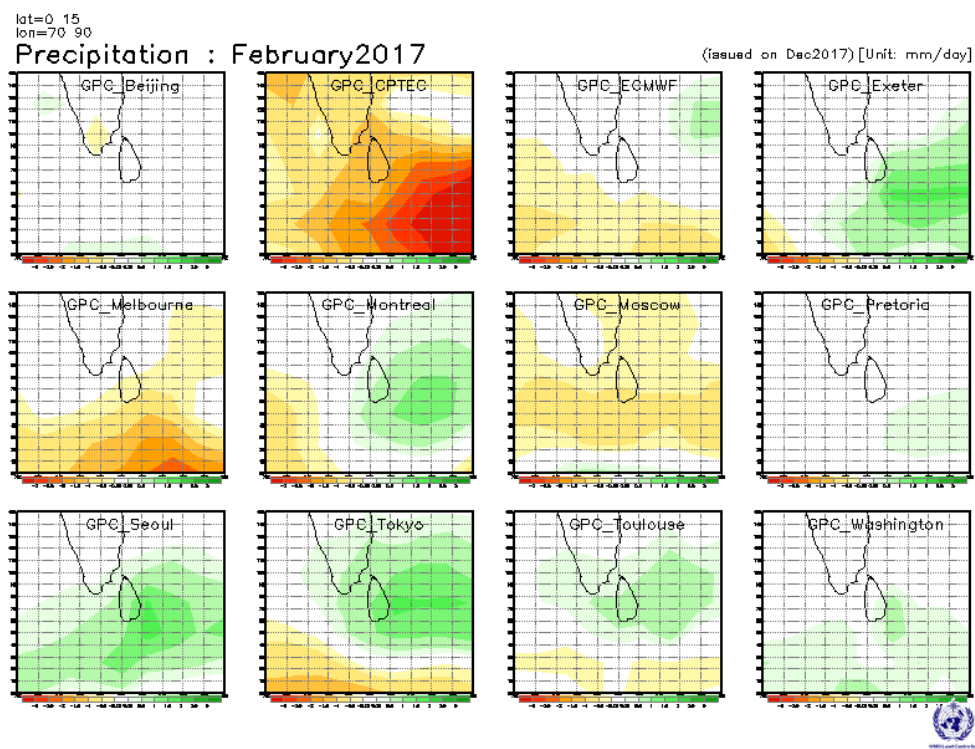

Fig 8 : Individual forecast for February 2017 by dynamical models from 12 WMO global producing centers (GPC).
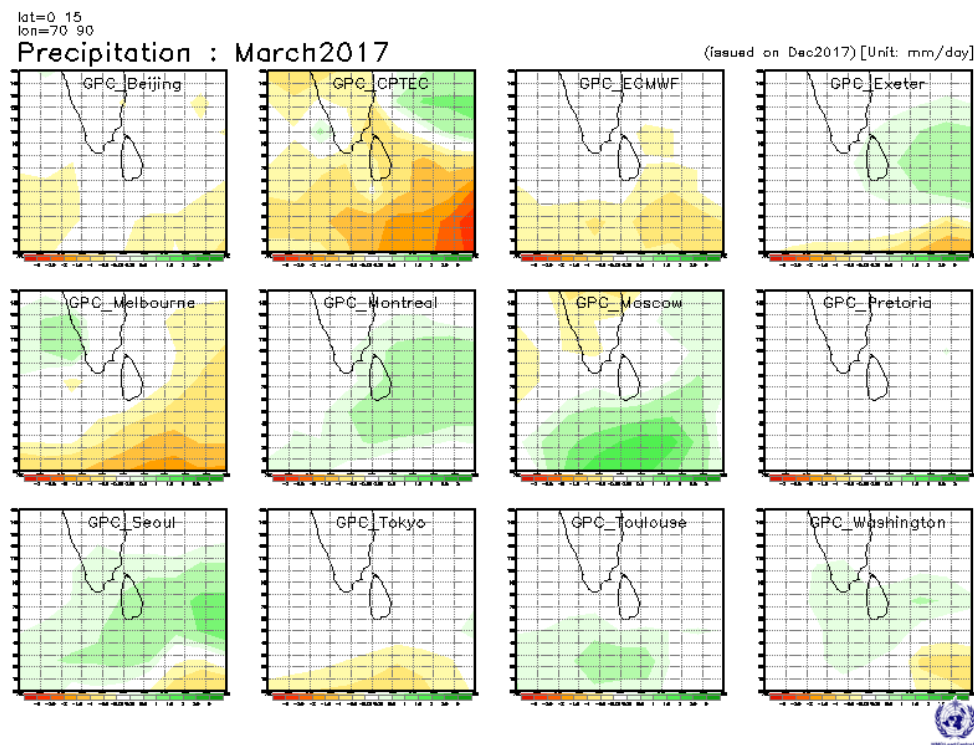
Fig 9 : Individual forecast for March 2017 by dynamical models from 12 WMO global producing centers (GPC).

