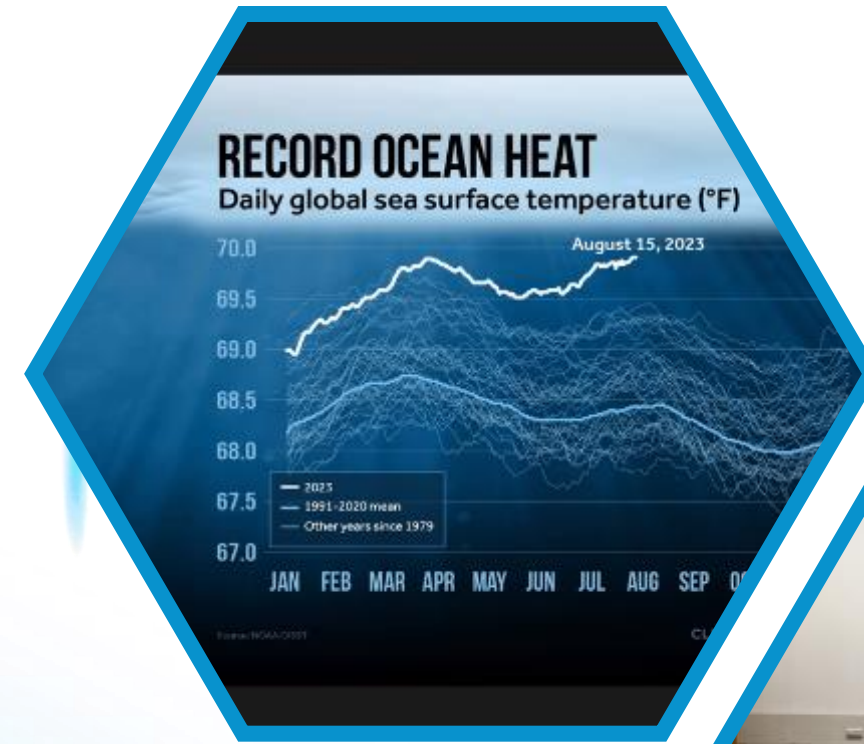


15TH SESSION OF THE PACIFIC ISLANDS CLIMATE OUTLOOK & STAKEHOLDER FORUM

PICOF-15

14 - 15 OCTOBER, 2024

HYBRID
IN-PERSON: NUKU'ALOFA, TONGA
ONLINE: ZOOM



Session 4: Looking Forward – Monthly and Seasonal Outlooks for November 2024 to April 2025

iii. Tropical cyclones

Simon McGree

(Australian) Bureau of Meteorology

The Bureau – South Pacific TC outlook November 2024 to April 2025

Average number of tropical cyclones likely in the South Pacific in 2024–25

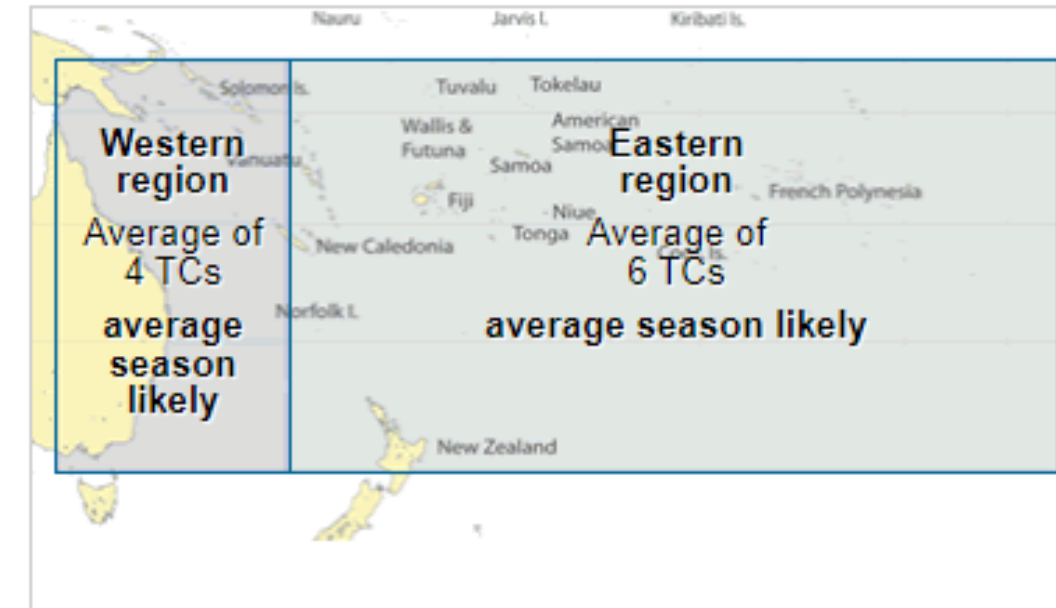
- The number of tropical cyclones expected during the 2024–25 South Pacific tropical cyclone season (November to April), 6 in the Eastern region and 4 in the Western region, is expected to be close to average.
- The likelihood of severe (strong) tropical cyclones is higher than average, because of the warmer than average ocean temperatures forecast for the South Pacific region in the coming months.
- Due to rising sea levels, the risk of storm surge from tropical cyclones is likely to continue to increase.
- Tropical cyclones can affect Pacific Islands and coastal regions even when they remain well offshore.
- Tropical lows that do not intensify into tropical cyclones, or lows that are the remnants of older tropical cyclones, can still produce damaging winds, widespread rainfall, and dangerous flooding.

The South Pacific tropical cyclone season typically runs from 1 November to 30 April, although tropical cyclones can, and do, form outside of these dates. All tropical cyclones that are active between 1 July and 30 June count toward the season's total. The average number of tropical cyclones during the season is 4 in the Western region and 6 in the Eastern region.

This forecast is based on the analysis of ENSO oceanic and atmospheric indicators over July to September 2024. The skill of this forecast is limited and the long-term trend towards fewer tropical cyclones can provide better guidance on the expected number of tropical cyclones.

Ocean temperatures are currently cooler than average in parts of the eastern and central equatorial Pacific, close to average in the vicinity of the Date Line, and warmer than average in the South Pacific, south of 20° S.

Region tropical cyclone forecast



Region	Long-term average (median) number of tropical cyclones	Chance more than average number of tropical cyclones
Western	4	average season likely
Eastern	6	average season likely

The long-term average number of tropical cyclones is calculated using data from the 1969–70 season up to the most recent season.

The Bureau – South Pacific TC outlook November 2024 to April 2025

About the long-range forecasts

The tropical cyclone season long-range forecast uses the statistical relationships between historical tropical cyclone numbers and two indicators: the Southern Oscillation Index (SOI) and the Niño3.4 sea surface temperature (SST) anomaly (relative to the 1991–2020 average). These two indicators provide a measure of the atmospheric and oceanic state, respectively, of El Niño-Southern Oscillation (ENSO).

The July, August and September SOI and NINO3.4 anomaly values are used in making the Australian Tropical Cyclone Outlook.

