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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 strengthened during the past month, as indicated by an increasingly prominent pattern of below-average sea surface temperatures (SSTs) across the central and eastern equatorial Pacific Ocean (Figs. 1and 2). The atmospheric circulation over the tropical Pacific Ocean also reflected La Niña and the low-level trade winds were stronger than average over the western and central Pacific, with anomalous westerly winds at upper-levels. Overall, the ocean and atmosphere system reflects La Niña(Climate Prediction Center, USA).

La Niña is predicted to persist through the JFM season by the majority of global models (Fig. 3 upper) and Neutral IOD condition is expected to prevail JFM season (Fig 3 lower).
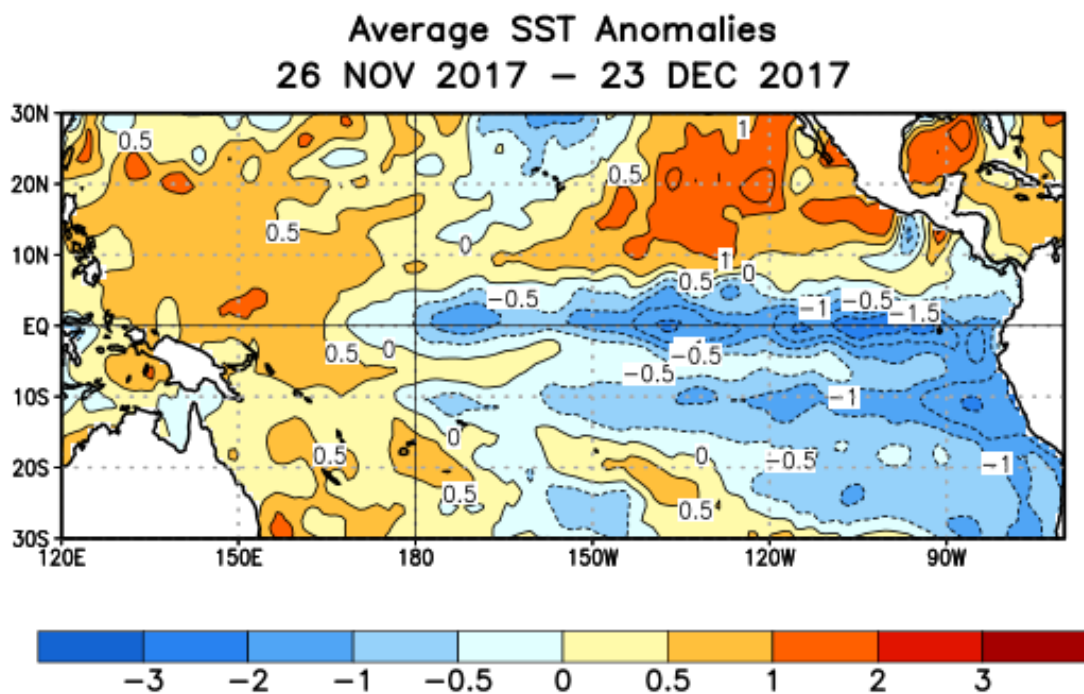