Figures 7, 8 and 9 show the probabilistic forecast from individual global producing centers (GPC) centers for January, February and March 2017 respectively. Out of 12 GPC forecasts 4 GCP forecasts provide below normal rainfall, for January (Fig 7). There is no signal for January over Sri Lanka from 6 GPS forecast outputs. 2 GPC models forecast above normal rainfall for January. Accordingly there is no signal for month of January. It indicates that there are equal chances of receiving below normal, near normal and above normal rainfall for January 2017.

Out of 12 GPC forecasts 3 GCP forecasts give below normal rainfall for February 2017 (Fig 8). Out of 12 GPC forecasts 4 GCP forecasts provide above normal rainfall, for February 2017. There is no signal for February 2017 over Sri Lanka from 5 GPS forecast outputs. Accordingly there is no signal indicating that there are equal chances of receiving below normal, near normal and above normal rainfall for February 2017.

Out of 12 GPC forecasts 1 GCP forecasts give below normal rainfall for March 2017 (Fig 9). Another 4 GCP forecasts give above normal rainfall for March 2017. There is no signal for March 2017 over Sri Lanka from 7 GPS forecast outputs. Accordingly there is no signal for March 2017. It indicates that there are equal chances of receiving below normal, near normal and above normal rainfall for March 2017.

(c) Statistical downscaling of CFSv2 global forecast output

(c.1) Probabilistic Forecast for JFM season 2017 using Climate Predictability tool (CPT)

The probabilistic rainfall forecast for JFM 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. There is no signal for all districts for JFM 2017. It indicates that there are equal chances of receiving below normal, near normal and above normal rainfall for JFM 2017.

| District	Average rainfall (mm) –JFM	Probability %		
		Below	Normal	Above
Colombo	336.4	35	35	30
Kalutara	461.6	30	35	35
Galle	455.3	35	35	30
Matara	398.0	35	30	35
Hambantota	220.5	35	35	30
Ampara	456.7	30	35	35
Batticaloa	399.2	35	30	35
Trincomalee	264.6	30	35	35
Mullaithivu	177.6	35	30	35
Jaffna	125.3	35	30	35
Killinochchi	157.1	30	35	35
Mannar	148.4	30	30	40
Puttalam	156.1	30	30	40
Gampaha	278.3	35	35	30
Kegalle	373.7	35	35	30
Ratnapura	454.0	35	30	35
Monaragala	355.8	35	30	35
Badulla	530.7	35	30	35
Pollonnaruwa	355.6	40	20	40
Vavuniya	176.8	40	20	40
Anuradapura	201.9	40	20	40
Kurunegala	221.2	40	20	40
Matale	427.8	35	30	35
Kandy	397.3	35	30	35
Nuwaraeliya	375.2	30	35	35

Table 1
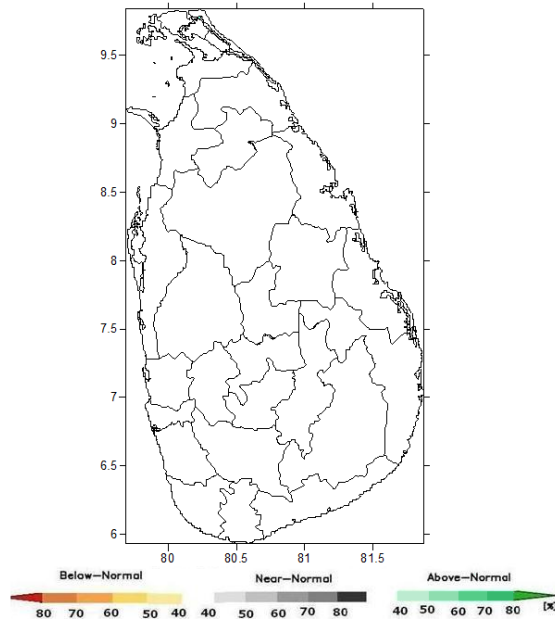
Fig 10. Probabilistic rainfall forecast for January -March2017 using CPT