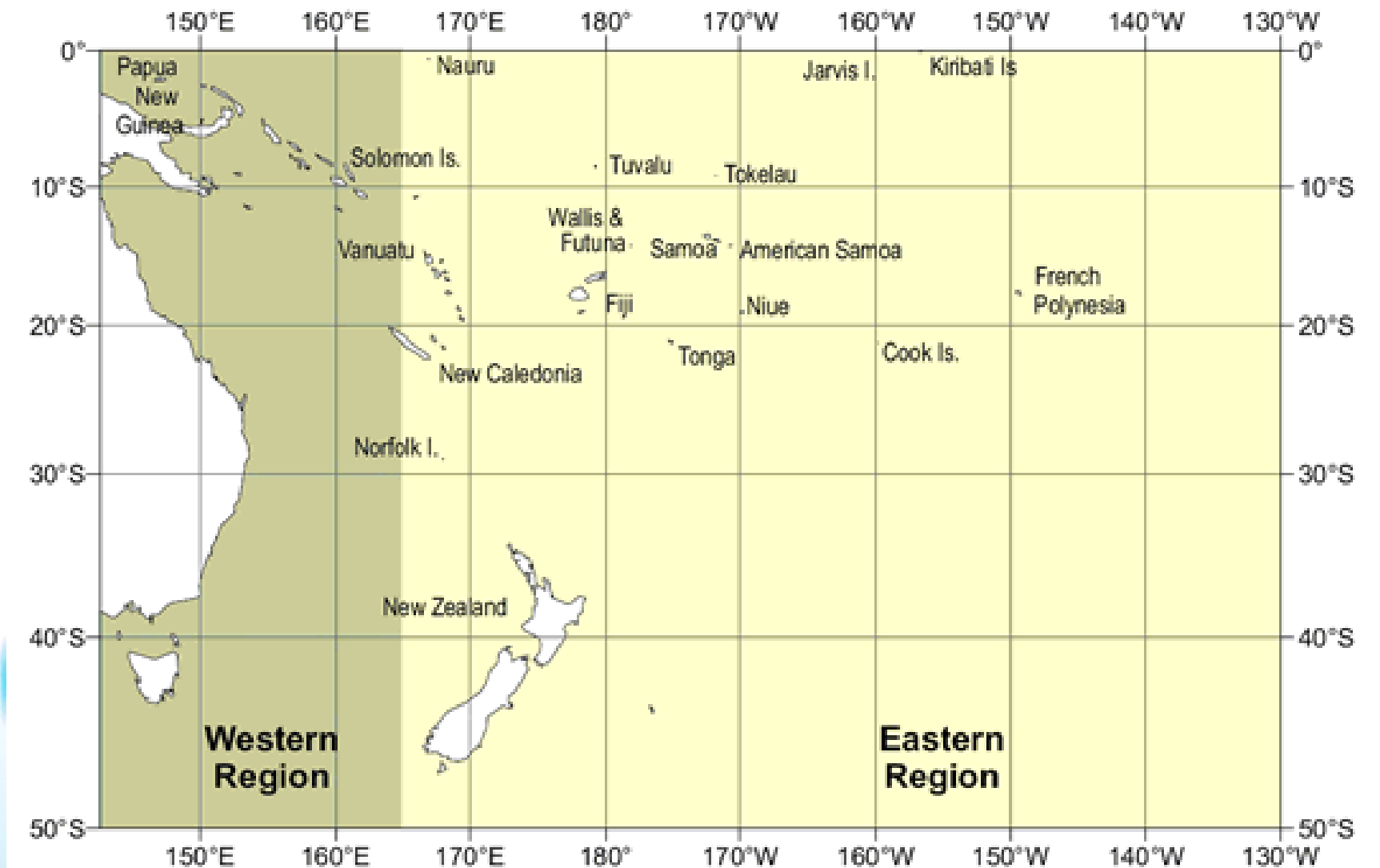
2024	July	August	September
SOI	-6.9	7.8	-1.0
NINO3.4 SST	0.05 °C	-0.07 °C	-0.45 °C

Interpreting the outlook

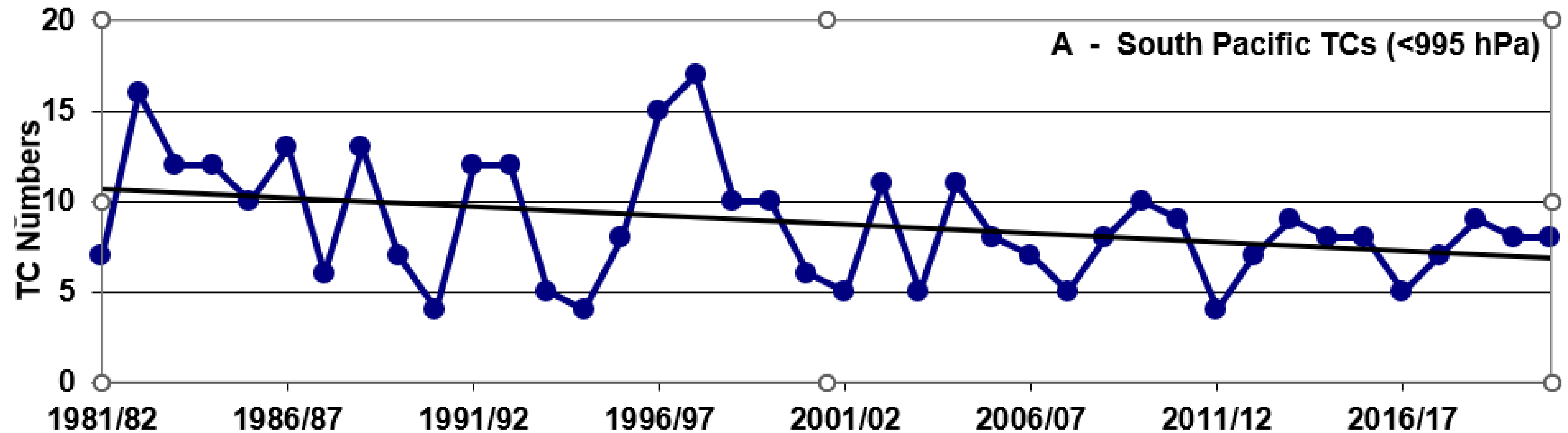
Percentages such as a 60% chance of having more tropical cyclones than average (or a 40% chance of having fewer) mean that for every ten years with similar climate patterns to those currently observed, six years would be expected to have an above-average number of tropical cyclones and four years would be expected to have a below-average number.

South Pacific region long-range forecast accuracy

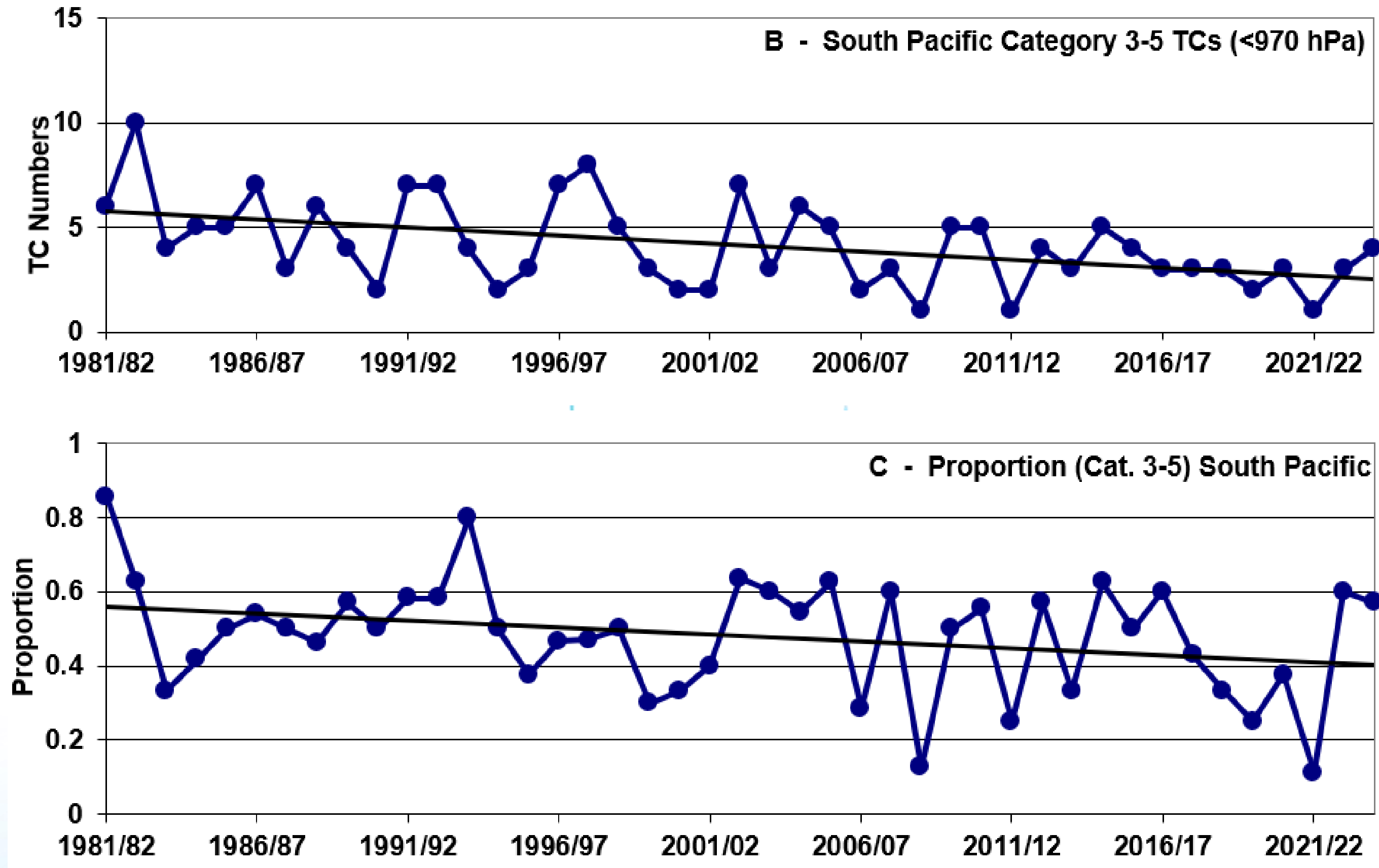
The statistical model used for this long-range forecast has a **high** level of accuracy predicting cyclone numbers in the **western region**, but a **very low** level of accuracy for the **eastern region**.