Fig 1: Observed Average sea surface temperature (SST) anomalies (°C)
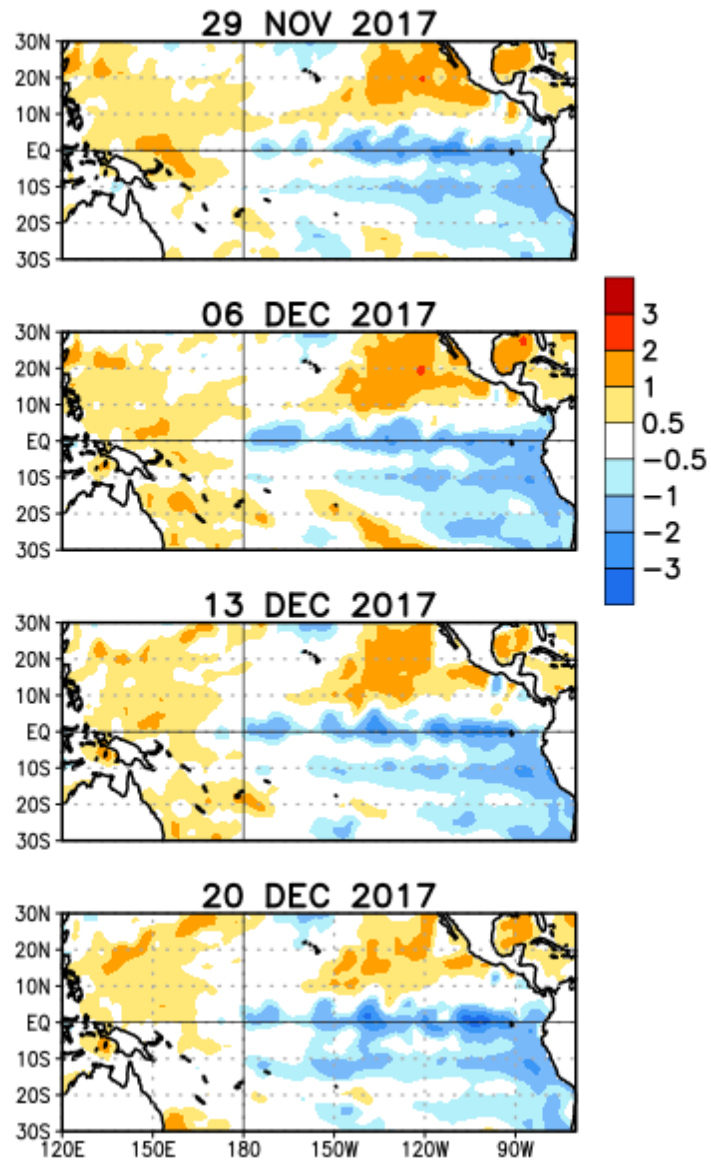