



भारत सरकार
Government of India
पृथ्वी विज्ञान मंत्रालय (एम. ओ. ई. एस.)
Ministry of Earth Sciences (MoES)
भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

**2nd Stage Long Range Forecast for the
2018 Southwest Monsoon Rainfall**

HIGHLIGHTS

- Rainfall over the country as a whole for the 2018 southwest monsoon season (June to September) is most likely to be **NORMAL** (96% to 104% of long period average (LPA)).
- Quantitatively, monsoon season (June to September) rainfall for the country as a whole is likely to be **97%** of the LPA with a model error of **±4%**.
- Region wise, the season rainfall is likely to be **100%** of LPA over North-West India, **99%** of LPA over Central India, **95%** of LPA over South Peninsula and **93%** of LPA over North-East India all with a model error of **± 8 %**.
- The monthly rainfall over the country as whole is likely to be **101%** of its LPA during July and **94%** of LPA during August both with a model error of **± 9 %**.

1. Background

India Meteorological Department (IMD) had issued the first stage operational long range forecasts for the 2018 southwest monsoon season (June-September) rainfall over the country as a whole on 16th April. IMD has now prepared the 2nd Stage Long Range forecast of the seasonal rainfall over the country as a whole, forecasts for the monthly rainfall for July & August over the country as a whole, and forecasts for the seasonal rainfall for the 4 broad geographical regions of India (Northwest India, Northeast India, Central India and South Peninsula). The 2nd stage forecasts for the southwest monsoon season (June-September) rainfall over the country as a whole was prepared using a 6-parameter Statistical Ensemble Forecasting System (SEFS) and the operational Monsoon Mission Climate Forecast System (MMCFS).

2. Sea Surface Temperature Conditions in the Pacific & Indian Oceans

The moderate La Nina conditions developed in the equatorial Pacific in later part of the last year weakened to weak La Nina conditions early this year and currently have turned to neutral ENSO conditions. The MMCFS & other global climate models indicate conditions over the Pacific likely to continue to be Neutral during most part of the monsoon season and turn to weak El Nino conditions after the monsoon season.

At present, the warm neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Indian Ocean. The MMCFS and other global climate models indicate weak negative IOD conditions are likely to develop during the middle of the monsoon season and continue to persist till the early part of the post-monsoon season.

3. Monsoon Mission Coupled Forecasting System (MMCFS)

The latest experimental forecast based on the MMCFS suggests that the monsoon season rainfall during the 2018 monsoon season (June to September) averaged over the country as a whole is likely to be 102% \pm 4% of LPA.

4. The Operational Second Stage Forecasts for the 2018 Southwest Monsoon Rainfall

i) Season (June-September) Rainfall over the country as a whole

Quantitatively, the season rainfall for the country as a whole is likely to be 97% of the long period average (LPA) with a model error of \pm 4%. The LPA rainfall over the country as a whole for the period 1951-2000 is 89 cm.

The 5 category probability forecasts for the Season (June to September) rainfall over the country as a whole is given below.

| Category | Rainfall Range (% of LPA) | Forecast Probability (%) | Climatological Probability (%) |
|--------------|---------------------------|--------------------------|--------------------------------|
| Deficient | < 90 | 13 | 16 |
| Below Normal | 90 - 96 | 28 | 17 |
| Normal | 96 -104 | 43 | 33 |
| Above Normal | 104 -110 | 13 | 16 |
| Excess | > 110 | 3 | 17 |

ii) Season (June-September) Rainfall over the Broad Geographical Regions

The season rainfall is likely to be 100% of LPA over North-West India, 99% of LPA over Central India, 95% of LPA over South Peninsula, and 93% of LPA over North-East India all with a model error of \pm 8 %.

iii) Monthly (July & August) Rainfall over the country as a whole

The monthly rainfall over the country as a whole is likely to be 101% of its LPA during July and 94% of LPA during August both with a model error of \pm 9 %.