The Bureau – South Pacific TC outlook November 2024 to April 2025



The Bureau – South Pacific TC outlook November 2024 to April 2025



NIWA – TC outlook Nov-Apr 2024-25

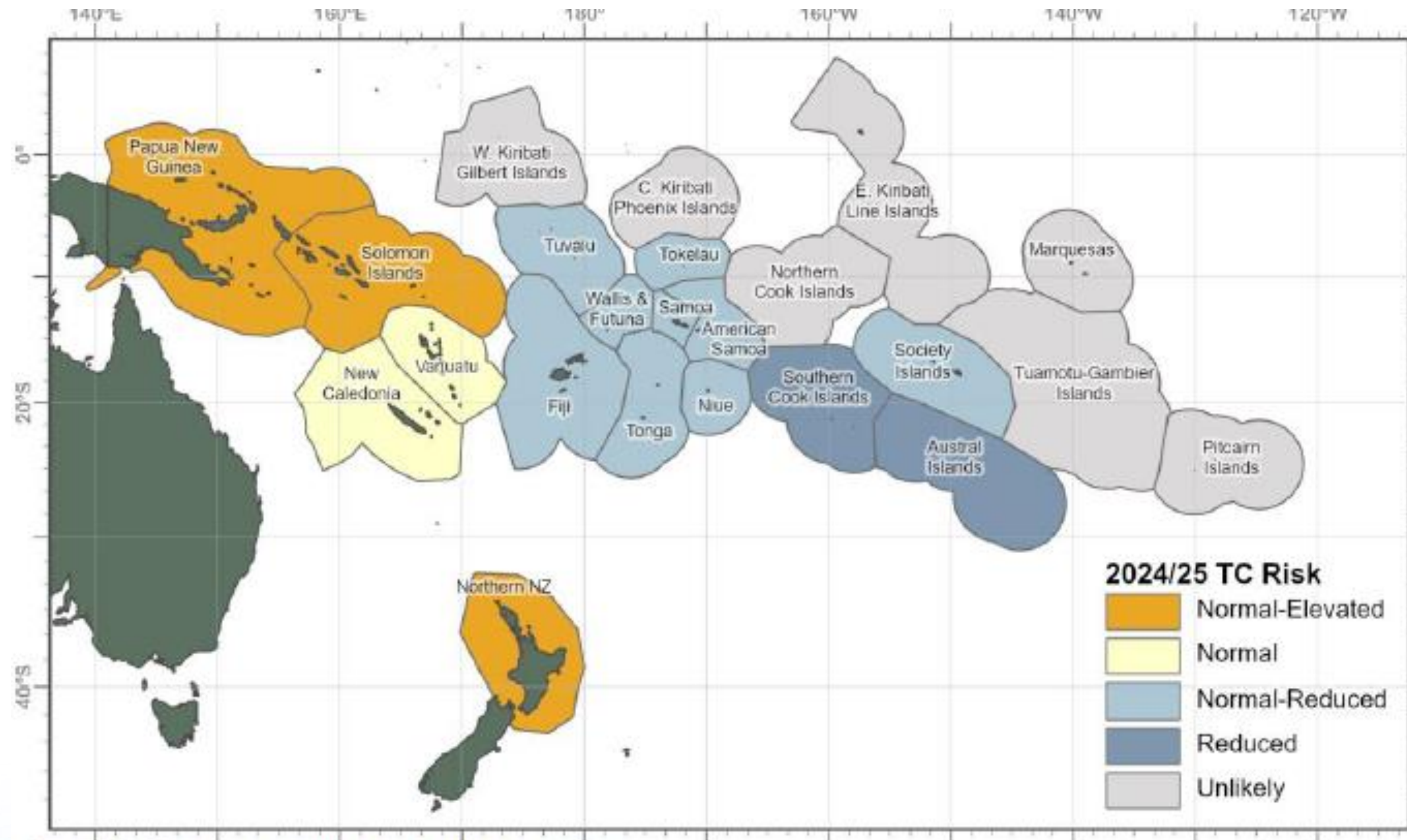


Figure 1: Tropical cyclone risk for the 2024-25 season

NIWA – TC outlook Nov-Apr 2024-25

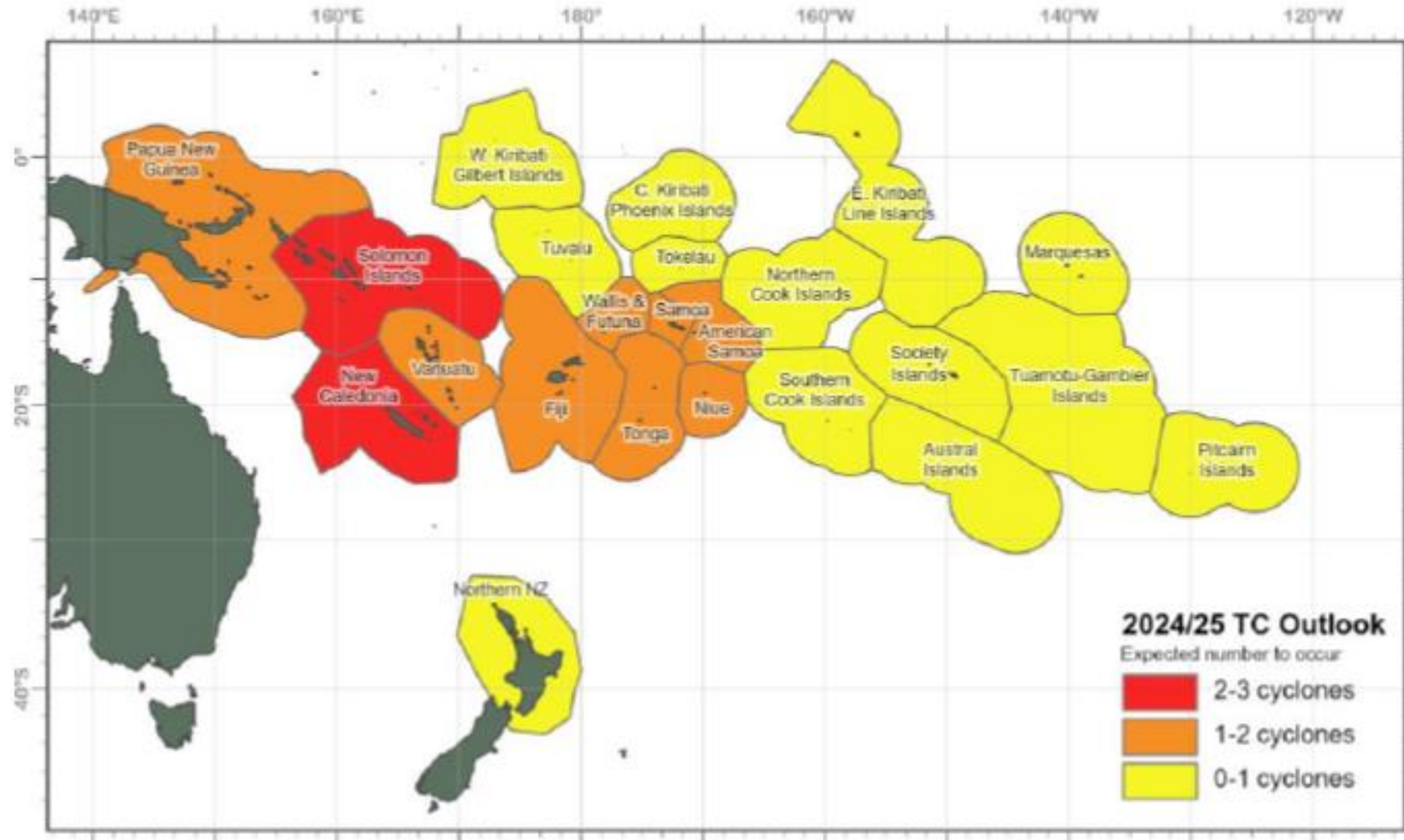
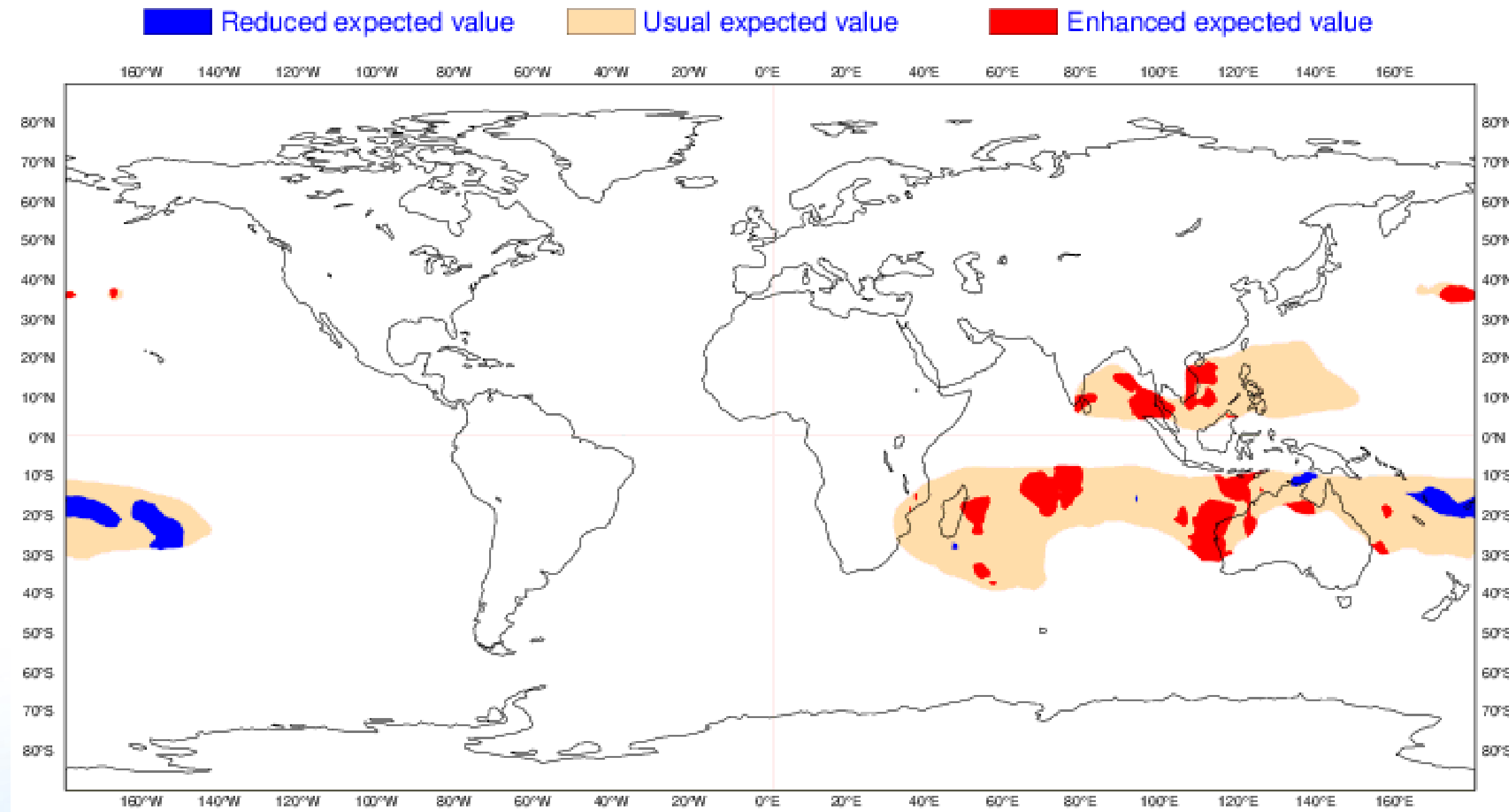


Figure 2: Number of predicted named tropical cyclones interacting with an island group for the 2024-25 season

ECMWF – TC outlook Nov-Apr 2024-25

ECMWF Seasonal Forecast
Standardized Tropical Storm Density
Forecast start reference is 01/10/2024
Ensemble size = 51, climate size = 575

