

PACIFIC ISLANDS CLIMATE OUTLOOK FORUM-19

20 - 21 OCTOBER, 2026

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Looking Forward – Monthly and Seasonal Outlooks
for November 2026 to April 2027

Tropical Cyclones

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Te Whatu Ao

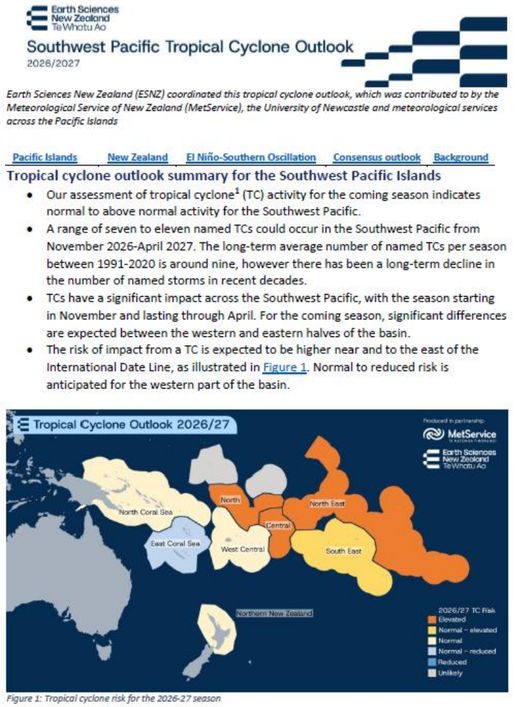
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Earth Sciences NZ – SW Pacific Tropical Cyclone Outlook

About the outlook

- The **2026–27 TC outlook** is coordinated by Earth Sciences New Zealand, with contributions from the NZ MetService, the University of Newcastle, and Pacific meteorological services.
- Provides a **seasonal overview of expected TC activity and regional risk** across the Southwest Pacific (November–April).
- **ENSO is a key influence** on the geographical distribution of tropical cyclone activity.
- The outlook describes risk in a **statistical sense**.
- It's an **outlook**, not a forecast, and it's impossible to predict individual TC's months in advance.
- **TC impacts** can vary dramatically from season to season and can be driven by combination of TC intensity, track, interactions with populated areas and exposure + vulnerability.



Earth Sciences New Zealand Te Whatu Ao

Southwest Pacific Tropical Cyclone Outlook
2026/2027

Earth Sciences New Zealand (ESNZ) coordinated this tropical cyclone outlook, which was contributed to by the Meteorological Service of New Zealand (MetService), the University of Newcastle and meteorological services across the Pacific Islands

Pacific Islands | New Zealand | El Niño-Southern Oscillation | Consensus outlook | Background

Tropical cyclone outlook summary for the Southwest Pacific Islands

- Our assessment of tropical cyclone[1] (TC) activity for the coming season indicates normal to above normal activity for the Southwest Pacific.
- A range of seven to eleven named TCs could occur in the Southwest Pacific from November 2026-April 2027. The long-term average number of named TCs per season between 1991-2020 is around nine, however there has been a long-term decline in the number of named storms in recent decades.
- TCs have a significant impact across the Southwest Pacific, with the season starting in November and lasting through April. For the coming season, significant differences are expected between the western and eastern halves of the basin.
- The risk of impact from a TC is expected to be higher near and to the east of the International Date Line, as illustrated in Figure 1. Normal to reduced risk is anticipated for the western part of the basin.

Figure 1: Tropical cyclone risk for the 2026-27 season

[1] Tropical cyclones are categorised in strength from 1 to 5, with 5 being most intense. Tropical cyclones that reach category 3 or higher are classified as severe, with mean (10 minute) wind speeds of at least 119 km/h.

Issued: 14 October 2026 1

Source: [ESNZ Southwest Pacific Tropical Cyclone Outlook - Oct 2026]

ESNZ Outlook: Developing the Consensus

Three sources of seasonal guidance

ESNZ Analogue Method

Historical cyclone seasons with similar climate conditions

International Dynamical Models

Seasonal forecasts of atmospheric and oceanic conditions and TC activity

TCO-SP Statistical Model

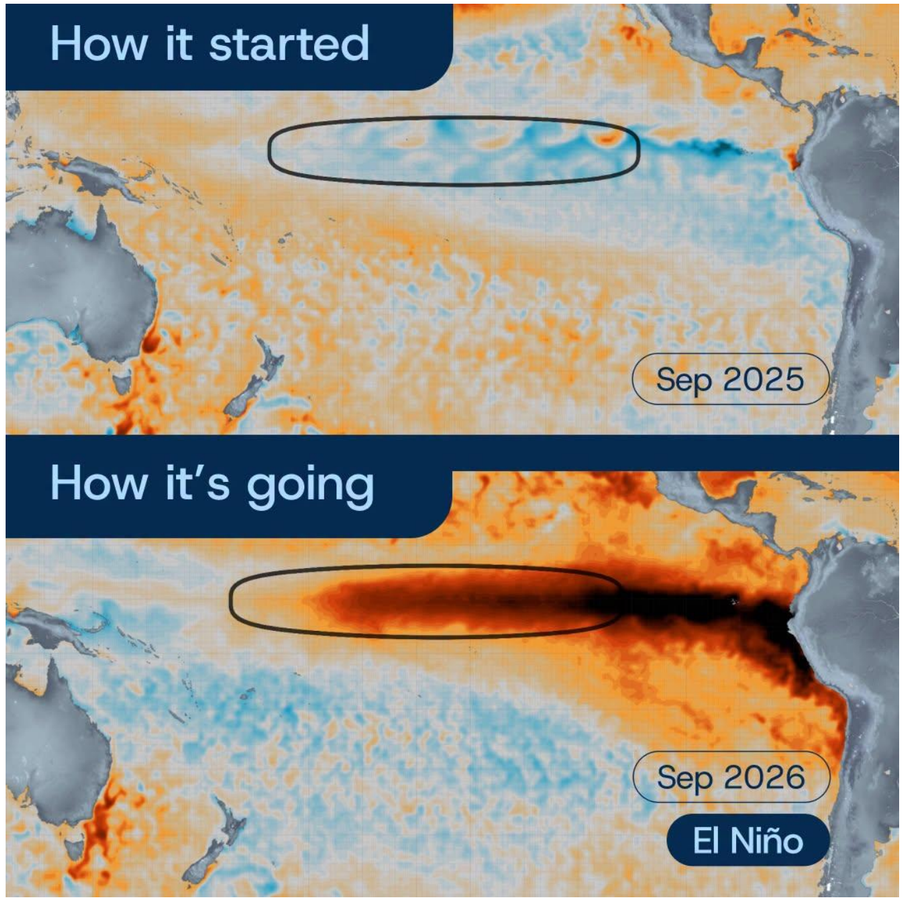
Statistical relationships between climate indices and historical cyclone activity