**Government of India
Earth System Science Organization
Ministry of Earth Sciences
India Meteorological Department**

Press Release

Dated: 29th May, 2018

Time of Issue: 1130 hrs IST

Sub: Onset of Monsoon over Kerala

➤ **Southwest monsoon has set in over Kerala, today, the 29th May 2018.**

- Today, the southwest monsoon has further advanced into remaining parts of southeast Arabian Sea, Comorin – Maldives area, entire Lakshadweep, most parts of Kerala, some parts of Tamil Nadu and some more parts of southwest, central and northeast Bay of Bengal.
- Thus the southwest monsoon has set in over Kerala, today, the 29th May 2018, 3 days ahead of its normal date.
- The Northern Limit of Monsoon (NLM) passes through Lat. 12⁰N/ Long 60⁰E, Lat 12⁰N/ Long 65⁰E, Lat.12⁰N/ Long 70⁰E, Kannur, Coimbatore, Kodaikanal, Tuticorin, Lat. 09⁰N/ Long 80⁰E, Lat. 13⁰N/ Long 85⁰E, Lat.18⁰N/ Long 90⁰E, Lat. 21⁰N/ Long 93⁰E. Figure-1 shows the Northern Limit of Monsoon (NLM) as on today.

➤ **Prevailing meteorological conditions leading to onset of monsoon over Kerala.**

- ✓ Widespread rainfall occurred over Kerala, during the past 3-4 days. The 14 rainfall monitoring stations for Monsoon onset over Kerala have reported more than 60% rainfall from 25th May. (Fig-2).
- ✓ Westerly winds have strengthened in the lower levels (more than 30 knots) and deepened with Westerly/ West-southwesterly winds upto 600 hPa (approximately upto 4.5km) over the south Arabian Sea (equator to Lat. 10⁰N and Long. 55⁰E to 80⁰E) from today morning.
- ✓ There is persistent convection (cloudiness indicated by Outgoing Long-wave Radiation values <200 Wm⁻¹) from 23rd May. The Satellite (INSAT-3D) derived Outgoing Long wave Radiation value in the box confined by Lat. 5-10⁰N, Long. 70-80⁰E is 187 W/m². (Fig-2).
- ✓ In addition to the above features, the following developments are also noticed:
 - An east-west shear zone runs roughly along latitude 12⁰N (across south peninsula) at 3.1 km above mean sea level.
 - A well marked low pressure area lies over southeast and adjoining eastcentral Arabian Sea off north Kerala- Karnataka coasts.
 - Another well marked low pressure area lies over eastcentral and adjoining northeast Bay of Bengal. It is likely to concentrate into a Depression during next 12 hours.

➤ **Further advance during next 48 hours**

Conditions are favorable for further advance of Southwest Monsoon into some parts of central Arabian Sea, remaining parts of Kerala, some parts of coastal and south interior Karnataka, some more parts of eastcentral and northeast Bay of Bengal, and some parts of northeastern states during next 48 hours.

For updated forecast kindly visit: <http://www.imd.gov.in/pages/allindiawxfcbulletin.php>