SEAS5
NDJFMA 2024/25
Climate (initial dates) = 1993-2015



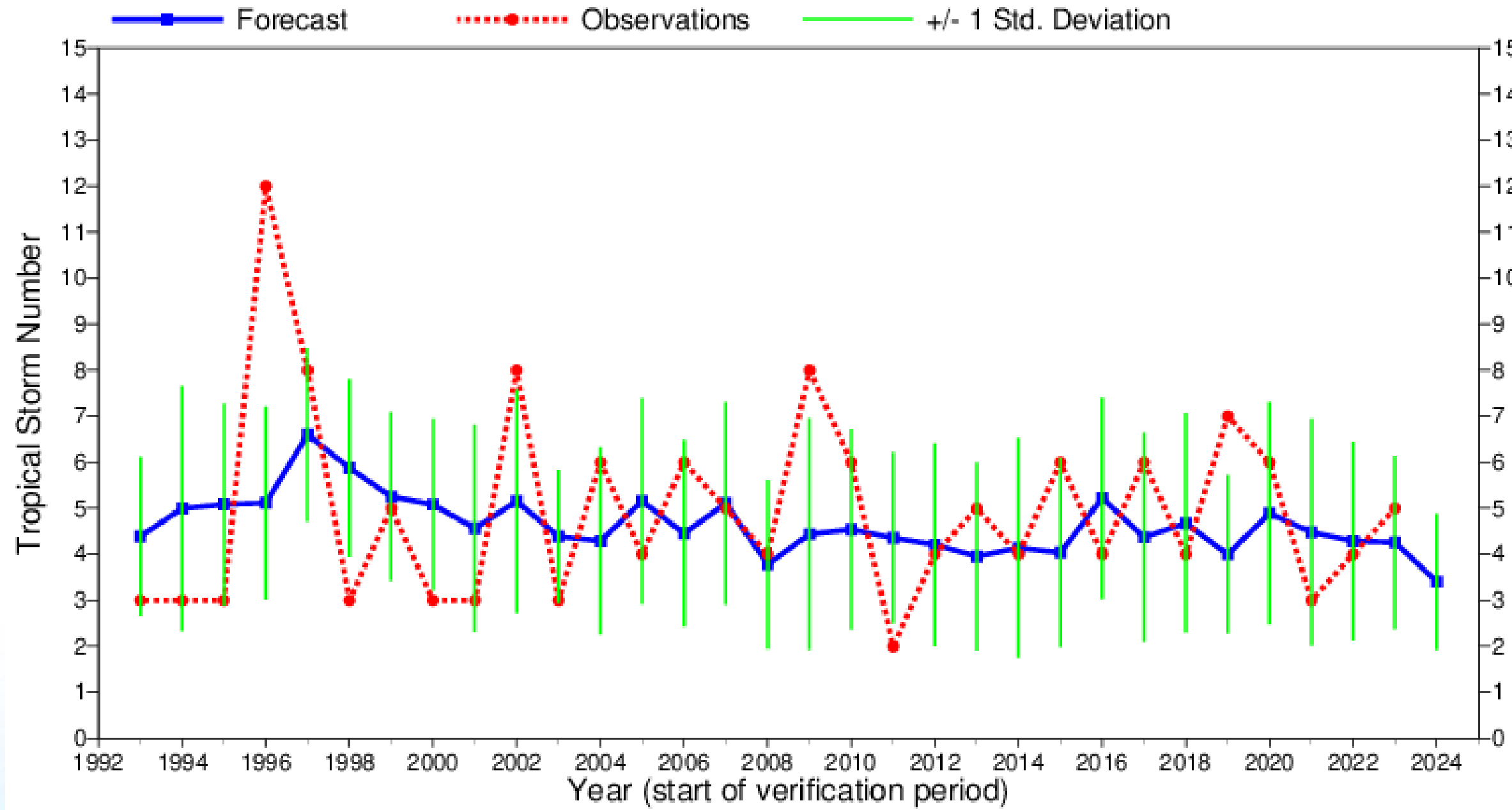
ECMWF – TC outlook Nov-Apr 2024-25

ECMWF Seasonal Forecast
 South Pacific Tropical Storm Frequency

Forecast start reference is 01/10/YYYY
 Calibration period (initial dates) = 1993-2023
 Ensemble size = 25 (real time = 51)

SEAS5
 NDJFMA