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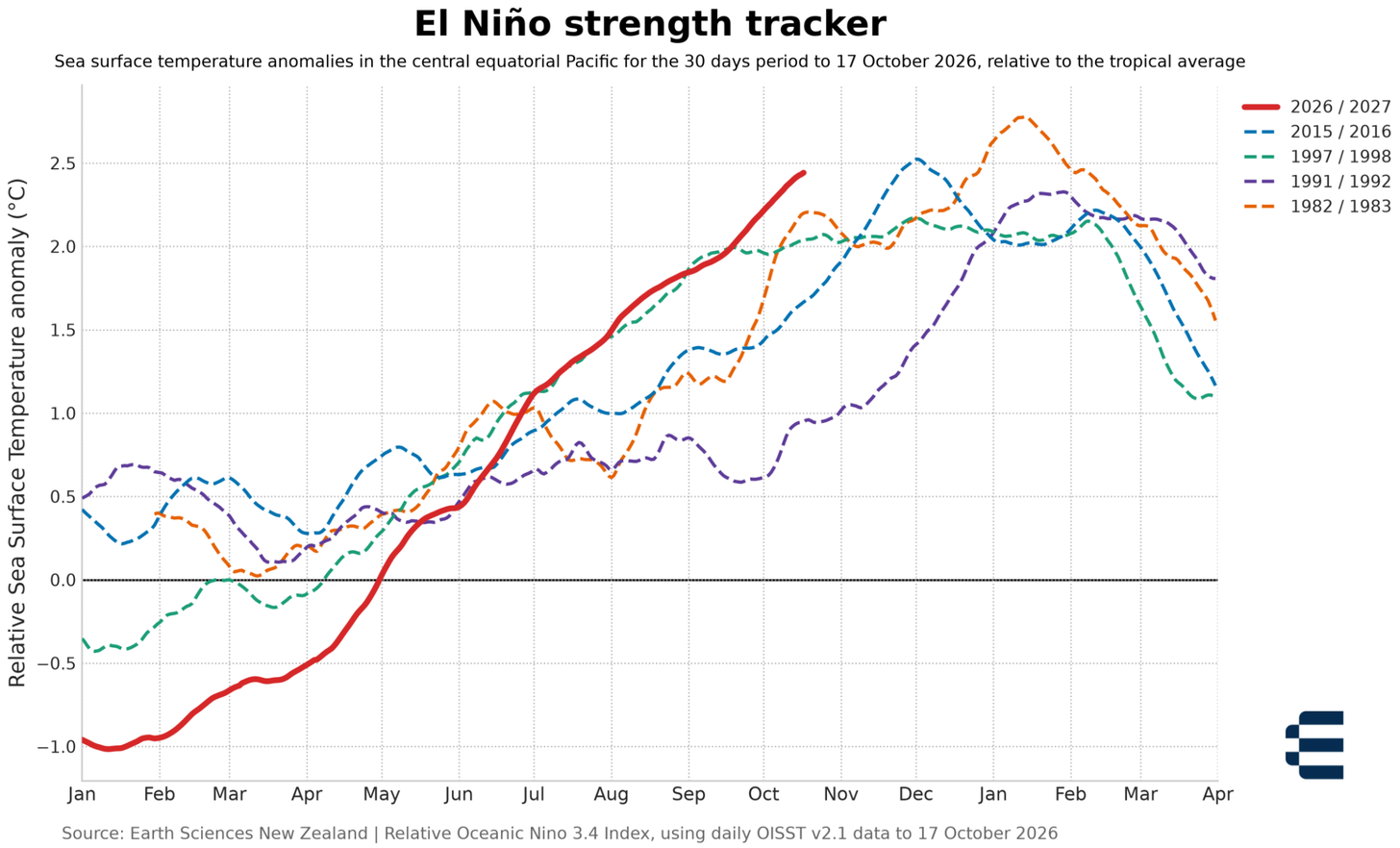
Island Climate Update (ICU) Consensus Outlook

Combines guidance from all three methods, with confidence reflecting their agreement

Rapid development of a very strong El Niño



Source: Earth Sciences NZ



Source: El Nino 2026 | Earth Sciences NZ

The development of a very strong El Niño provides an important basis for this season's tropical cyclone outlook.

