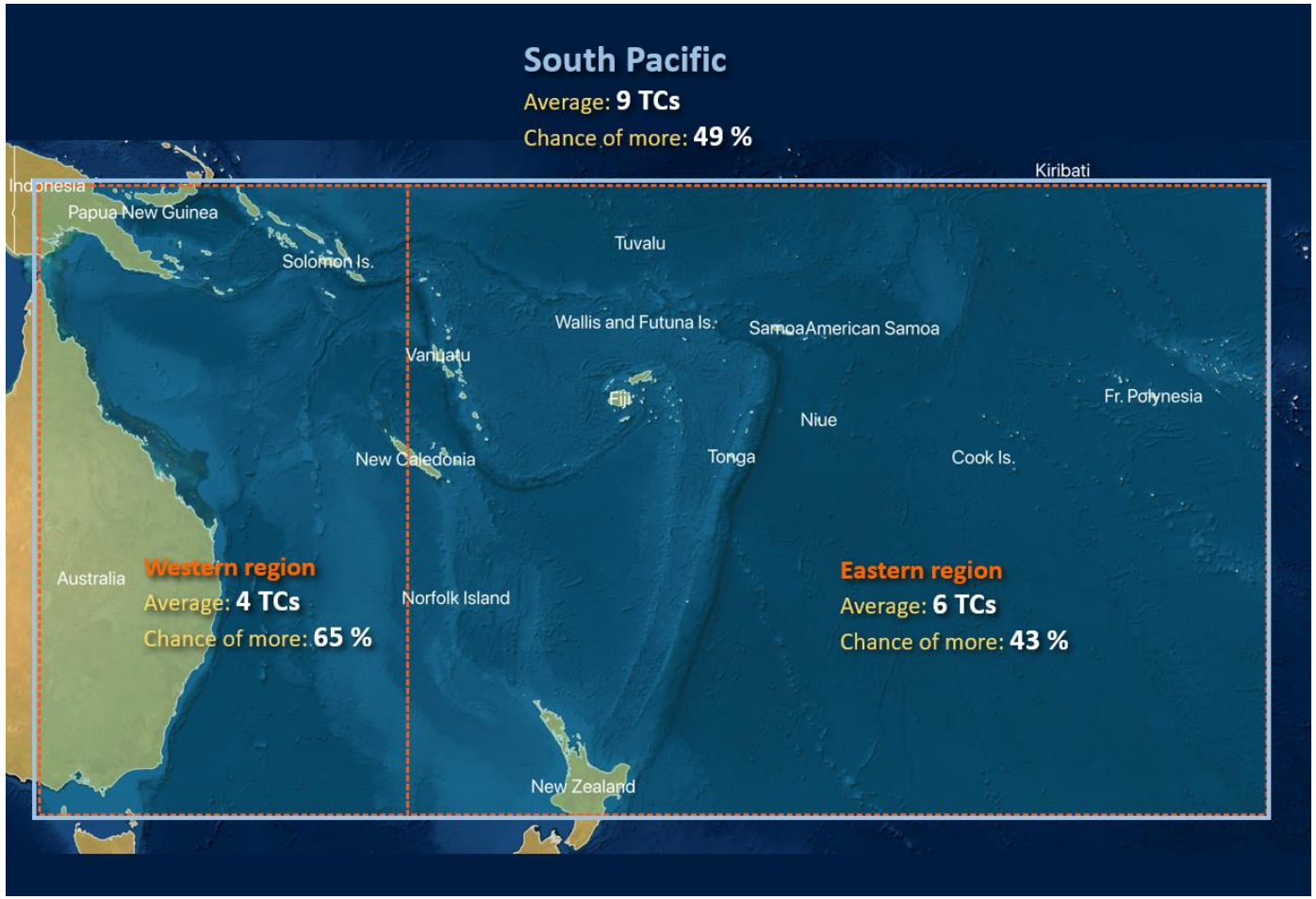
The Bureau of Meteorology

Session 5: Looking Forward Session and Intra-seasonal guidance for 2022/23 Tropical Cyclones

The Bureau – South Pacific TC outlook Nov-Apr 2022-23



- Established La Niña in the tropical Pacific Ocean influenced tropical cyclone outlook.
- An above-average number of tropical cyclones is likely (65% likelihood) in the western South Pacific region this season, with model accuracy historically being moderate.
- A close-to-average to below-average number of tropical cyclones is expected for the eastern South Pacific, but model accuracy is historically very low for this region.