Correlation= 0.16(0.61)
 RMS Error= 2.08(2.15)



ECMWF – TC outlook Nov-Apr 2024-25

ECMWF Seasonal Forecast
Tropical Storm Frequency
Forecast start reference is 01/10/2024
Ensemble size = 51, climate size = 775

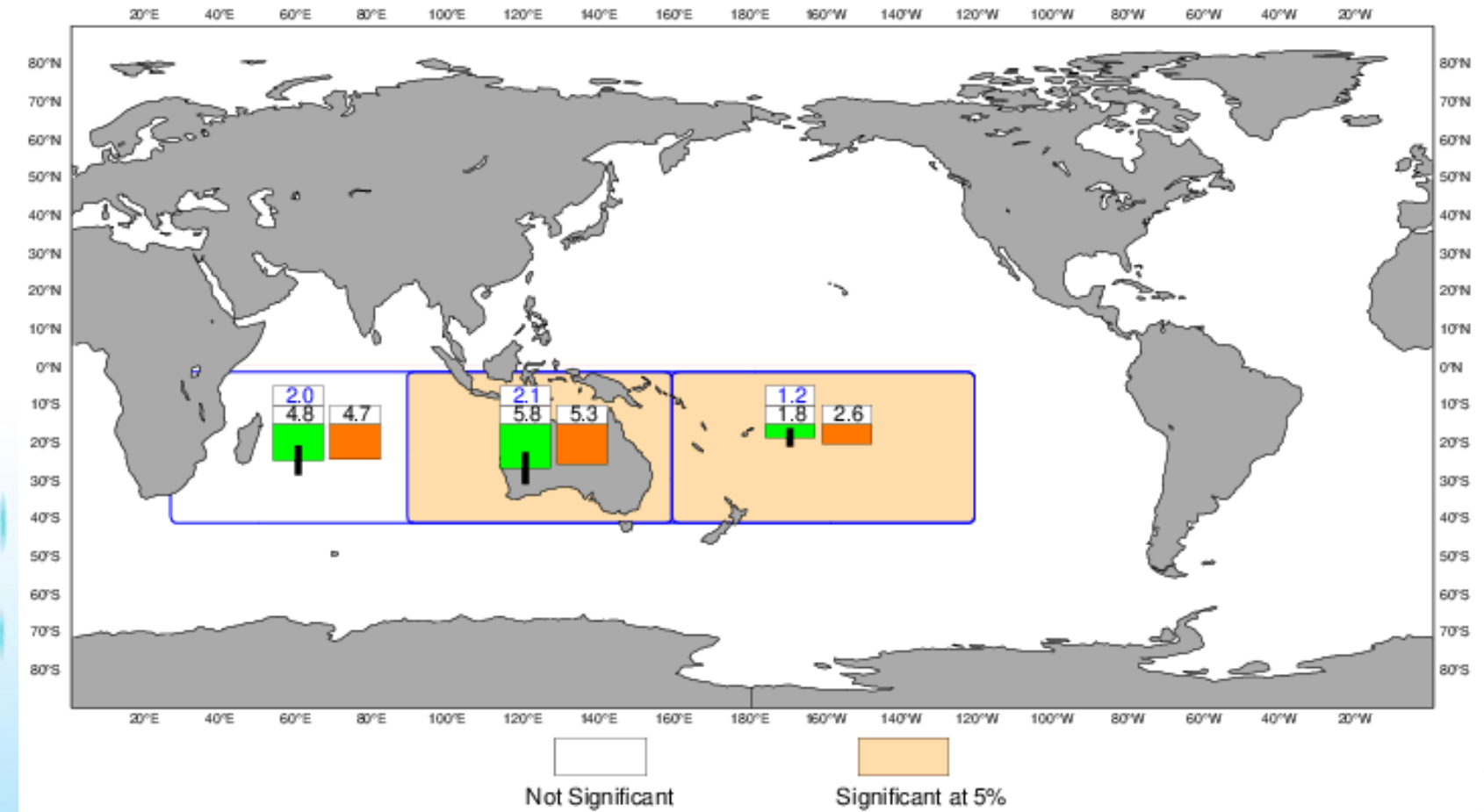
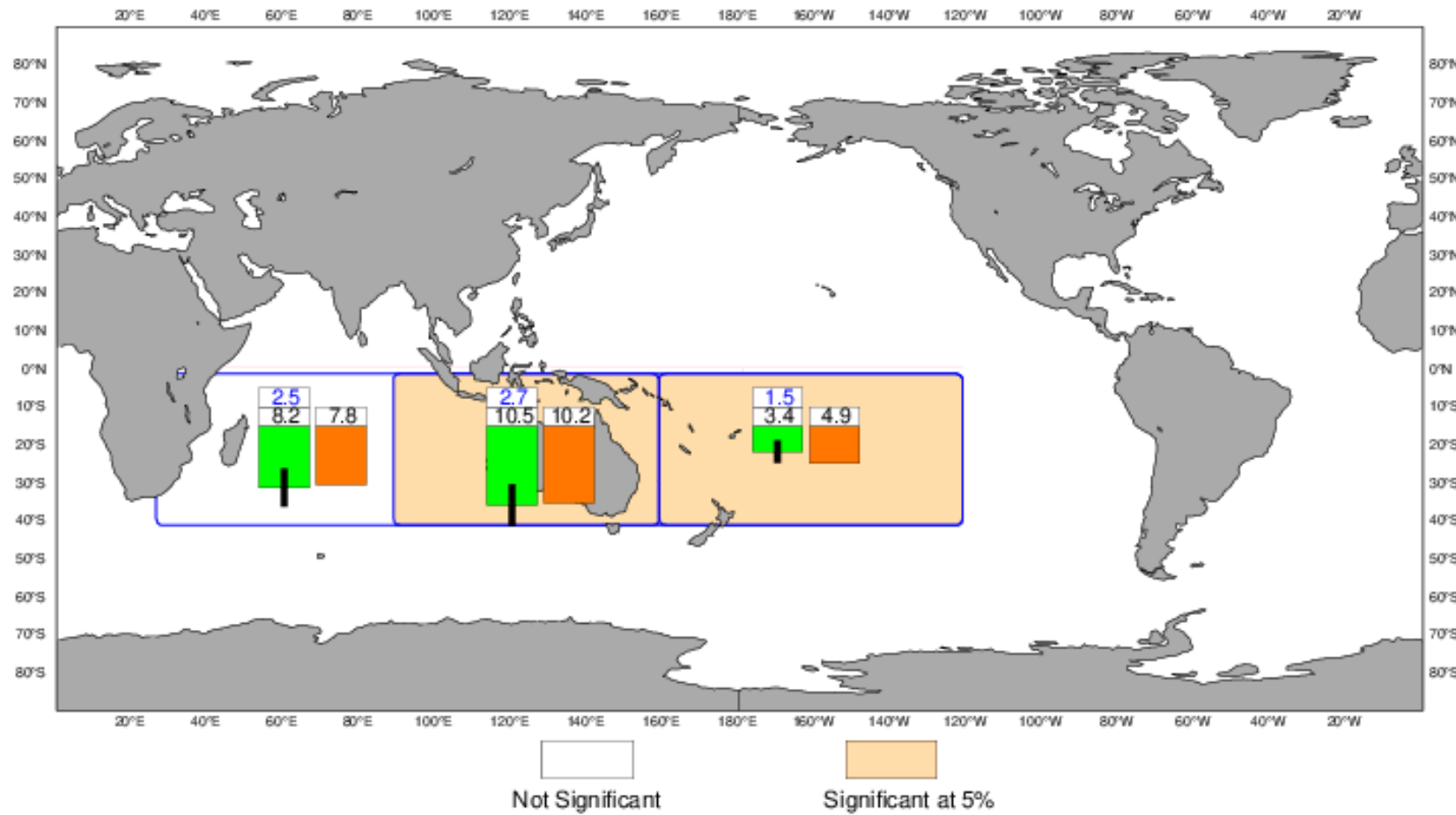
SEAS5
NDJFMA 2024/25
Climate (initial dates) = 1993-2023