ESNZ Analogue method: Historical seasons with similar climate conditions

Analogue season selection based on:

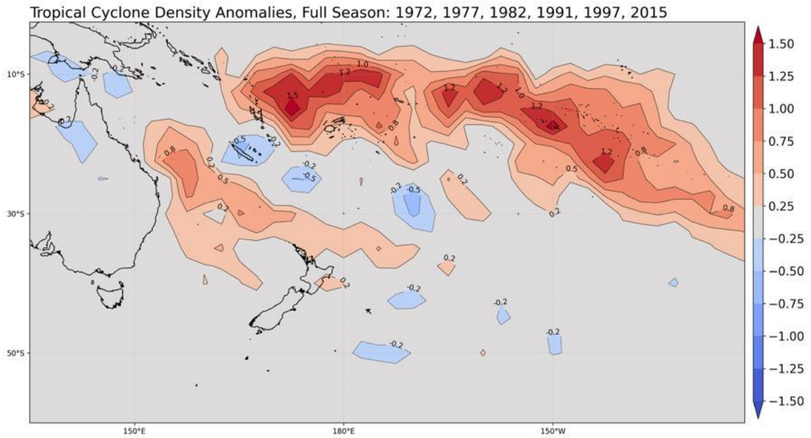
Recent evolution

- **Well-coupled El Niño established** during May–June 2026
- **Rapid strengthening** through July–August

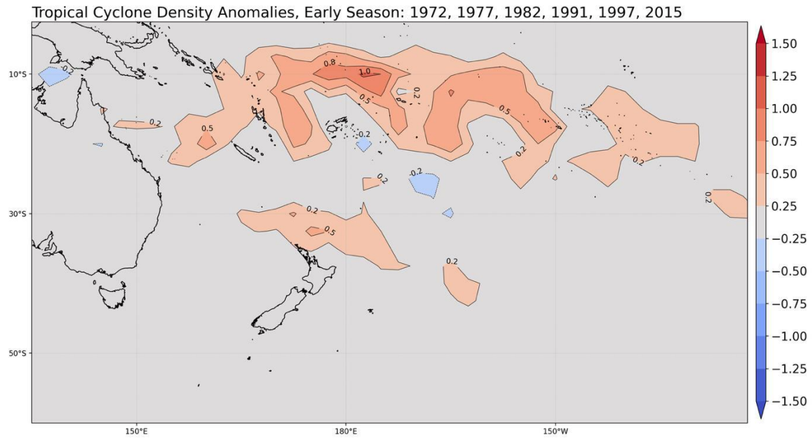
Forecast ENSO conditions

- **Very strong El Niño expected** during October–December 2026
- **No indication of a transition to La Niña** at the start of the TC season

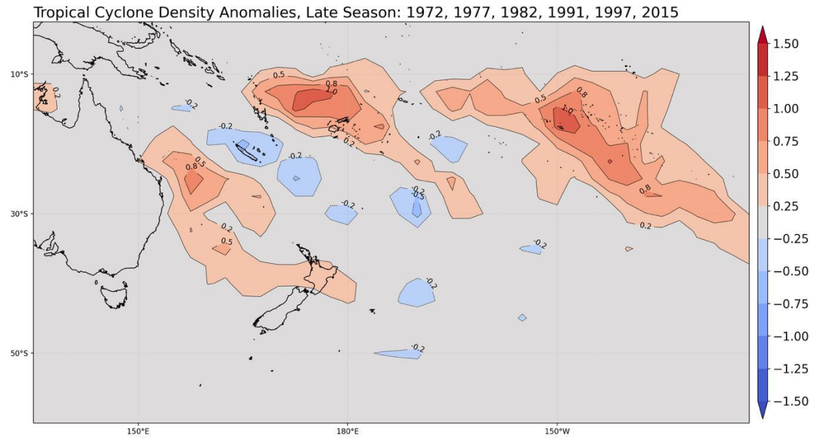
Tropical cyclone density anomalies from historical analogue seasons:



Full Season (Nov-Apr)



Early Season (Nov-Jan)



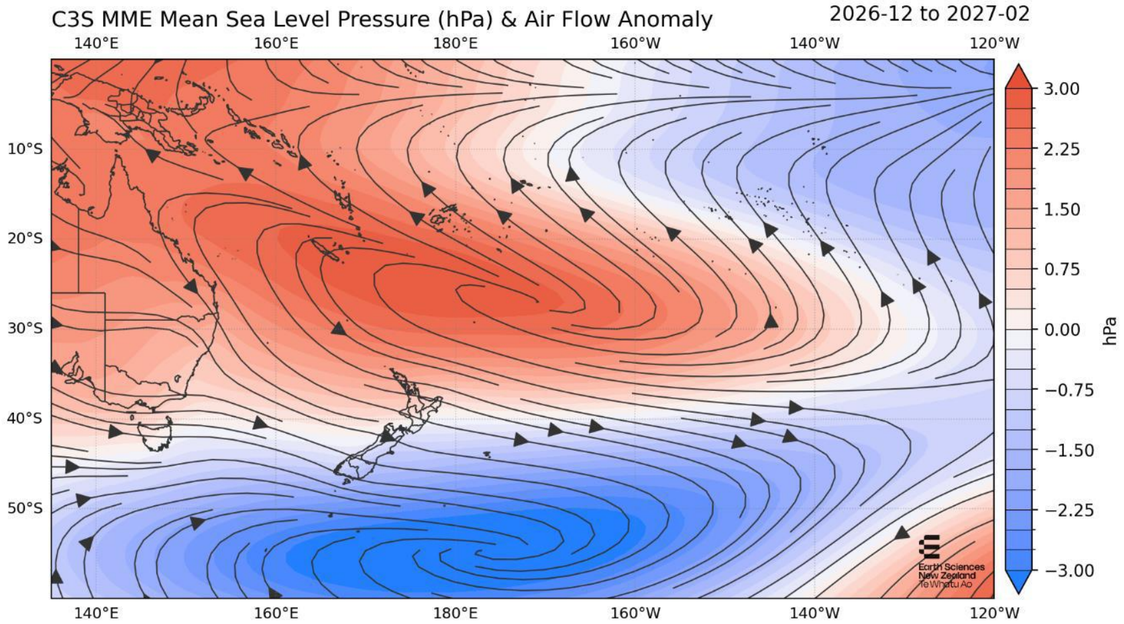
Late Season (Feb-Apr)

