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Ministry of Earth Sciences (MoES)
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Pune, India**

**El Niño Southern Oscillation (ENSO) and
Indian Ocean Dipole (IOD) Bulletin**

JULY 2026

Highlights

Currently, weak El Niño conditions prevail over the equatorial Pacific Ocean, with sea surface temperature (SST) anomalies remaining above normal across the central and eastern equatorial Pacific. These conditions are expected to strengthen further during the Southwest Monsoon season. Forecasts from the Monsoon Mission Coupled Forecast System (MMCFS) also indicate a continued strengthening of El Niño conditions throughout the Southwest Monsoon season.

At present, neutral Indian Ocean Dipole (IOD) conditions prevail over the Indian Ocean. Forecasts from the Monsoon Mission Coupled Forecast System (MMCFS) indicate that these neutral IOD conditions are likely to persist throughout the Southwest Monsoon season.

1. Current Sea Surface Temperature (SST) Conditions over the Pacific and Indian Oceans

During June 2026, sea surface temperatures (SSTs) were above average across the equatorial central and eastern Pacific Ocean, indicating the persistence of El Niño conditions (Fig. 1a). Positive SST anomalies were prominent over the far eastern equatorial Pacific, with warmer-than-normal conditions extending westward across the central Pacific. Above-average SSTs were also observed over large parts of the North Pacific, western Pacific, and several regions of the global oceans. Meanwhile, near-normal to slightly below-normal SSTs were observed over some regions of the southern Pacific and parts of the North Atlantic Ocean (Fig. 1a). Compared to May 2026, SST anomalies strengthened over the eastern equatorial Pacific Ocean during June 2026, while slight cooling was observed over parts of the central and western Pacific (Fig. 1b).

In the Indian Ocean, Positive SST anomalies were observed over parts of the western and eastern basin, including regions near the Maritime Continent in June 2026 (Fig. 1a). Warmer than normal SSTs were also observed over the Arabian Sea and the Bay of Bengal. Compared with May 2026, warm SST anomalies observed over the western and eastern equatorial Indian Ocean, while cooling was evident over the Arabian Sea, Bay of Bengal, central and southern Indian Ocean (Fig. 1b).

1.1 El Niño Southern Oscillation (ENSO) conditions over the Pacific Ocean

The monthly time series of Niño 3.4 SST anomalies for the 12-month period from July 2025 to June 2026 is shown in Fig. 2a. ENSO-neutral conditions prevailed over the equatorial Pacific Ocean during July 2025. La Niña conditions emerged in August 2025 and persisted through February 2026. ENSO-neutral conditions redeveloped in March 2026. Subsequently, the Niño 3.4 SST anomalies increased rapidly, crossing the El Niño threshold in May 2026. By June 2026, the Niño 3.4 SST anomaly reached around $+1.0^{\circ}\text{C}$, indicating the development of moderate El Niño conditions over the central equatorial Pacific Ocean, with the latest three-month running mean Niño3.4 SST anomaly for May–June–July (AMJ) 2026 reaching above the El Niño threshold of $+0.5^{\circ}\text{C}$.

Strong positive subsurface temperature anomalies are observed across much of the western and eastern equatorial Pacific Ocean below the 20°C isotherm, extending down to the thermocline. The strongest positive anomalies are located near the surface in the eastern equatorial Pacific Ocean (Fig. 2b).

1.2. Indian Ocean Dipole (IOD) conditions over the Indian Ocean

Figure 2c shows the monthly time series of the Dipole Mode Index (DMI) over the Indian Ocean from July 2025 to June 2026. Neutral Indian Ocean Dipole (IOD) conditions prevailed during July 2025. Negative IOD conditions developed in August 2025 and persisted through December 2025. The negative anomalies gradually weakened thereafter, and near-neutral Indian Ocean Dipole (IOD) conditions developed during January 2026. Positive DMI values were observed from February to April 2026, indicating a warming tendency over the western equatorial Indian Ocean relative to the eastern equatorial Indian Ocean. Subsequently, DMI values decreased during May and June 2026, with negative values observed again in June 2026.

Positive subsurface temperature anomalies (Fig. 2d) are observed in the western and central equatorial Indian Ocean below the 20°C isotherm, extending down to the thermocline.