ECMWF Seasonal Forecast
Hurricane or typhoon Frequency
Forecast start reference is 01/10/2024
Ensemble size = 51, climate size = 775

SEAS5
NDJFMA 2024/25
Climate (initial dates) = 1993-2023

Forecast mean Standard deviation Climate mean

Forecast mean Standard deviation Climate mean



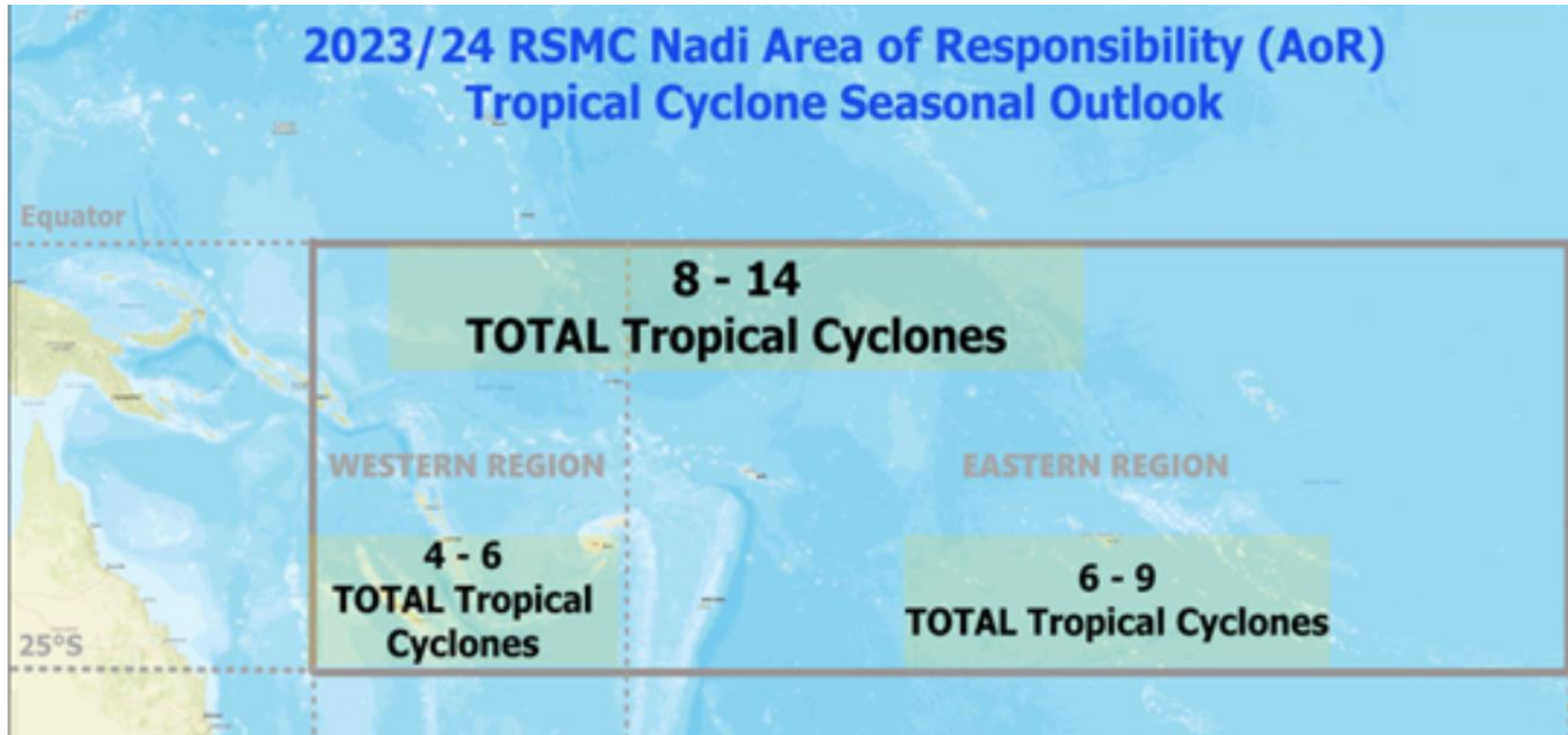
ECMWF – TC outlook Nov-Apr 2024-25

The screenshot displays the ECMWF Charts website interface. The browser address bar shows 'charts.ecmwf.int'. The page features a navigation menu with 'Home' and 'Charts catalogue'. A search bar is present, along with filter sections for 'Range' (Medium, Extended, Long), 'Type' (Forecasts, Verification), 'Component' (Surface, Atmosphere), 'Product type' (High resolution forecast, Ensemble forecast, etc.), and 'Parameters' (Wind). The main content area shows a grid of eight forecast charts, each with a 'Latest forecast' label and an 'ADD TO CHARTSET' button. The charts include:

- Mean sea level pressure and 850 hPa wind speed
- 500 hPa geopotential height and 850 hPa temperature
- 2 m temperature and 30 m wind
- 100 m wind and mean sea level pressure
- Mean sea level pressure and 200 hPa wind
- Rain and mean sea level pressure
- Total cloud cover
- Vorticity and 700 hPa wind

<https://charts.ecmwf.int/> -
 Select Range = Long,
 Type = Forecasts
 Parameters = Tropical
 cyclones