Source: [ESNZ Southwest Pacific Tropical Cyclone Outlook 2026–27, Figures 2 & 4.]

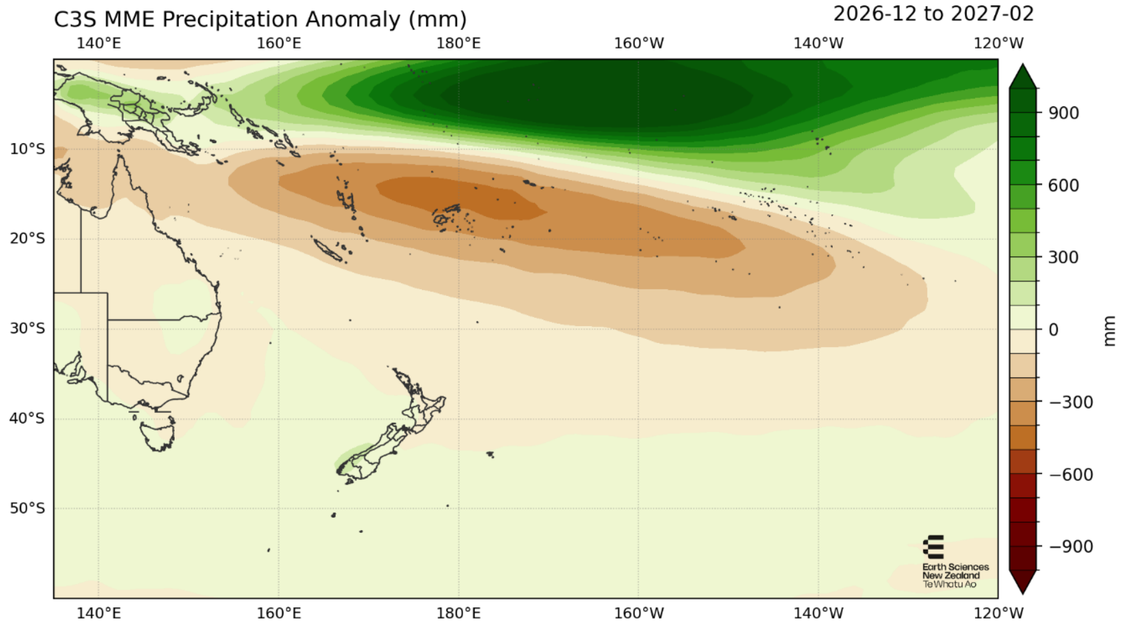
Historical analogues suggest increased TC activity across the central and eastern Southwest Pacific, particularly east of the International Date Line.

Dynamical models: Large-scale atmospheric conditions

- **Multi-model ensemble (MME) guidance** supports the expectation of a very strong El Niño persisting through the TC season.
- **Mean sea level pressure (MSLP)** is forecast to be above normal across much of the western Southwest Pacific and below normal near and east of the International Date Line.
- **Rainfall** is forecast to be above normal near the equator, with below-normal rainfall further south.
- The South Pacific Convergence Zone (**SPCZ**) is **expected to shift northeast of normal**, a typical impact of El Niño.



MSLP anomaly (Dec-Feb)



Rainfall anomaly (Dec-Feb)

Overall, dynamical guidance favours increased TC activity near and east of the International Date Line.

TCO-SP: Deterministic statistical model

How the model works

- Developed by the **University of Newcastle**.
- Uses statistical relationships between **historical cyclone activity and large-scale climate indices**.
- Provides an **independent statistical perspective** alongside the analogue and dynamical approaches.

2026–27 regional guidance

- **Elevated activity** in the Central and Northeast SW Pacific.
- **Normal to elevated activity** in the Southeast SW Pacific.
- **Normal to reduced activity** in the Western Central and Northern SW Pacific
- **Reduced activity** in the East Coral Sea.
- **Normal activity** for the Southwest Pacific basin overall.

Region	TCO-SP guidance
SP Basin	**Normal**
North Coral Sea	Normal
East Coral Sea	Reduced
Northern SW Pacific	Normal-Reduced
Western central SW Pacific	Normal-Reduced
Central SW Pacific	Elevated
Southeast SW Pacific	Normal-Elevated
Northeast SW Pacific	Elevated
N. New Zealand	Normal