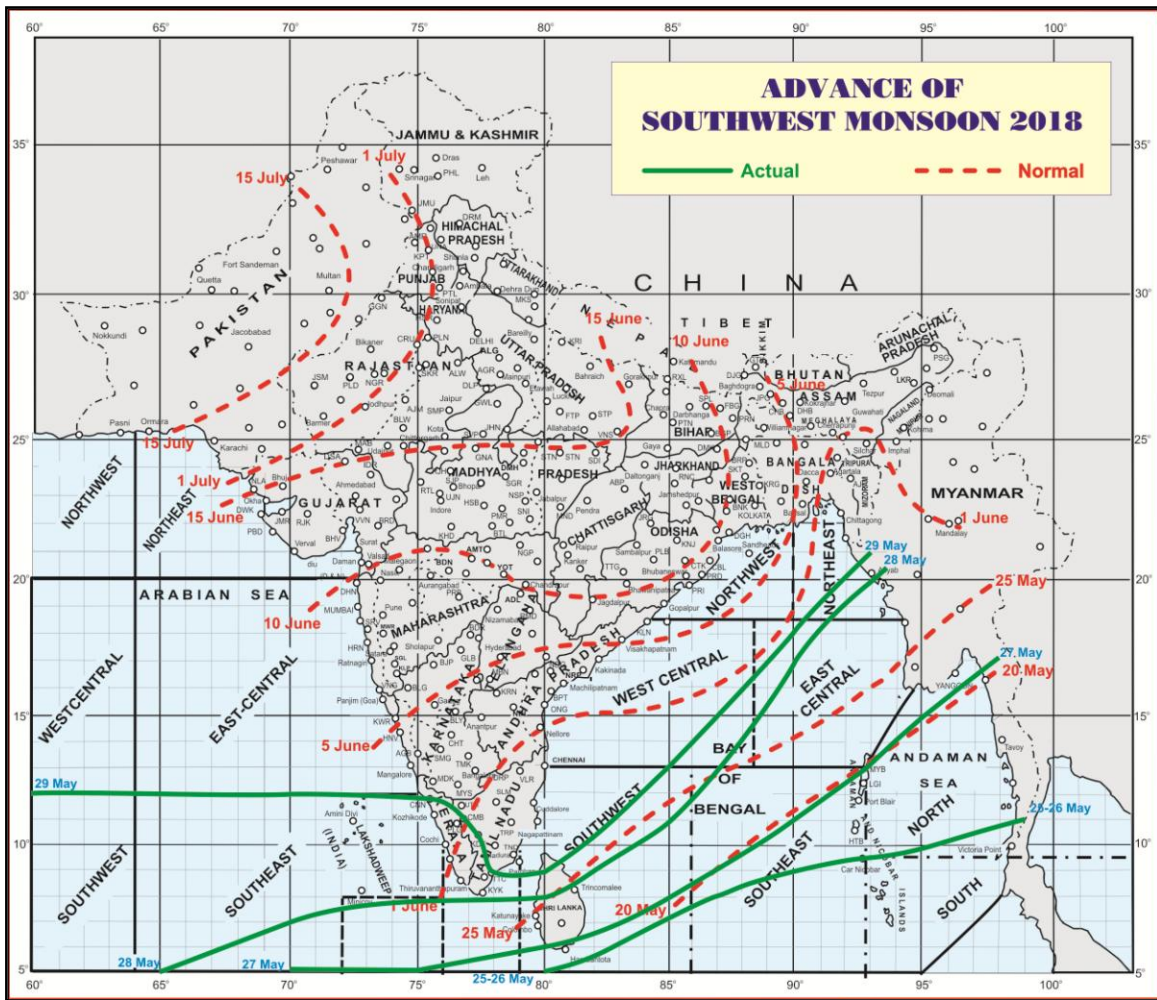


Fig 1: Northern Limit of Monsoon 2018 as on 29th May 2018

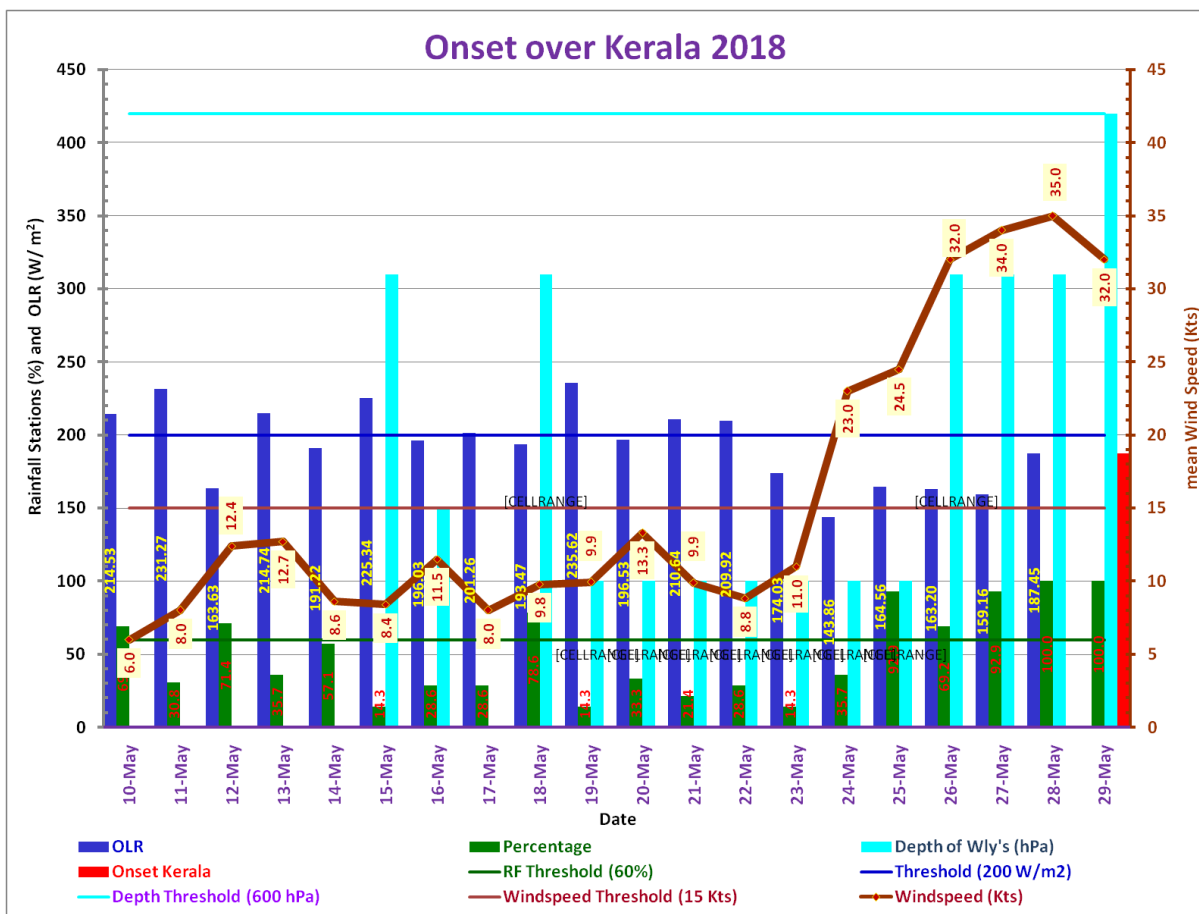


Fig.2: Parameters for declaring onset of monsoon over Kerala

Press Release

Kolkata , Dated 30.04.2018

Enhance Thunder Storm Activity

Thunderstorm/Rainfall Activity over Eastern States during Next 2-3 Days.

Synoptic Weather System : -

A cyclonic circulation over east Bihar & adjoining West Bengal -Jharkhand extending upto 2.1 km above mean level persists. A trough runs from the above cyclonic circulation to Manipur across Gangetic West Bengal and extends upto 1.5 km above mean sea level. The low pressure area over Andaman Sea & neighbourhood with associated cyclonic circulation extending upto 3.1 km above mean sea level persists.

Forecast and Warning During 30.04.18 to 02.05.18 :-

Under the influence of above weather system , fairly widespread to widespread rain fall activity with isolated heavy rain, thundersquall and hail is very likely over West Bengal and Sikkim during next three days.

Scattered to fairly widespread rain fall with isolated thunder squall is likely over Jharkhand and Bihar States during next two days.

Scattered to fairly widespread rain fall with isolated thunder squall and heavy rainfall is also likely over Odisha State during 1-3 May'2018.

Fishermen Warning for West Bengal and Odisha :-

In association with squally weather, wind speed likely to reach up to 45 kmph at times along and off West Bengal coasts. Fishermen are advised to be cautious while venturing in to the sea during next 48 hours.

For further details ,updates and nowcast kindly refer to imd-kolkata.gov.in websites.

Alipore dated 30.04.2018
DIRECTOR R.W.F.C
RMC Kolkata



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INDIA METEOROLOGICAL DEPARTMENT
Long Range Forecast

For 2018 Southwest Monsoon Seasonal (June-September) Rainfall

Summary of the Forecast for the 2018 southwest monsoon Rainfall

- a) Quantitatively, the monsoon seasonal rainfall is likely to be 97% of the Long Period Average (LPA) with a model error of $\pm 5\%$. The LPA of the season rainfall over the country as a whole for the period 1951-2000 is 89 cm.
- b) Forecast also suggests maximum probability for normal monsoon rainfall (96-104% of LPA) and low probability for deficient rainfall during the season.