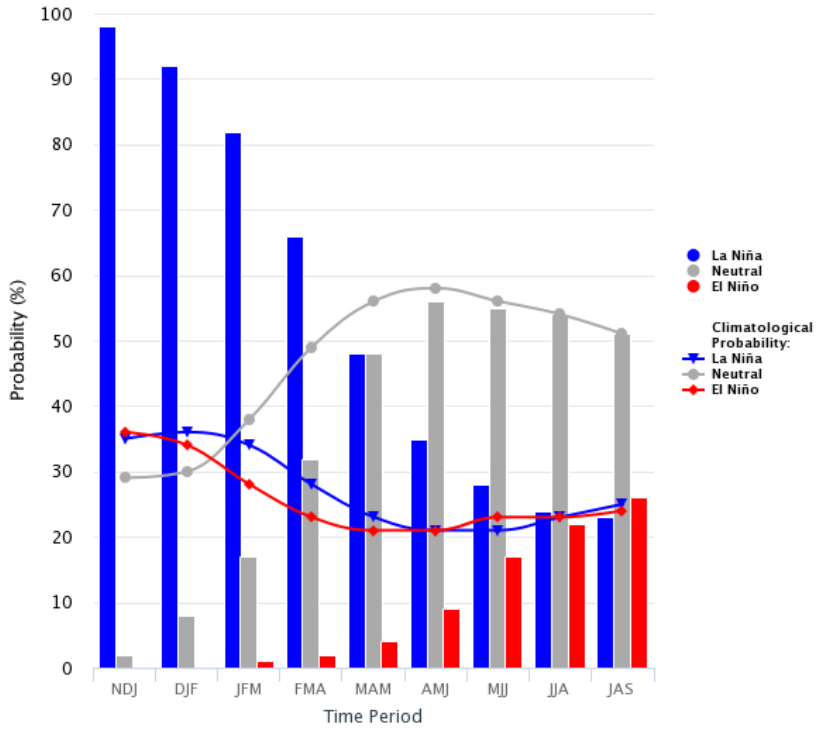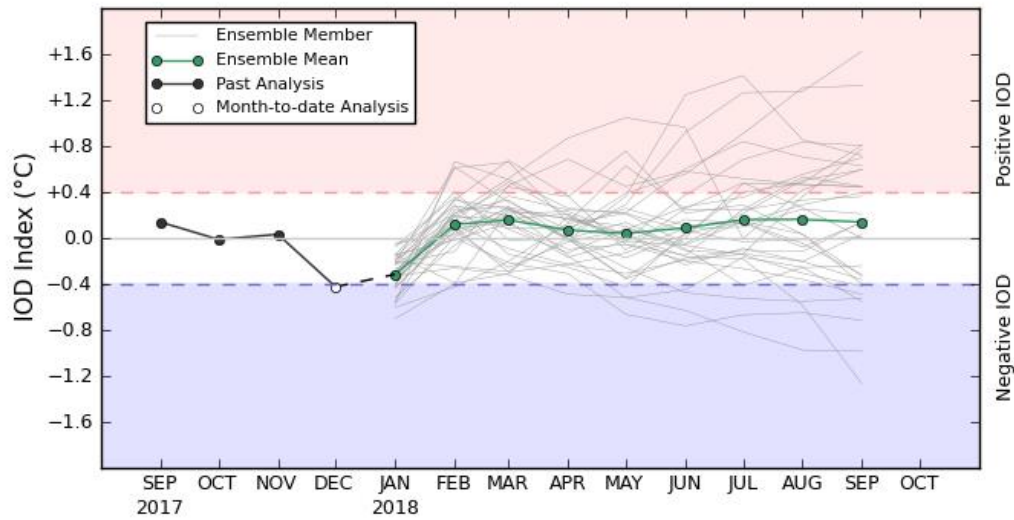
Weekly SST Anomalies (DEG C)