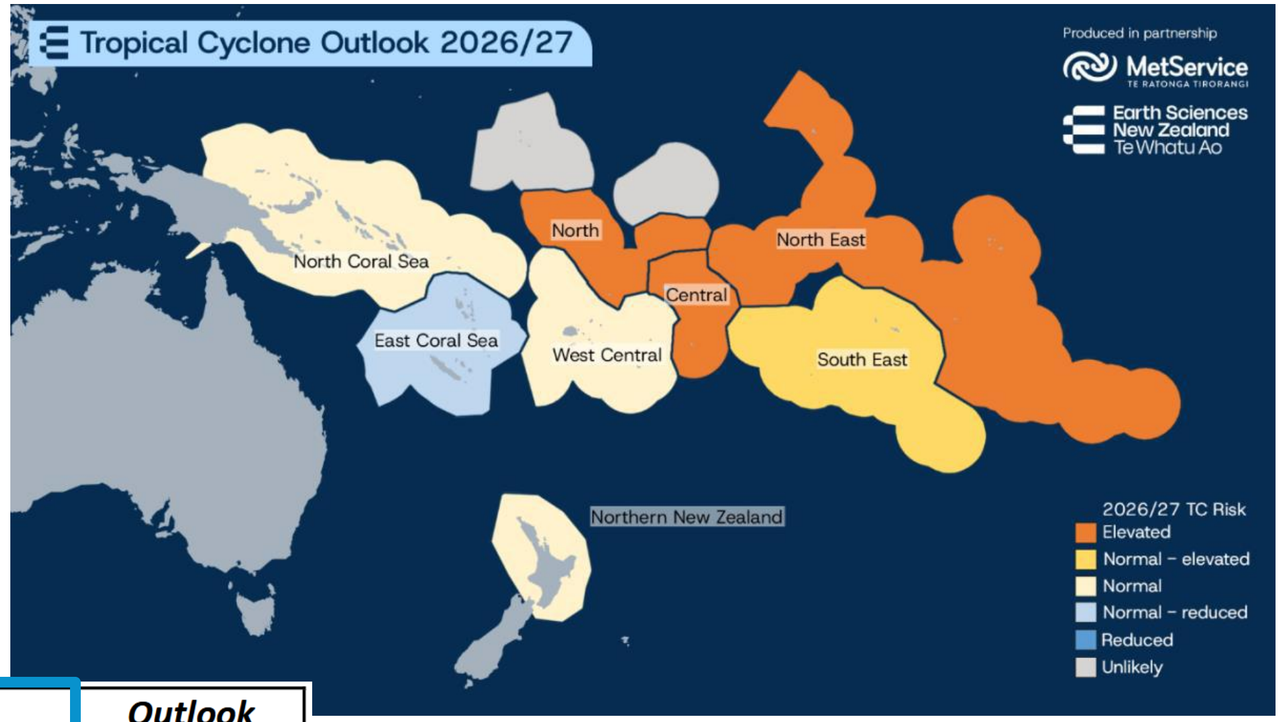
Source: ESNZ Southwest Pacific Tropical Cyclone Outlook 2026–27, Table 1.

TCO-SP guidance indicates elevated TC activity in the central and northeastern SW Pacific, despite near-normal activity across the basin overall

ESNZ Consensus: 2026–27 Tropical Cyclone Outlook

Key messages

- **Normal to above-normal TC activity** expected across the Southwest Pacific basin.
- **Elevated TC activity** expected near and east of the International Date Line, particularly in the northern, central, and northeastern SW Pacific.
- **Normal or reduced TC risk** expected across western parts of the basin, depending on the subregion.
- **Moderate to high confidence** in the consensus outlook.



Consensus across the three approaches:

TC activity 2026/27	*ESNZ Analogue*	*International Dynamical*	*TCO-SP Deterministic*	*ICU Consensus*	*Outlook Confidence*
SP Basin	**Normal-Elevated**	**Normal-Elevated**	**Normal**	**Normal-Elevated**	**Moderate-High**
North Coral Sea	Normal	Normal	Normal	**Normal**	**High**
East Coral Sea	Normal	Normal - Reduced	Reduced	**Normal - Reduced**	**Moderate**
Northern SW Pacific	Elevated	Elevated	Normal-Reduced	**Elevated**	**Moderate-High**
Western central SW Pacific	Normal-Elevated	Normal-Reduced	Normal-Reduced	**Normal**	**Moderate**
Central SW Pacific	Normal-Elevated	Elevated	Elevated	**Elevated**	**Moderate-High**
Southeast W Pacific	Elevated	Normal-Elevated	Normal-Elevated	**Normal-Elevated**	**Moderate-High**
Northeast SW Pacific	Elevated	Elevated	Elevated	**Elevated**	**High**
N. New Zealand	Normal	Normal	Normal	**Normal**	**High**

Source: ESNZ Southwest Pacific Tropical Cyclone Outlook 2026–27, Figure 1 and Table 1.

Commentary on TCO validation

- **Good overall forecast performance**

  Successfully predicted seasonal tropical cyclone counts in 11 of 17 seasons (~65% hit rate).

  Correctly forecast the minimum number of severe (Cat 3+) cyclones in ~70% of outlooks.

  Only 3 seasons missed both total cyclone activity and severe cyclone activity simultaneously.

- **ENSO influences forecast skill**

  Forecast skill appears **higher during El Niño years than during La Niña years**.

  Most forecast misses have occurred during moderate La Niña events.

  Success rate during the limited sample of moderate La Niña cases is approximately 50%.

- **Forecast range and bias**

  Forecast sharpness has varied considerably between years.

  All forecast misses were associated with **over-prediction** of cyclone numbers.

  Around half of the misses were only marginally outside the forecast range, rather than major forecast failures.