The Bureau – South Pacific TC outlook Nov-Apr 2022-23

About the outlooks

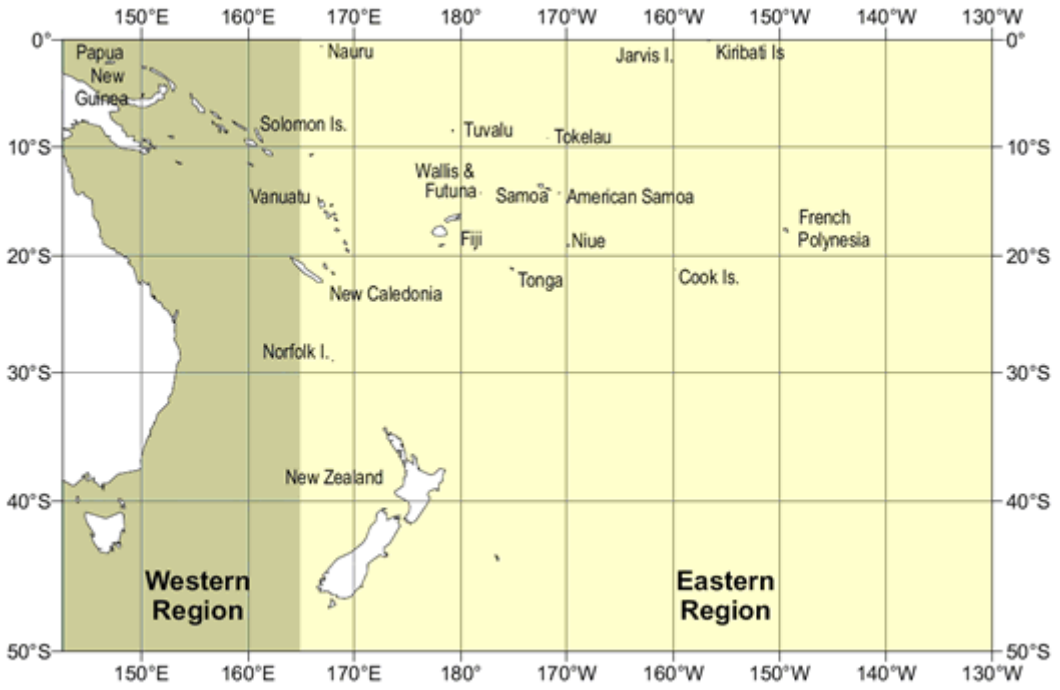
This outlook uses the statistical relationships between tropical cyclone numbers and two indicators: the Southern Oscillation Index (SOI) and the Niño3.4 sea surface temperature anomaly. These two indicators provide a measure of the atmospheric and oceanic state, respectively, of El Niño-Southern Oscillation (ENSO).

The July, August and September SOI and NINO3.4 values were used in making the tropical cyclone season outlook.