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

Fig 3: ENSO forecast from Climate Prediction Center (CPC)/ IRI Forecast (above) 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 higher chance of receiving above normal rainfall for JFM season over Sri Lanka (Fig. 4). Out of 13 GPC individual forecasts 6 models provide above normal rainfall for JFM season (Fig 5) . Only 1 GPC model forecast below normal rainfall (Fig 5). There is no signal for JFM season over Sri Lanka from 5 GPC forecast outputs. Accordingly there is ahigher chance of receiving above normal rainfallfor JFM season 2018.

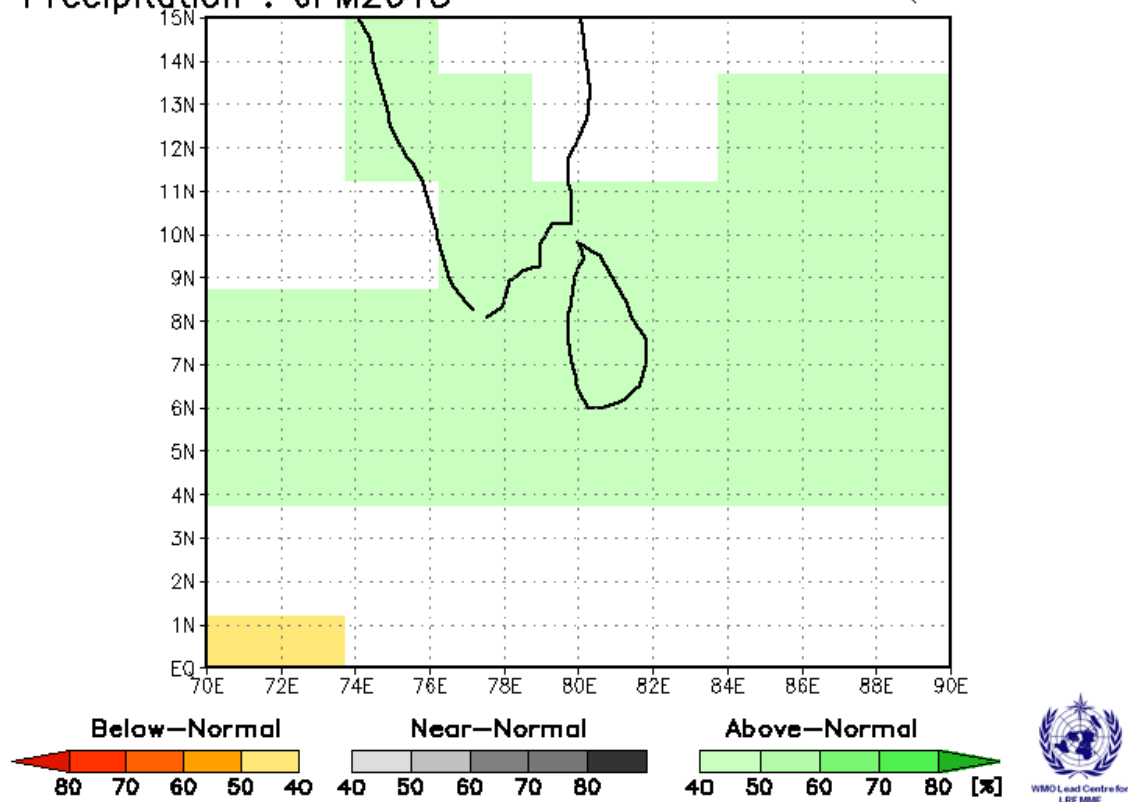
Fig 4 : Probabilistic multi model ensemble forecast for JFM using dynamical models from 13 WMO global producing centers (GPC).
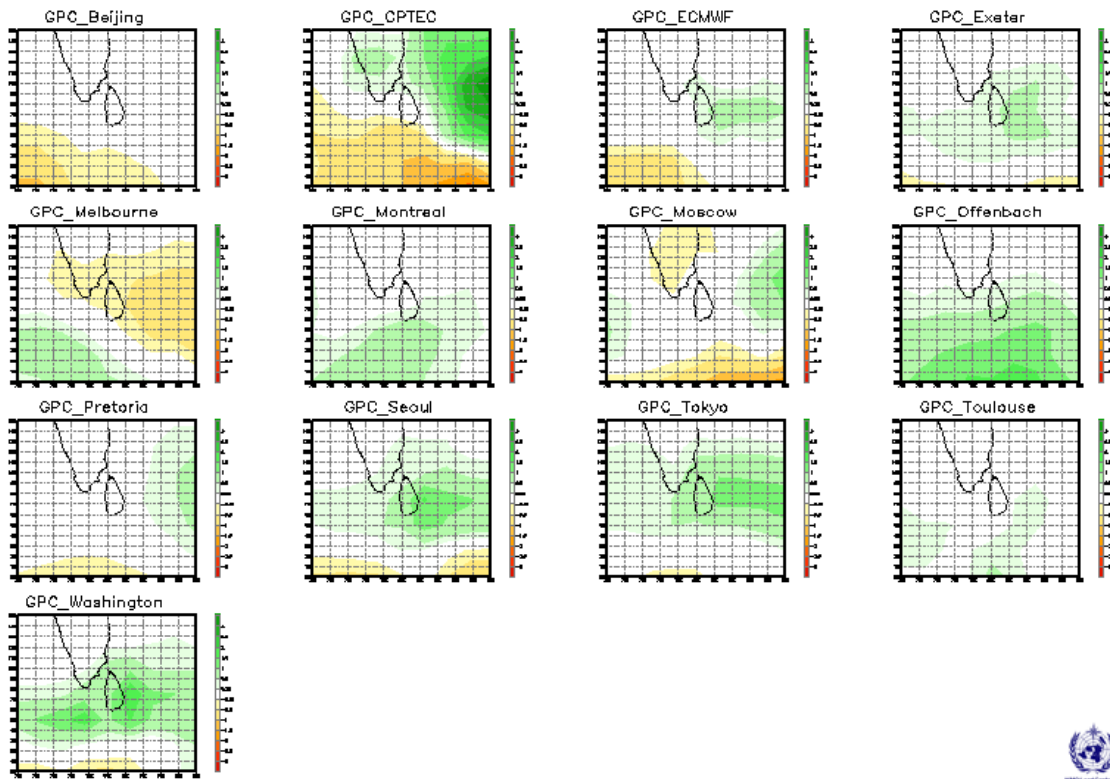
Fig 5: Individual forecast for JFM season by dynamical models from 13 WMO global producing centers (GPC).