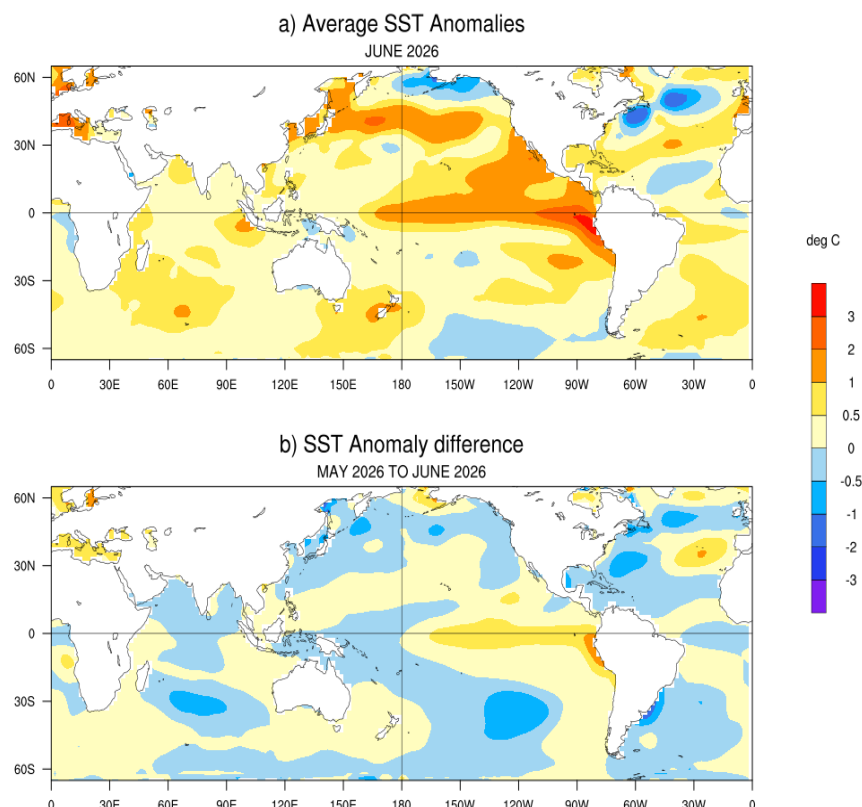


Fig.1: (a) Sea surface temperature (SST) anomalies (degC) during June 2026 and (b) changes in the SST anomalies (degC) from May 2026 to June 2026. SSTs are based on the ERSSTv5 (NCEP-NOAA), and anomalies are computed with respect to 30-year (1991-2020) long term mean.