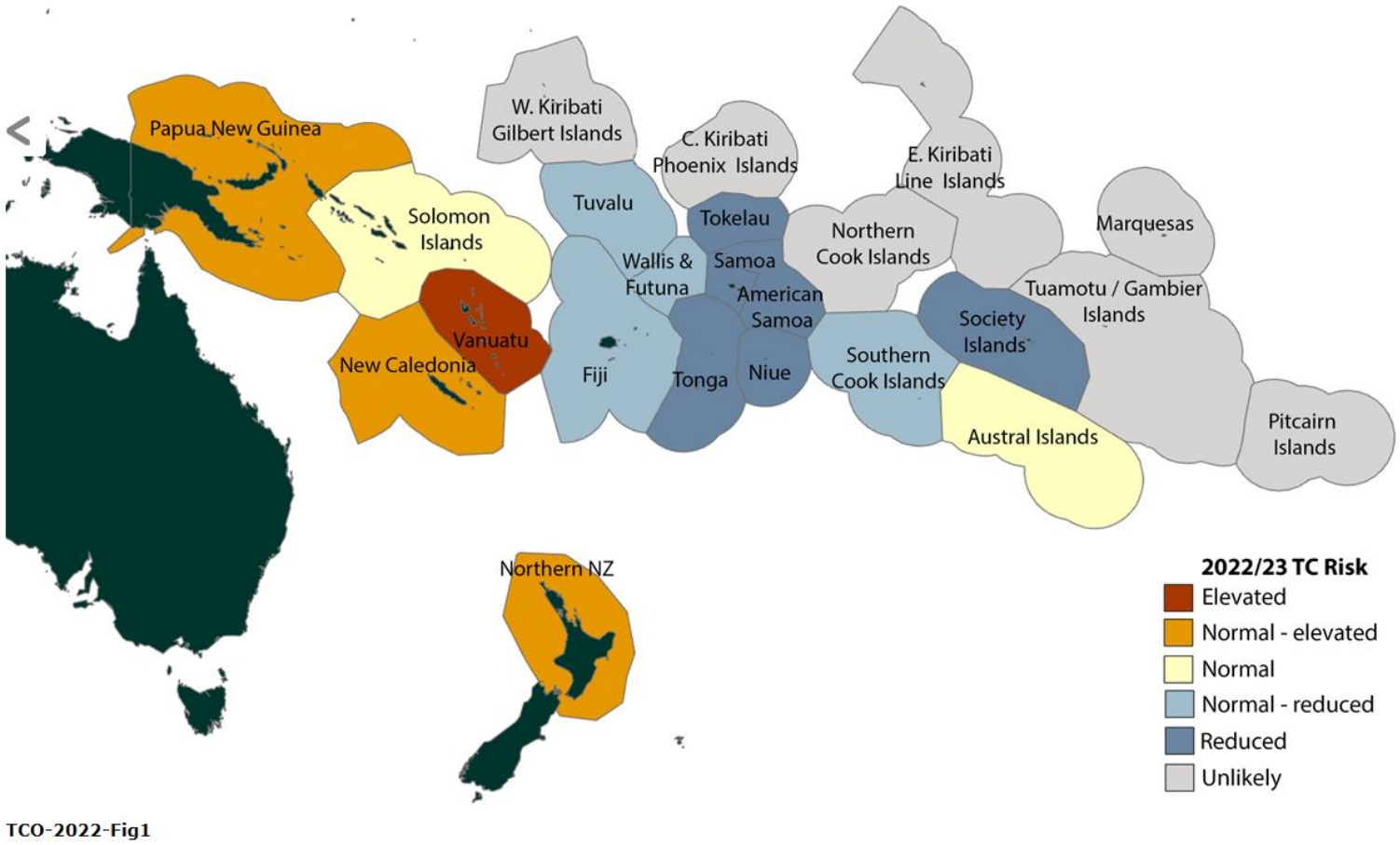
2022	July	August	September
SOI	8.7	9.1	18.3
NINO3.4 SST	-0.70 °C	-0.98 °C	-1.09 °C

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.



NIWA – TC outlook Nov-Apr 2022-23



TCO-2022-Fig1

Elevated TC activity is expected in and around the Coral Sea and the north/central Tasman Sea during the full season from November - April.

The risk of impacts from a TC are expected to be higher across that maritime region and around Vanuatu.

Reduced TC activity is expected east of the International Date Line

Link to outlook video:
https://youtu.be/DLLwQ1ftjdU

NIWA – TC outlook Nov-Apr 2022-23

Table 1: Island Climate Update (ICU) consensus outlook for November 2022-April 2023 tropical cyclone activity based on combining NIWA analogue model, international dynamical climate model and TCO-SP deterministic statistical model outlook results. Indications for upcoming TC activity based on these joint methods that cover the SW Pacific basin for the 2022/23 season are stated in the "ICU Consensus" column and are also shown in Figure 1. Expected TC numbers are based on the NIWA analogue method (see Table 2) and supported by the TCO-SP deterministic method.

TC activity	*NIWA*	*International*		*TCO-SP*	*ICU*
2022/23	*Analogue*	*Dynamical*		*Deterministic*	*Consensus*
SP Basin	Normal-Elevated	Normal	*	Normal	**Normal**
Solomon Is.	Normal	Normal	1	Normal	**Normal**
Papua New Guinea	Normal-Elevated	Normal		Elevated	**Normal-Elevated**
N. New Zealand	Normal-Elevated	Normal		Normal	**Normal-Elevated**
Vanuatu	Elevated	Elevated		Normal	**Elevated**
New Caledonia	Normal-Elevated	Elevated		Normal	**Normal-Elevated**
Tonga	Reduced	Reduced		Reduced	**Reduced**
Fiji	Normal-Reduced	Normal-Reduced		Normal	**Normal-Reduced**
Wallis & Futuna	Reduced	Reduced	2	Reduced	**Reduced**
Tokelau	Reduced	Reduced		Reduced	**Reduced**

NIWA maps based on consensus guidance.