(a.2) Forecast for January, February and March 2018

Figure 6 shows the probabilistic multi model ensemble forecast using dynamical models from 13 global producing centers (GPC) for, January, February and March 2018. There is a higher chance of receiving above normal rainfall for month of January and February 2018 for Sri Lanka (Fig 6). There is no signal for month of March (Fig 6). It indicates that there are equal chances of receiving below normal, near normal and above normal rainfall for March 2018.
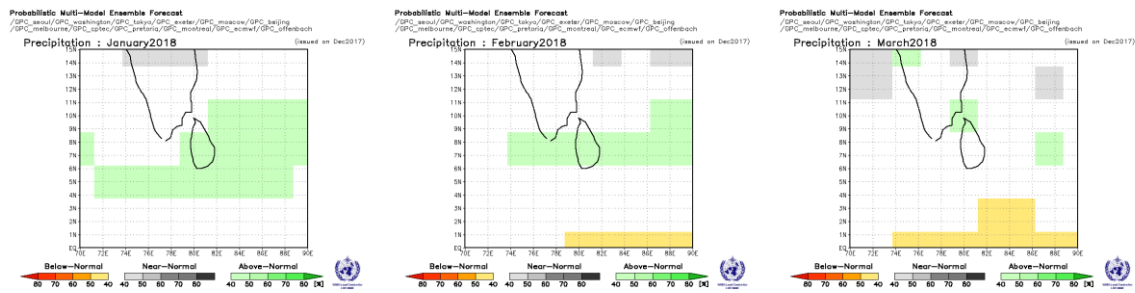
Fig 6:Probabilistic multi model ensemble forecast for January 2018 (left), February 2018 (middle) and March2018 (right) using dynamical models from 12 WMO global producing centers (GPC).
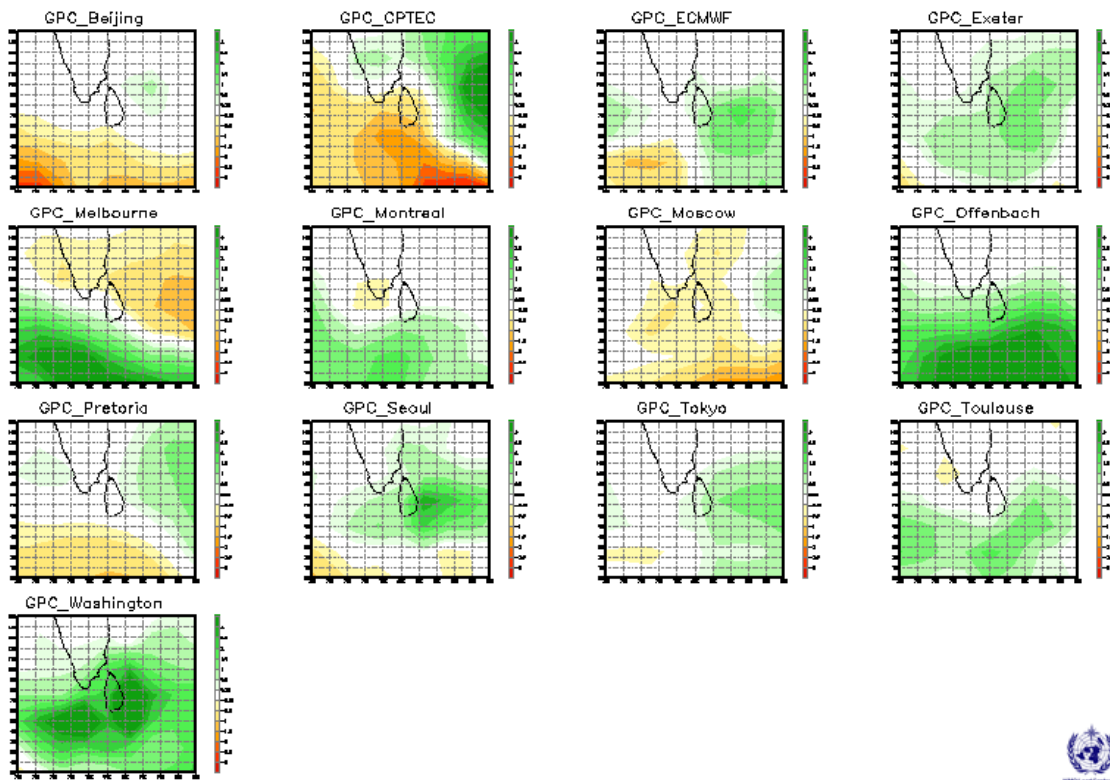