RSMC Nadi TC outlook Nov-Apr 2023-24



Multi-week TC outlooks – from the Bureau

Global and Pacific ACCESS-S outlooks and Pacific climate monitoring

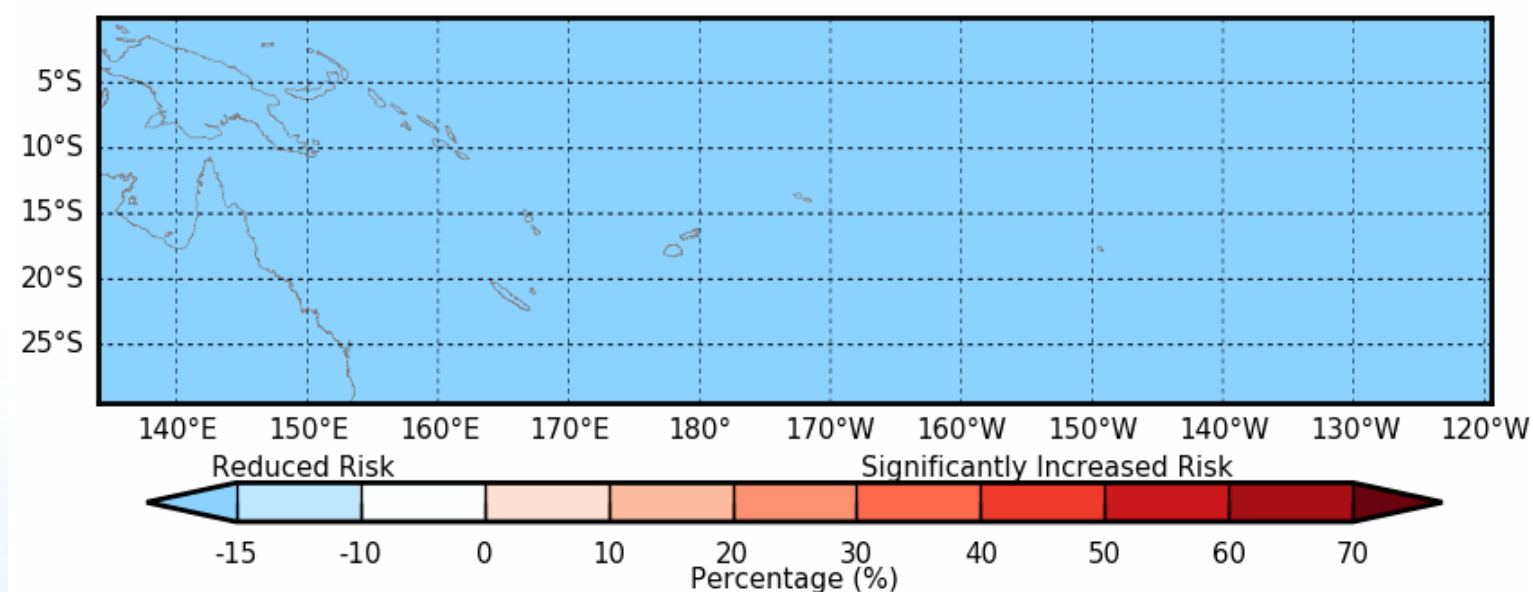
Outlooks issued on Thursdays, one and two week outlooks also issued on Mondays

[About ACCESS-S](#) | [About GPCs](#) | [About RCCs](#)

Seasonal and inter-annual climate variability poses a major risk to many parts of our global society, the economy and the environment. The risks are particularly significant for Pacific Island Countries and compounded by human caused climate change which interacts with natural climate variability. The website provides dynamical model based seasonal and sub-seasonal outlooks and satellite-based climate monitoring with an emphasis on the western Pacific region.

Category	Domain	Period	Variable	Archive
Tropical cyclones ▼	South Pacific ▼	Week ▼	Difference from nor ▼	Operational ▼
		2 ▼	Large ▼	

Difference from normal chance of Tropical Cyclone's in the South Pacific
Forecast period: 16/10/2023 - 22/10/2023



- Source = <http://www.bom.gov.au/climate/pacific/outlooks/>
- Multi-week TC outlooks out to week 3 (South Pacific), 4 (Northwest Pacific)
- Use 'difference from normal chance of TC formation' option
- The Bureau only has one category = tropical cyclone (27.2 knot at 850 hPa threshold)

Multi-week TC outlooks – from MeteoFrance New Caledonia

- Source = <https://www.meteo.nc/nouvelle-caledonie/cyclone/coin-des-experts>
- Southern hemisphere only
- Weeks 1-3
- Focus on Anomaly probability map

Nouvelle-Calédonie
Météo et climat

Accueil | Prévisions | Mer | Observations | Climat | Agriculture | Aviation | **Cyclone**

Phénomènes en cours | Bulletin | Saison en cours | Historique des cyclones | Consignes de sécurité | **Coin des experts**

Nouvelle-Calédonie > Cyclone > Coin des experts

Vigilance météorologique
→ Consultez la carte

Pas de BMS

Activité cyclonique

Actualités

- > Bilan de l'épisode pluvieux du 15 au 18 août 2022
- > Bilan de l'hiver austral et prévisions pour les mois à venir

→ Toutes les actualités

Prévision statistique d'activité cyclonique hebdomadaire dans l'hémisphère Sud

Avertissement :

Ces prévisions ne constituent pas un système d'alerte pour le public mais visent à donner une estimation du risque cyclonique dans les semaines à venir. La compréhension de ces prévisions probabilistes peut ne pas être évidente pour un internaute non averti et requiert la lecture de la documentation associée.

Cette estimation s'appuie sur l'état présent de quelques grandes composantes du système climatique, connu pour influencer l'activité cyclonique. C'est un élément à prendre en compte pour évaluer le risque cyclonique dans les semaines à venir. Pour réaliser une analyse complète, on pourra également s'appuyer sur les prévisions des modèles numériques de prévision du temps et l'occurrence éventuelle de cyclone au moment considéré (en particulier pour la première semaine de prévision).

Toutefois, ce type d'analyse ne peut pas permettre de conclure de manière certaine qu'un cyclone se produira ou non mais peut permettre de déterminer des périodes et régions qui sont favorables aux phénomènes cycloniques.

Pour des informations sur les alertes cycloniques en cours en Nouvelle-Calédonie, consultez la rubrique [Cyclone/phénomène en cours](#).

Prévisions

Cliquez ci-dessous pour afficher les graphes

TC occurrence from 23/11/2010 to 29/11/2010 (week 1)

Total probability

Week 1
Week 2
Week 3

occurrence prob. (%)

2010/2011

Les dates correspondent au début de chaque semaine de prévision

Les cartes disponibles ici présentent la probabilité prévue qu'au moins un cyclone se produise (i.e. occurrence, incluant toute sa trajectoire) ou se forme (i.e. genèse d'un nouveau cyclone) durant les semaines à venir (appelées week 1, week 2 et week 3) sur une grille de plusieurs régions qui se superposent.