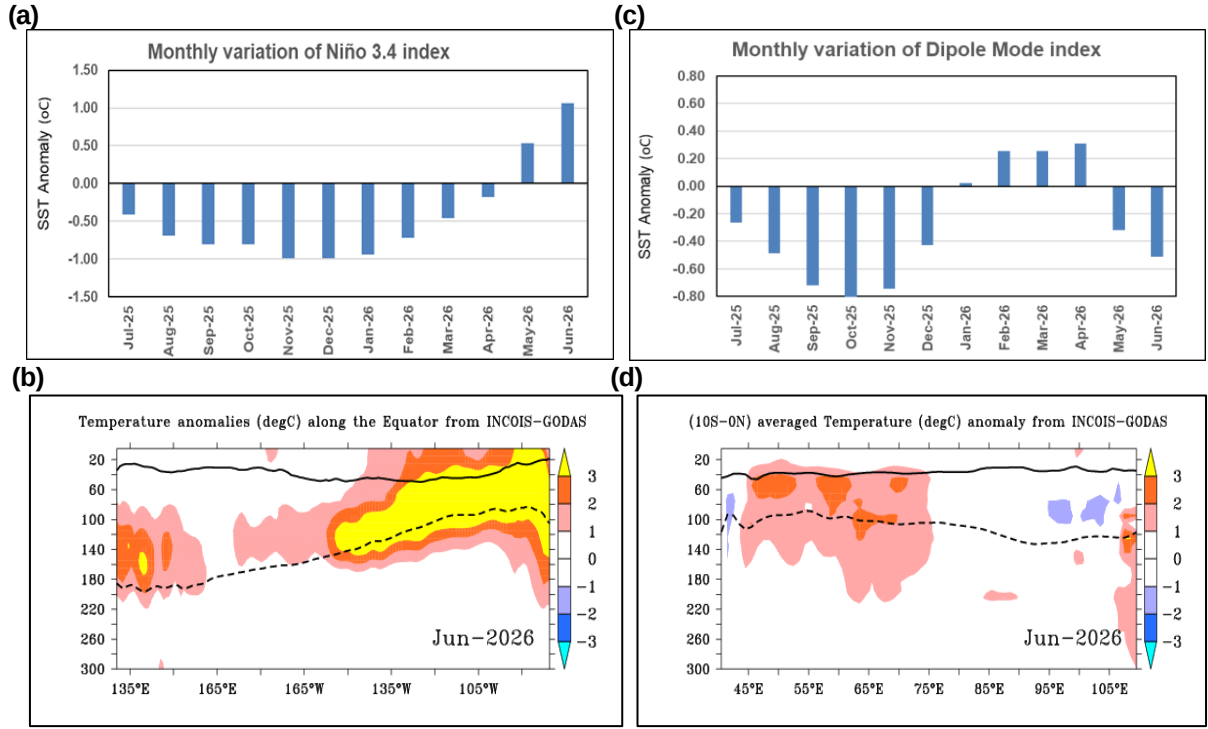


Fig.2: (a) Monthly variation of Niño 3.4 SST index for the last 12 months and **(b)** Depth-longitude section of sub-surface temperature anomalies in the equatorial (5°S-5°N) Pacific Ocean for the month of June 2026. **(c)** Same as **(a)** but for the Dipole Mode Index (DMI). **(d)** Same as **(b)** but for the tropical Indian Ocean (10°S-Eq). The anomalies in **(a)** and **(c)** were computed using the base period of 1991-2020 (Data Source: ERSSTv5). The solid dark line in **(b)** and **(d)** is the 20°C isotherm and the dashed line is thermocline depth (Data Source: INCOIS-GODAS).

2. ENSO and IOD Forecast

The SST forecast was generated using the high-resolution Monsoon Mission Coupled Forecast System (MMCFS) (AGCM T382L64; ~38 km horizontal resolution and OGCM ~25 km resolution in the tropics), initialized with June 2026 initial conditions. The model initial conditions were obtained from analyses produced by ESSO-INCOIS and ESSO-NCMRWF. Probability density function (PDF)-based bias correction was applied to the forecasts of the Niño 3.4 index (Fig. 4a) and the Dipole Mode Index (DMI; Fig. 4b) using hindcasts for the period 1999–2008. Forecast anomalies were computed relative to the 1991–2020 climatological mean.

The forecast of three-month seasonally averaged SST anomalies over the Pacific Ocean (Fig. 3) indicates that positive SST anomalies are likely to prevail over the central equatorial Pacific Ocean during July-Sep (JAS) 2026. Thereafter, from July–September (JAS) 2026 onwards, positive SST anomalies are expected to strengthen and expand across the central and eastern equatorial Pacific Ocean. The latest MMCFS plume and probability forecasts (Figs. 4a and 5a) suggest a moderate to strong El Niño conditions during the southwest monsoon season. The India Meteorological Department (IMD) will continue to closely monitor the evolving ENSO conditions and provide monthly updates based on the latest observations and changes in the Pacific Ocean.

The 3-month season-averaged SST anomaly forecast for the Indian Ocean (Fig. 3) suggests that neutral SST anomalies are prevailing over most parts of the Indian Ocean during the upcoming seasons. At present, neutral Indian Ocean Dipole (IOD) conditions are present over the Indian Ocean and the latest MMCFS forecast indicates that the neutral IOD conditions are likely to continue till the end of the southwest monsoon season (see Figs. 4b and 5b).