Fig 7: Individual forecast for January 2018 by dynamical models from 13 WMO global producing centers (GPC).
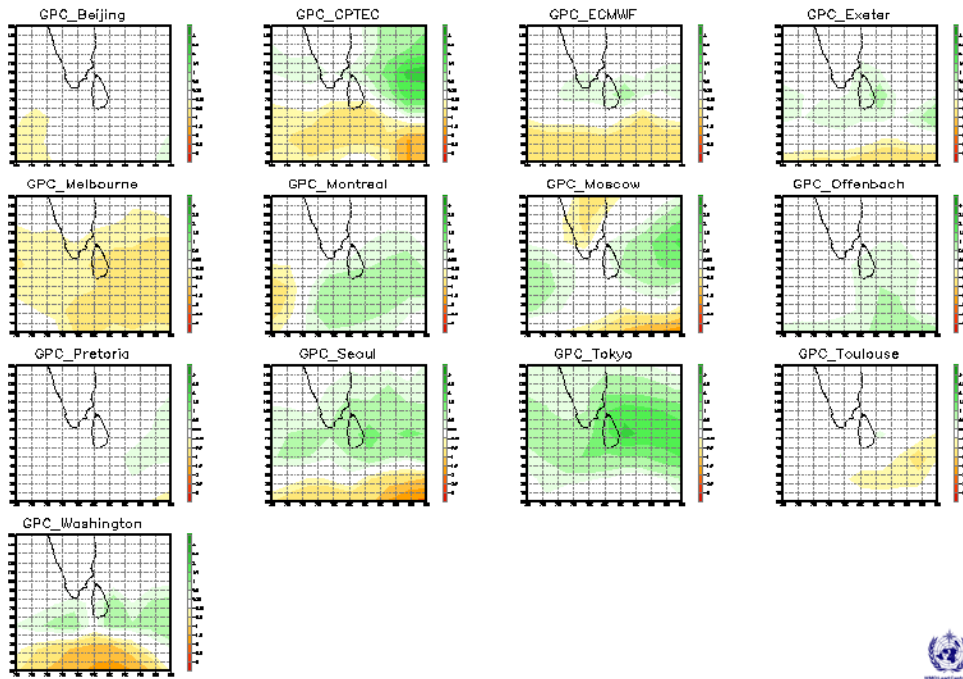
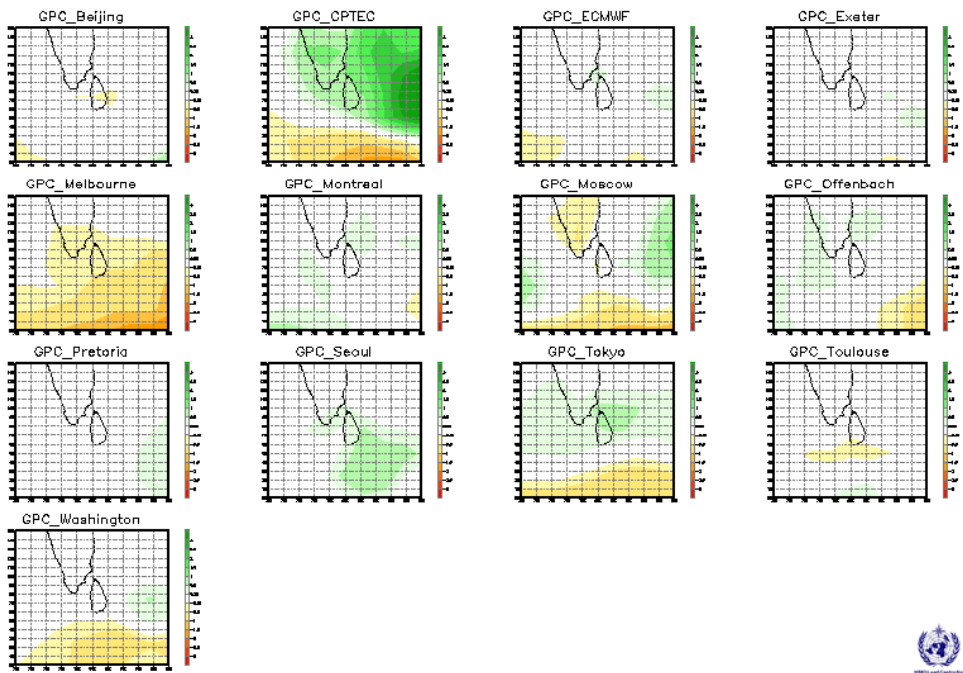Fig 8: Individual forecast for February 2018 by dynamical models from 13 WMO global producing centers (GPC).

Fig 9: Individual forecast for March 2018 by dynamical models from 13 WMO globalproducing centers (GPC).

Figures 7, 8 and 9 show the monthly forecast from individual global producing centers (GPC) centers for January 2017, FebruaryandMarch2018 respectively.

Out of 13 GPC forecasts 6 GPC models provide above normal rainfall for January. 3 GPC forecasts provide below normal rainfall for January (Fig 7). There is no signal for January over Sri Lanka from 4 GPC forecast outputs. Accordingly there is a higher chance of receiving above normal rainfall for month of January 2018 for Sri Lanka.

Out of 13 GPC forecasts 6 GPC models provide above normal rainfall for February. 1 GPC model forecasts below normal rainfall for February (Fig 8). There is no signal for February over Sri Lanka from 6 GPC forecast outputs. Accordingly there is a higher chance of receiving above normal rainfall for month of February 2018 for Sri Lanka.

Out of 13 GPC forecasts 3 GPC forecasts give above normal and only one GPC forecasts give below normal rainfall for March 2018 (Fig 9). There is no signal for March 2018 over Sri Lanka from 9 GPC forecast outputs. Accordingly there is no signal for March 2018. It indicates that there are equal chances of receiving below normal, near normal and above normal rainfall for March 2018.