- **Important caveats**

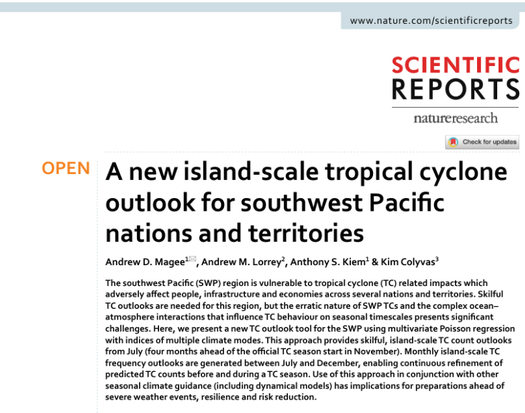
  Spatial verification of forecast risk patterns has not yet been systematically evaluated.

  Outlooks include expert judgement and subjective adjustments (e.g., analog selection, trend considerations, PINMS input).

  No full objective reforecast assessment has been undertaken.

  Verification statistics should therefore be interpreted with appropriate caution.

Commentary on TCO validation

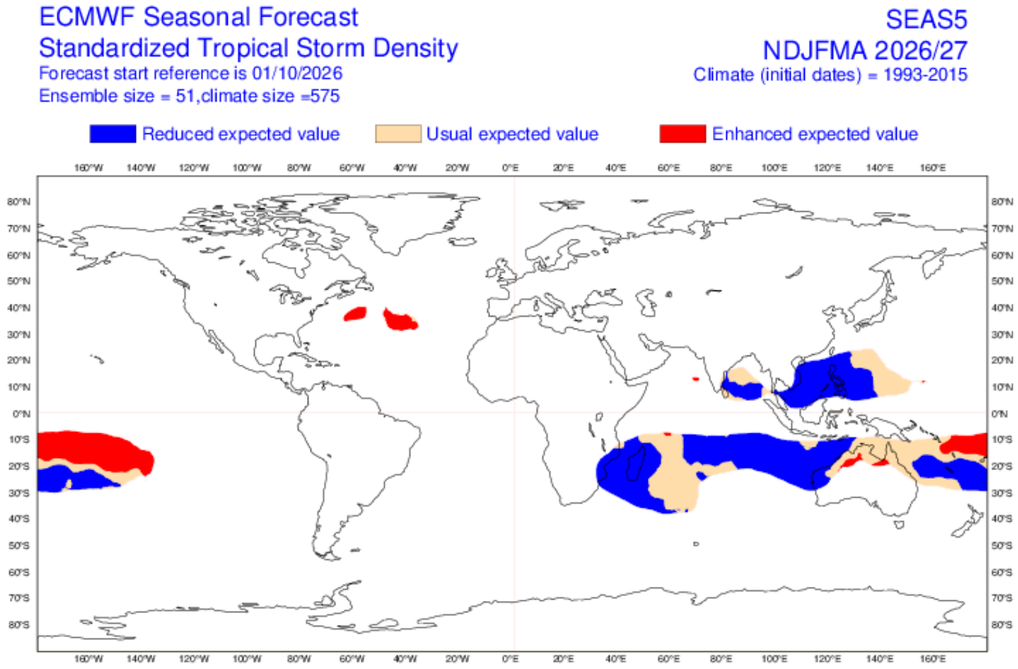


TCO-SP (Magee et al, 2020)

- Model skill was assessed using **cross-validation (hindcast) experiments**, designed to emulate real-time forecasting and avoid overfitting.
- The statistical model demonstrated **significant skill at forecasting seasonal tropical cyclone counts** for many Southwest Pacific islands and territories up to **four months before the season begins**.
- Forecast skill generally **improved as the season approached** (July → December outlook updates), reflecting the increasing predictability of large-scale climate drivers such as ENSO and other ocean-atmosphere modes.
- Validation showed the model could successfully reproduce **year-to-year variations in cyclone activity**, rather than simply predicting climatological averages
- Skill was strongest for some islands and sub-regions where tropical cyclone occurrence is strongly linked to large-scale climate variability, while skill was lower in regions with fewer cyclone events and greater stochastic variability.
- The use of **multiple climate predictors** (ENSO, IPO, and other large-scale climate indices) provided improved performance relative to outlook approaches relying on a single climate driver.

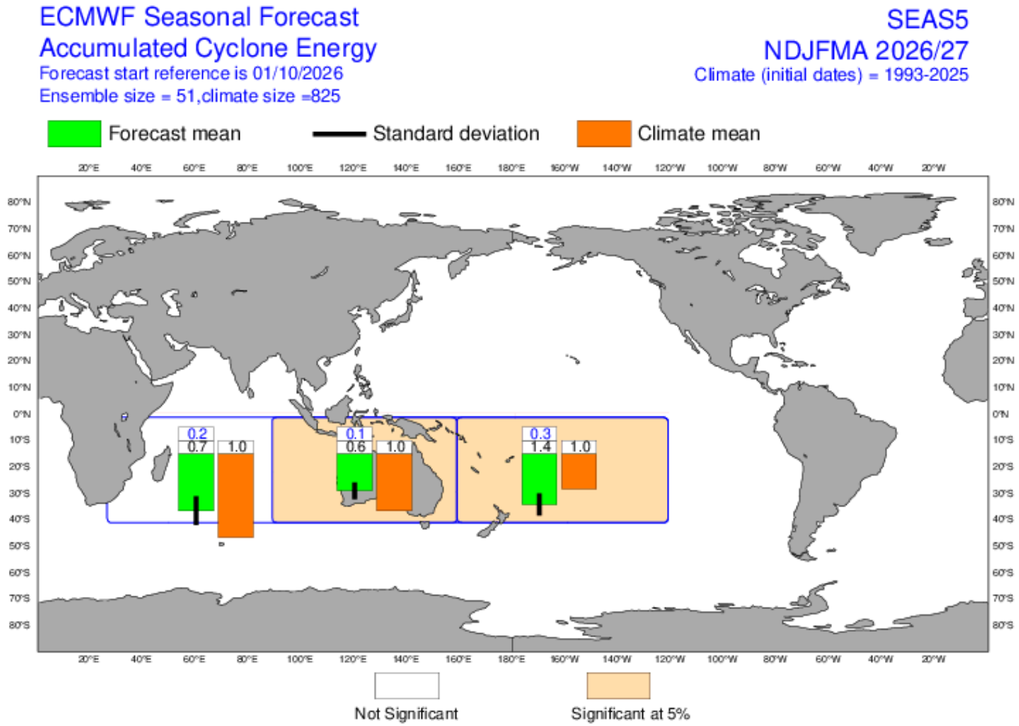
ECMWF: 2026–27 Seasonal Tropical Cyclone Guidance