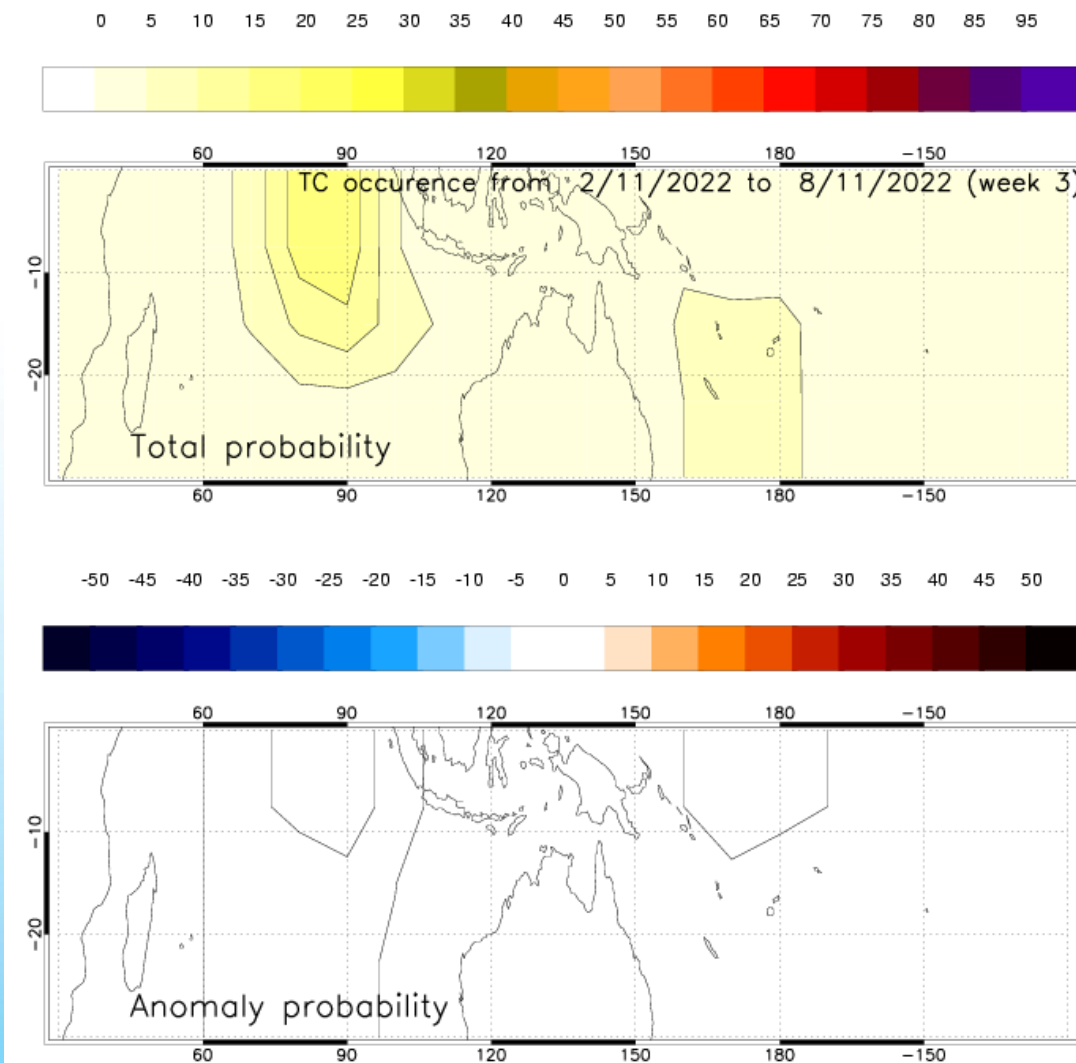
A noter : on désigne ici par cyclone, une dépression tropicale d'intensité modérée, forte ou un cyclone tropical.

Photo de la semaine

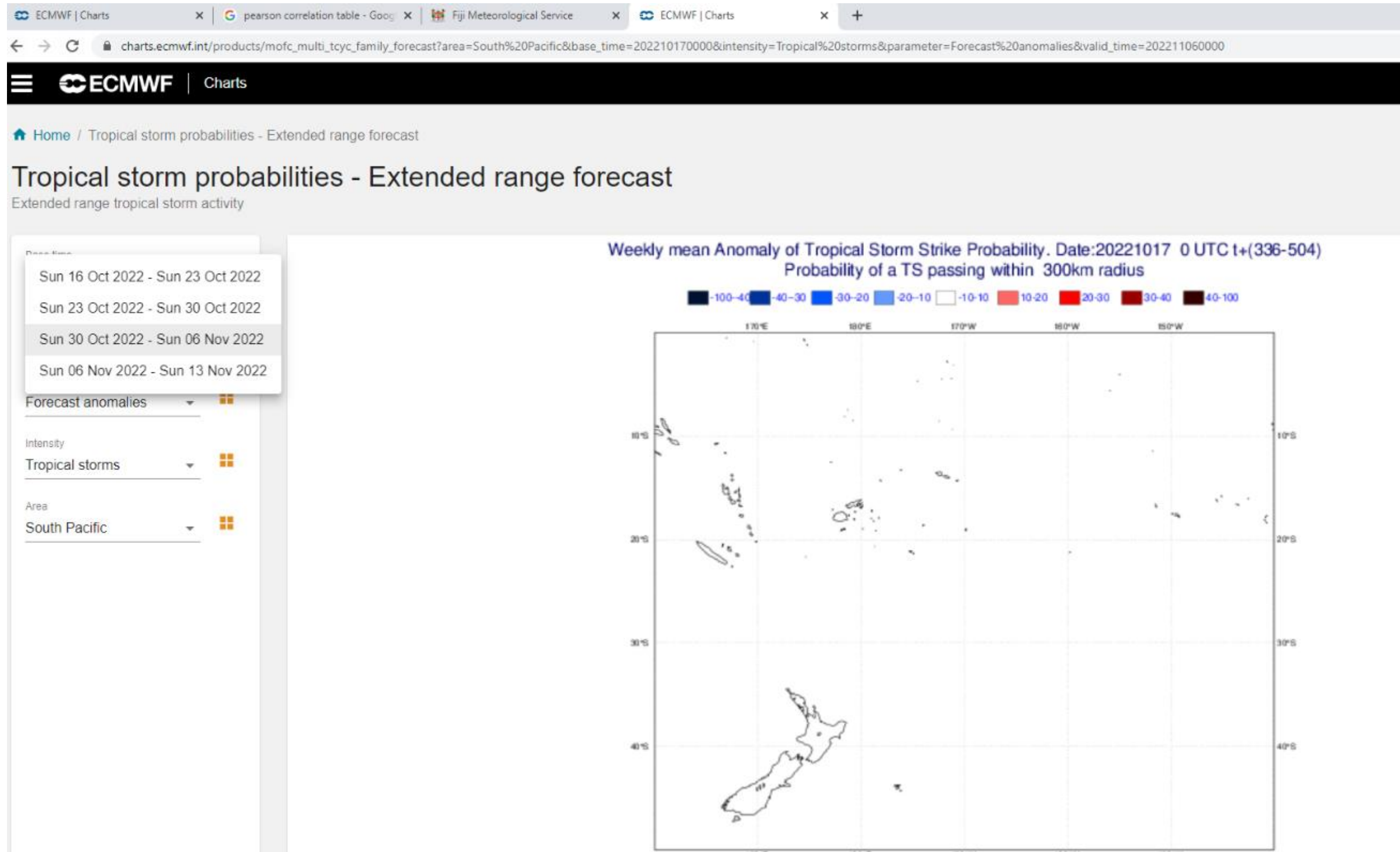
Course avec les dauphins
Jérémie Vetter

→ Consulter la galerie

optimal.rh



Multi-week TC outlooks – from ECMWF



- Source = <https://charts.ecmwf.int/>
- Multi-week TC outlooks out to week 4
- Both Northwest and South Pacific
- Use forecast anomalies option!
These are probabilities of a TS, Depression or Hurricane passing within 300 km radius

Summary

- The official 2024/25 Southwest Pacific tropical cyclone (TC) season begins on 1 November 2024 and will continue until 30 April 2025. TCs have occurred out-of-season in the months of May, June and October;
- TCs are categorised in strength from 1 to 5, with 5 being most intense. TCs that reach category 3 or higher are classified as severe;
- For the coming season normal or above normal TC activity is likely west of and including Vanuatu. East of Vanuatu, normal to below normal TC activity is likely.
- Since the 1981/82 TC season there has been a significant decline in the total numbers of TCs east of Cape York, northern Australia. In the early 1980s the average number of TCs per season was 11. In recent years this has declined to about 7 per season. The average number of severe TCs has declined as well from about 6 per season in the early 1980s to about 3 per season in recent years. These trends are likely to be the better predictor of TC occurrence in the coming season;
- Monitoring multi-week weekly TC outlooks through the season is highly recommended as well as monitoring daily weather forecasts when the chance of TC occurrence is higher than normal;
- It does not take a direct hit or severe TC to cause considerable damage or life-threatening weather. When dangerous weather is forecast, please heed the advice of your local meteorological service, civil defence, or disaster management office.

THANK YOU!

simon.mcgree@bom.gov.au