(b) Statistical downscaling of CFSv2 global forecast output

(b.1) Probabilistic Forecast for JFM season 2018 using Climate Predictability tool (CPT)

The probabilistic rainfall forecast for JFM 2018 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. Majority of districts have more chance (higher probability) of receiving about to slightly above average rainfall during JFM season 2018.

| District	Average rainfall (mm) –JFM	Probability %		
		Below	Normal	Above
Colombo	336.4	25	30	45
Kalutara	461.6	25	30	45
Galle	455.3	25	25	50
Matara	398.0	25	30	45
Hambantota	220.5	25	30	45
Ampara	456.7	25	25	50
Batticaloa	399.2	25	25	50
Trincomalee	264.6	25	25	50
Mullaithivu	177.6	30	30	40
Jaffna	125.3	25	30	45
Killinochchi	157.1	25	30	45
Mannar	148.4	25	30	45
Puttalam	156.1	30	30	40
Gampaha	278.3	25	30	45
Kegalle	373.7	30	30	40
Ratnapura	454.0	30	30	40
Monaragala	355.8	25	30	45
Badulla	530.7	25	30	45
Pollonnaruwa	355.6	25	25	50
Vavuniya	176.8	30	30	40
Anuradapura	201.9	25	30	45
Kurunegala	221.2	25	30	45
Matale	427.8	25	30	45
Kandy	397.3	25	25	50
Nuwaraeliya	375.2	30	30	40

Table 1
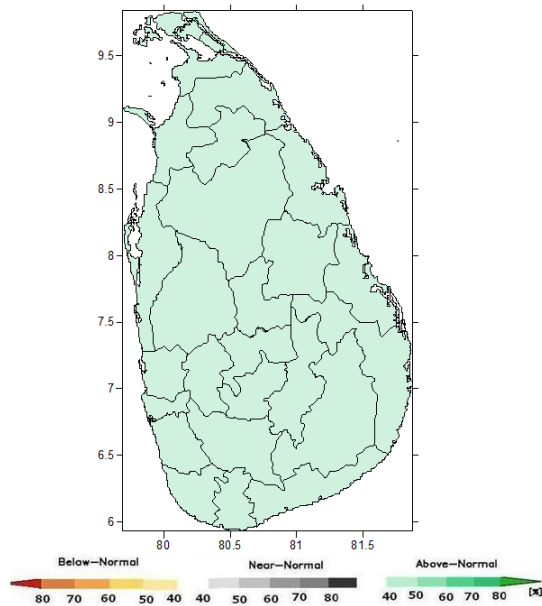
Fig 10. Probabilistic rainfall forecast for January-March 2018 using CPT

(d)   (c.2)   **(c.1) <u>Probabilistic Forecast for JFM season 2018 usingRIMES FOCUS System</u>**

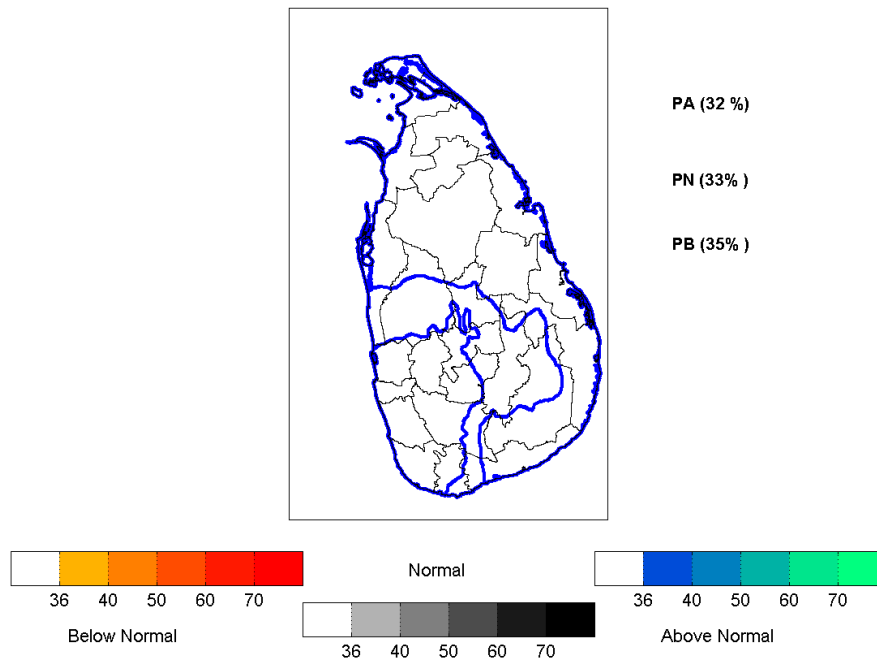PROBABILISTIC-FORECAST-DEC-JFM-2017-4567$_3$