- **Tropical cyclone density:** Regional variability expected, with areas of enhanced activity in the eastern Southwest Pacific and reduced activity across parts of the western basin.
- **Accumulated Cyclone Energy (ACE):** Above normal in the Southwest Pacific (~140%) but below normal in the Australian region (~60%).



Tropical storm density anomaly

Source: ECMWF



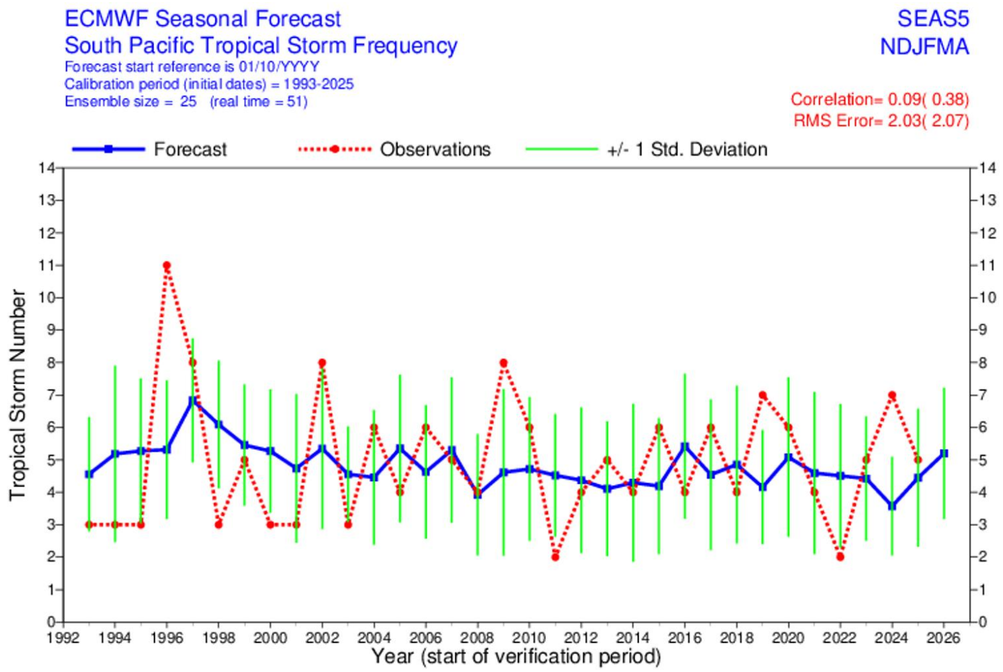
Accumulated Cyclone Energy (ACE)

Source: ECMWF

ECMWF guidance indicates substantial regional variability in TC activity, broadly consistent with the ESNZ consensus outlook.

ECMWF: Historical Seasonal TC Forecast Skill

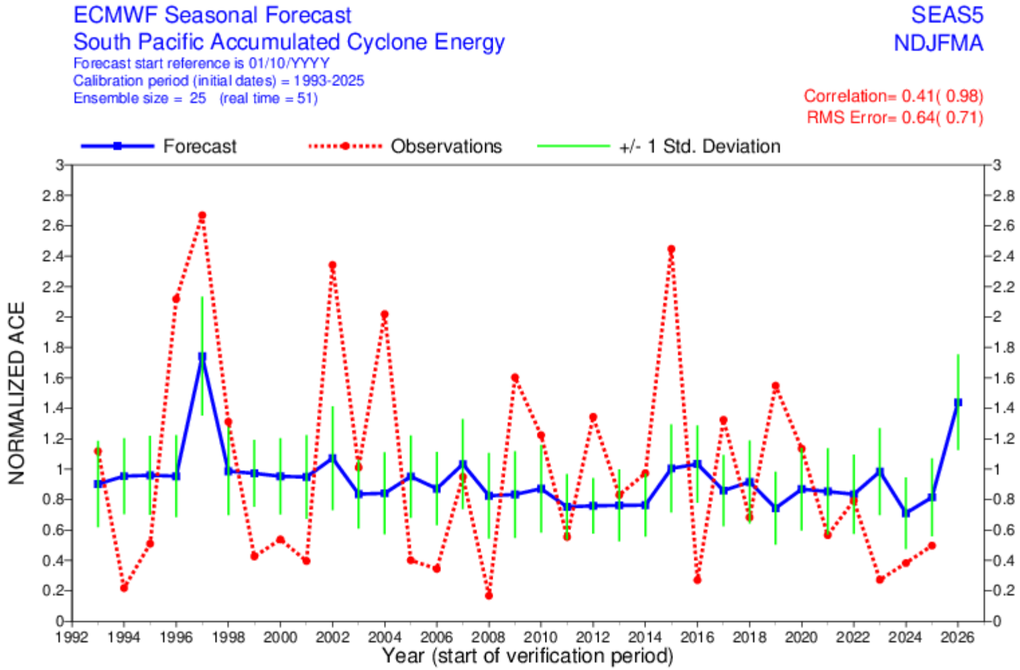
- **Historical forecast skill varies by metric**, with greater skill in predicting seasonal Accumulated Cyclone Energy (ACE) than TC frequency.
- **ECMWF forecasts show less year-to-year variability than observations**, with difficulty capturing particularly active or inactive seasons.