IMD will issue the update in early June, 2018 as a part of the second stage forecast. Along with the updated forecast, separate forecasts for the monthly (July and August) rainfall over the country as a whole and seasonal (June-September) rainfall over the four geographical regions of India will also be issued.

1. Background

India Meteorological Department (IMD) issues operational forecast for the southwest monsoon seasonal (June to September) rainfall for the country as a whole in two stages. The first stage forecast is issued in April and the second stage forecast is issued in June. These forecasts are prepared using state-of-the-art Statistical Ensemble Forecasting system (SEFS) that is critically reviewed and improved regularly through in-house research activities. Since 2012, IMD is also using the dynamical global climate forecasting system (CFS) model developed under the Monsoon Mission to generate forecasts. For this purpose, the latest version of the high resolution (horizontal resolution of approximately 38km (T382) Monsoon Mission CFS (MMCFS) was implemented in January 2017 at the Office of Climate Research and Services, IMD, Pune.

IMD's SEFS model for the April forecast uses the following 5 predictors that require data upto March.

| S. No | Predictor | Period |
|-------|---|--------------------|
| 1 | Sea Surface Temperature (SST) Gradient between North Atlantic and North Pacific | December + January |
| 2 | Equatorial South Indian Ocean SST | February |
| 3 | East Asia Mean Sea Level Pressure | February + March |
| 4 | Northwest Europe Land Surface Air Temperature | January |
| 5 | Equatorial Pacific Warm Water Volume | February + March |

2. Forecast for the 2018 Southwest monsoon Season (June–September) rainfall over the Country as a whole

2a. Forecast based on the Monsoon Mission Coupled Forecasting System (MMCFS)

For generating the forecast for the 2018 southwest Monsoon season rainfall, atmospheric and Oceanic initial conditions of April 2018 were used. The forecast was computed as the average of the ensemble member forecasts.

The forecast based on the MMCFS suggests that the monsoon rainfall during the 2018 monsoon season (June to September) averaged over the country as a whole is likely to be $99\% \pm 5\%$ of the Long Period Average (LPA).

2b. Forecast Based on the Operational Statistical Ensemble Forecasting System (SEFS)

- (a) Quantitatively, the monsoon seasonal rainfall is likely to be 97% of the Long Period Average (LPA) with a model error of $\pm 5\%$.
- (b) The 5 category probability forecasts for the Seasonal (June to September) rainfall over the country as a whole is given below:

| Category | Rainfall Range (% of LPA) | Forecast Probability (%) | Climatological Probability (%) |
|--------------|---------------------------|--------------------------|--------------------------------|
| Deficient | < 90 | 14 | 16 |
| Below Normal | 90 - 96 | 30 | 17 |
| Normal | 96 -104 | 42 | 33 |
| Above Normal | 104 -110 | 12 | 16 |
| Excess | > 110 | 02 | 17 |

Forecast suggests maximum probability for normal rainfall and a low probability for deficient rainfall during the season.

3. Sea Surface Temperature (SST) Conditions in the equatorial Pacific & Indian Oceans

The moderate La Nina conditions developed in the equatorial Pacific during last year started weakening in the early part of this year and currently have turned to weak La Nina conditions. The latest forecasts from MMCFS & other global models indicate conditions over the Pacific to turn to neutral ENSO conditions before the beginning of the monsoon season.

At present, neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Indian Ocean. The latest forecasts from the MMCFS and global models indicate weak negative IOD conditions may develop during the middle of the monsoon season.

As the extreme sea surface temperature conditions over the Pacific and Indian Oceans particularly ENSO conditions over the Pacific (El Nino or La Nina) are known to have strong influence on the Indian summer monsoon, IMD is carefully monitoring the sea surface conditions over the Pacific and Indian oceans.