PA (32 %)

PN (33%)

PB (35%)

Fig 11. Probabilistic rainfall forecast for January-March2018 using RIMES FOCUS System

Figure 11 represents the probabilistic rainfall forecast for JFM 2018 given by RIMES FOCUS System.There is no signal in the Wet zone, Dry zone and Intermediate zone.

Summary

Season	WMO LC MME	WMO GPC	RIMES FOCUS	CPT	Final
JFM season 2018	AN	AN	No signal	AN	AN
January 2018	AN	AN	AN in Dry zone	BN	AN
February 2018	AN	AN			AN
March 2018	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

Moderate La Nina conditions and IOD-neutral conditions will prevail through JFM season2018.

Most of the global model forecasts provide above normal rainfall for JFM season. WMO multi model ensemble prediction is favorable for above normal rainfall for JFM. Climate predictability tool provides higher chance of receiving above normal rainfall in majority of districts. La Niña is anticipated to affect precipitation in Sri Lanka during the upcoming months. La Niña is favored for above normal rainfall in month of January and February.

Considering the prevailing global climate conditions, forecasts from different global climate models and statistical downscaling of GCM output using CPT, above normal rainfall can be expected for most parts of the island in JFM season 2018 (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 lows, and depressions etc. The seasonal predictability of the JFM season over Sri Lanka is also influenced by the Madden Julian Oscillation (MJO), which represents the major global scale of intra-seasonal variability pattern.
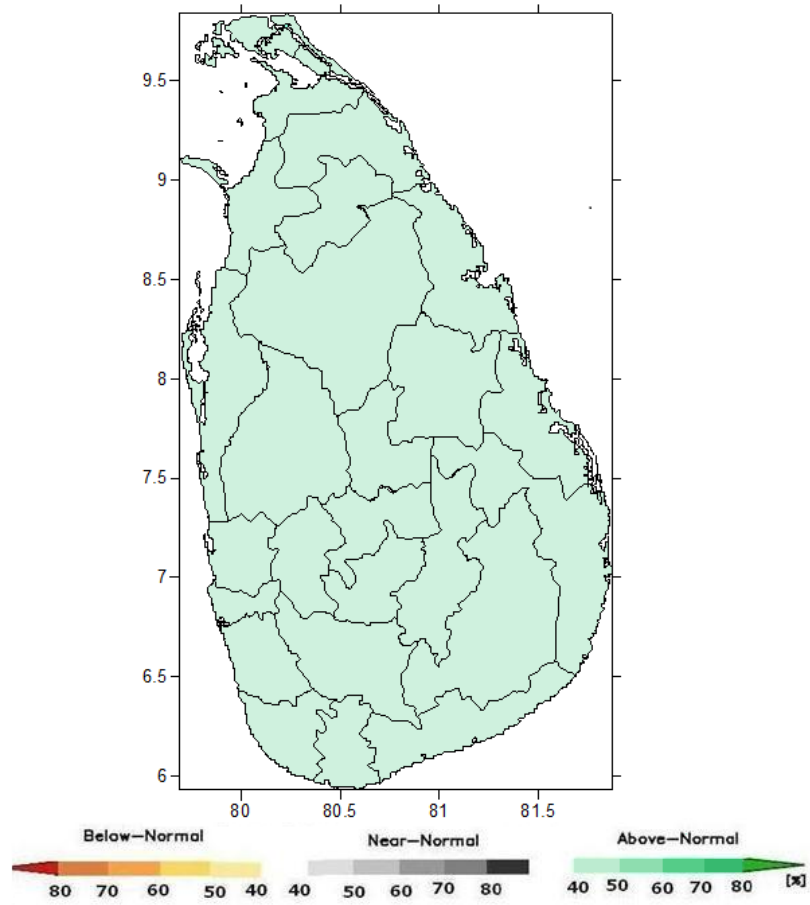
Fig 12.Consensus Probabilistic rainfall forecast for January–March 2018