Tropical Storm Frequency

Correlation: 0.09 | RMSE: 2.03 storms

Source: ECMWF



Accumulated Cyclone Energy (ACE)

Correlation: 0.41 | RMSE: 0.64 (normalised ACE)

Source: ECMWF

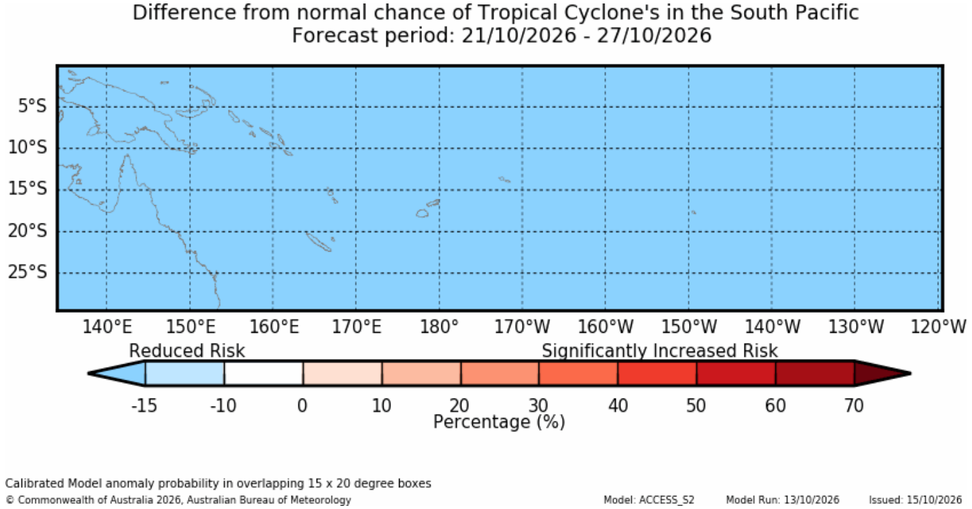
ECMWF shows greater historical skill for seasonal ACE than cyclone frequency, although substantial forecast uncertainty remains.

Beyond the seasonal outlook: Sub-seasonal TC guidance

- **Sub-seasonal outlooks** provide regularly updated guidance on potential tropical cyclone activity over the coming weeks.
- **Bureau ACCESS-S** provides two-week guidance on the chance of tropical cyclone formation.
- **ECMWF extended-range forecasts** provide weekly guidance on tropical storm activity and strike probabilities.

Australian Bureau of Meteorology ACCESS-S

1–2 week tropical cyclone formation guidance

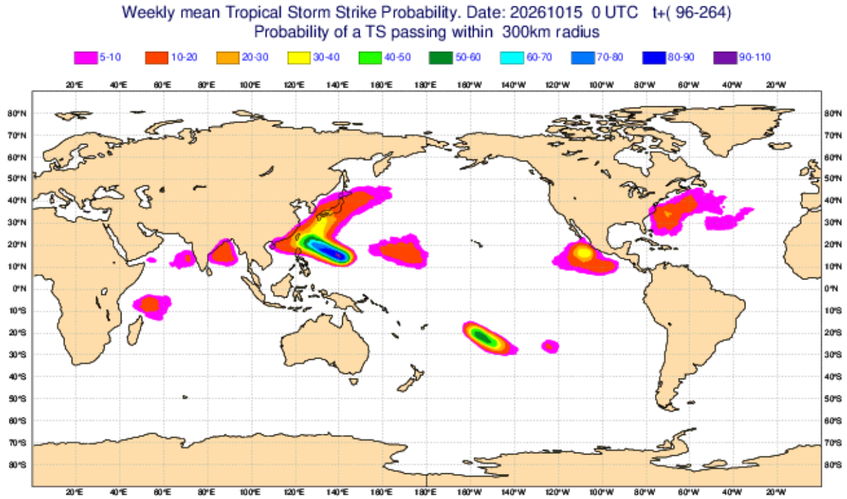


Forecast changes in the likelihood of tropical cyclone formation relative to normal.

Source: https://www.bom.gov.au/climate/pacific/outlooks/

ECMWF

Weekly tropical storm activity guidance



Forecast probability of a tropical storm passing within 300 km of a location.

Source: https://charts.ecmwf.int

Sub-seasonal forecasts complement the seasonal outlook by helping identify periods and regions of increased tropical cyclone potential.

Summary

- **Normal to above-normal TC activity** is expected across the Southwest Pacific during November 2026 – April 2027.
- **Elevated TC activity is favoured near and east of the International Date Line**, particularly across the northern, central, and northeastern Southwest Pacific, while normal or reduced activity is expected in western parts of the basin.
- **Very strong El Niño conditions** are a key driver of the outlook, with the analogue, dynamical, and statistical guidance broadly supporting increased activity in the central and eastern Pacific.
- **Severe tropical cyclones remain possible across the region**, including areas where normal or reduced seasonal activity is expected.
- **Continued monitoring of sub-seasonal guidance and official warnings is important**. Even areas with normal or reduced seasonal risk can experience damaging cyclones.

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