MMCFS SST Anomaly Forecast :Jun 2026 IC

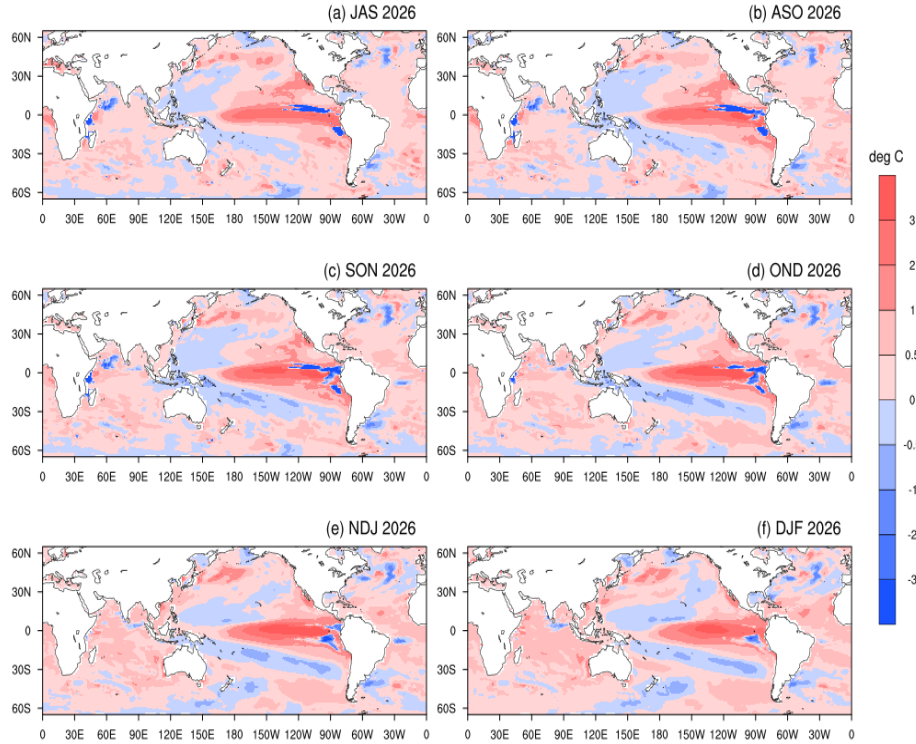


Fig.3: Forecasted Seasonal mean SST anomalies for three-monthly (a) July to September (JAS 2026), (b) August to October (ASO 2026) (c) September to November (SON 2026), (d) October to December (OND 2026), (e) November to January (NDJ 2026) and (f) December to February (DJF 2027) Model bias correction base period: 1999-2008; Climatology base period:1991-2020).

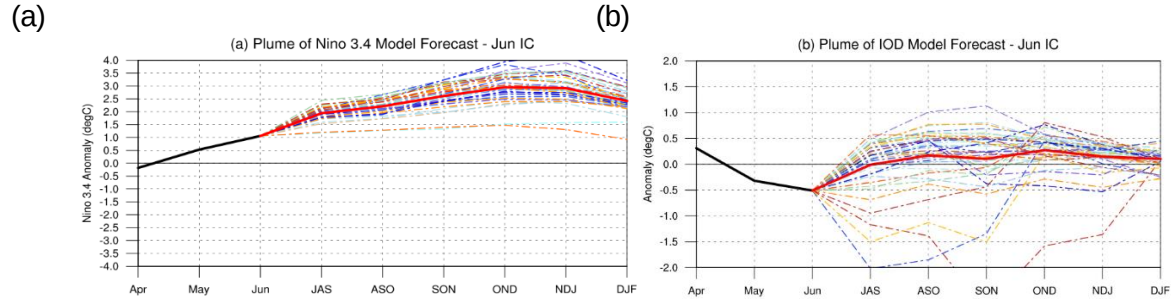


Fig.4: Plume of (a) Niño 3.4 SST index, (b) Indian Ocean Dipole (IOD) Mode Index forecasted by high-resolution MMCFS. The forecasts were PDF corrected for bias and variance. The solid green line is the observed SST anomaly (ERSSTv5, NOAA) and the solid red line is the ensemble mean SST anomaly forecast of 43 members (MMCFS). The individual ensemble member forecasts are shown in light dotted lines of different colours.

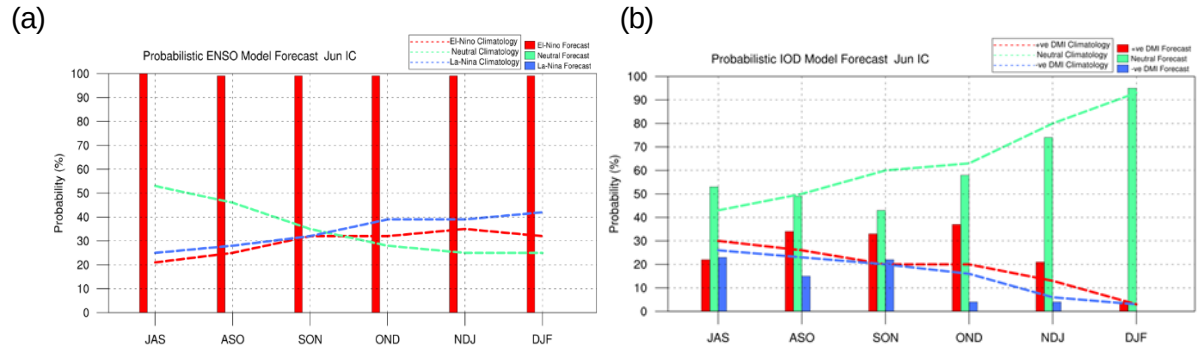


Fig.5: Probability forecast along with climatological probabilities of (a) Niño 3.4 and (b) Indian Ocean Dipole (IOD) Mode Index from high-resolution MMCFS. The data source for Climatology probabilities: NOAA Extended Reconstructed SST V5. Criteria used for Probabilistic ENSO Forecast: La Niña ≤ -0.5 , Neutral <0.5 to >-0.5 , El Niño ≥ 0.5 . Criteria used for Probabilistic DMI Forecast: negative DMI ≤ -0.4 , Neutral <0.4 to >-0.4 , positive DMI ≥ 0.4 .