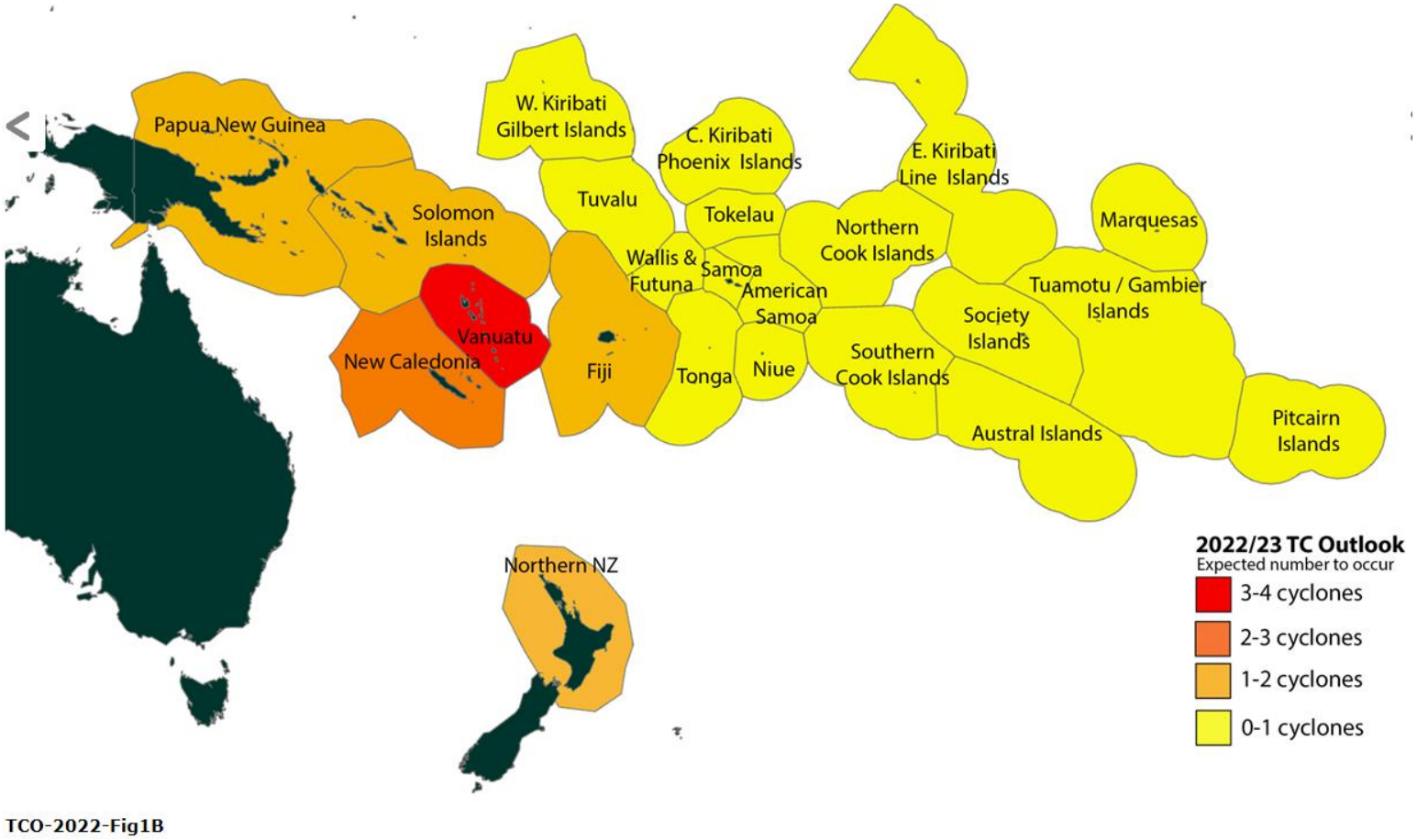
Combination of NIWA analogue method, International dynamical outlook and TCO-SPO outlook.