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

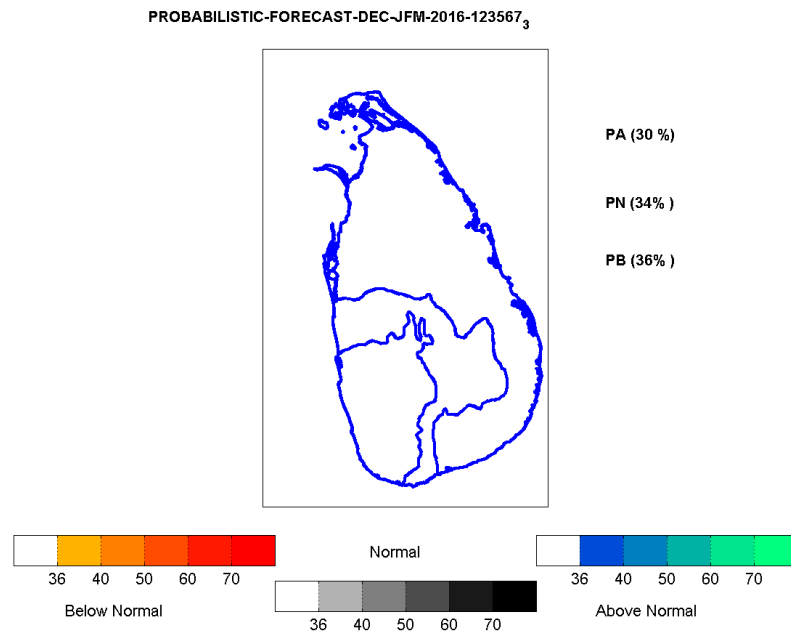PROBABILISTIC-FORECAST-DEC-JFM-2016-123567$_3$

Fig 11. Probabilistic rainfall forecast for January - March 2017 using RIMES FOCUS System

The probabilistic rainfall forecast for JFM 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 forJFMseason for SRI LANKA					
Season	WMO LC MME	WMO GPC	RIMES FOCUS	CPT	Final
For JFM season	No Signal	No Signal	No Signal	No Signal	Near Normal
For January2016	No Signal	No Signal	No Signal	No Signal	Near Normal
For February 2016	No Signal	No Signal			Near Normal
For March2016	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

Most of the global model forecasts provide no clear signal over Sri Lanka for JFM season.

The multi-model averages favor borderline La Niña conditions during the Northern Hemisphere winter.

Recent forecasts from coupled models suggest neutral IOD conditions during the JFM 2017.

Borderline La Nina conditions are expected to affect rainfall patterns in Sri Lanka during the January and February. According to the analysis from historical data; La Nina conditions favor for above normal rainfall over most parts of the island in January and February.

Considering all the model outputs and weak La Nina conditions predicted in early part of JFM season, near normal rainfall can be expected for JFM season 2017 (Fig 12).

However, the predictability is also limited to some extent due to the strong day to day atmospheric variability caused by the passage of the synoptic scale systems such as easterly waves, lows, depressions, cyclones etc. The seasonal predictability of the JFM season over Sri Lanka is also influenced by the Madden Julian Oscillation (MJO), which represent the major global scale intra seasonal variability pattern.
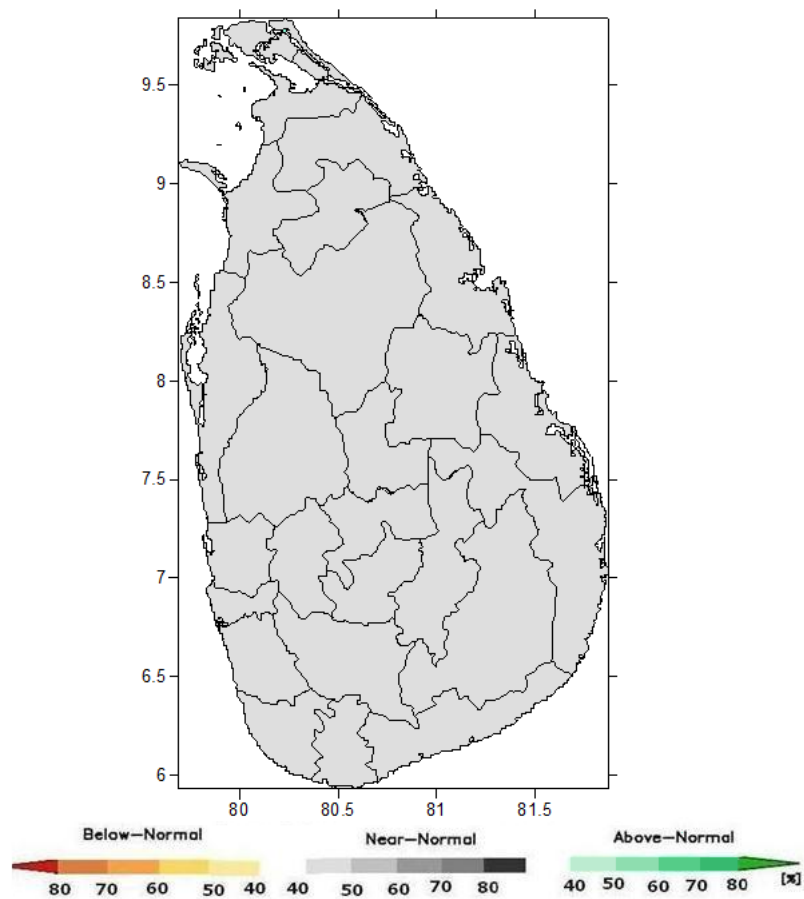
Fig 12. Consensus Probabilistic rainfall forecast for January-March 2017