Analogues are selected by looking at the recent state of the ENSO system: SOI averaged over the last 3 months & NINO34 over the last 5 months.

These two indices are standardised to compute a "Coupled ENSO Index" (CEI) (Gergis and Fowler, 2005).

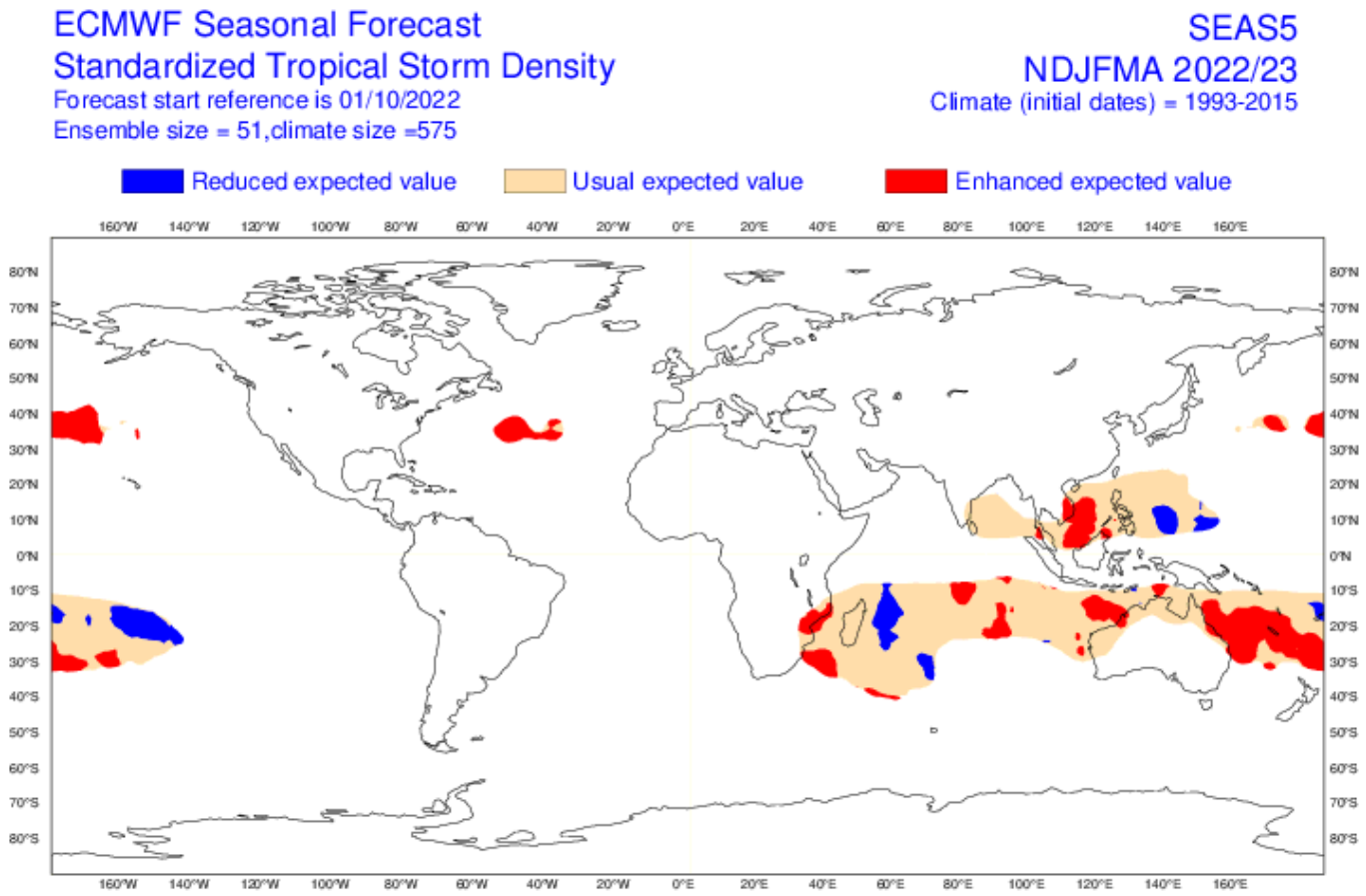
The CEI value for September is then compared to historical years back to 1969. Years with very similar values are considered analogues.

NIWA – consensus TC outlook Nov-Apr 2022-23



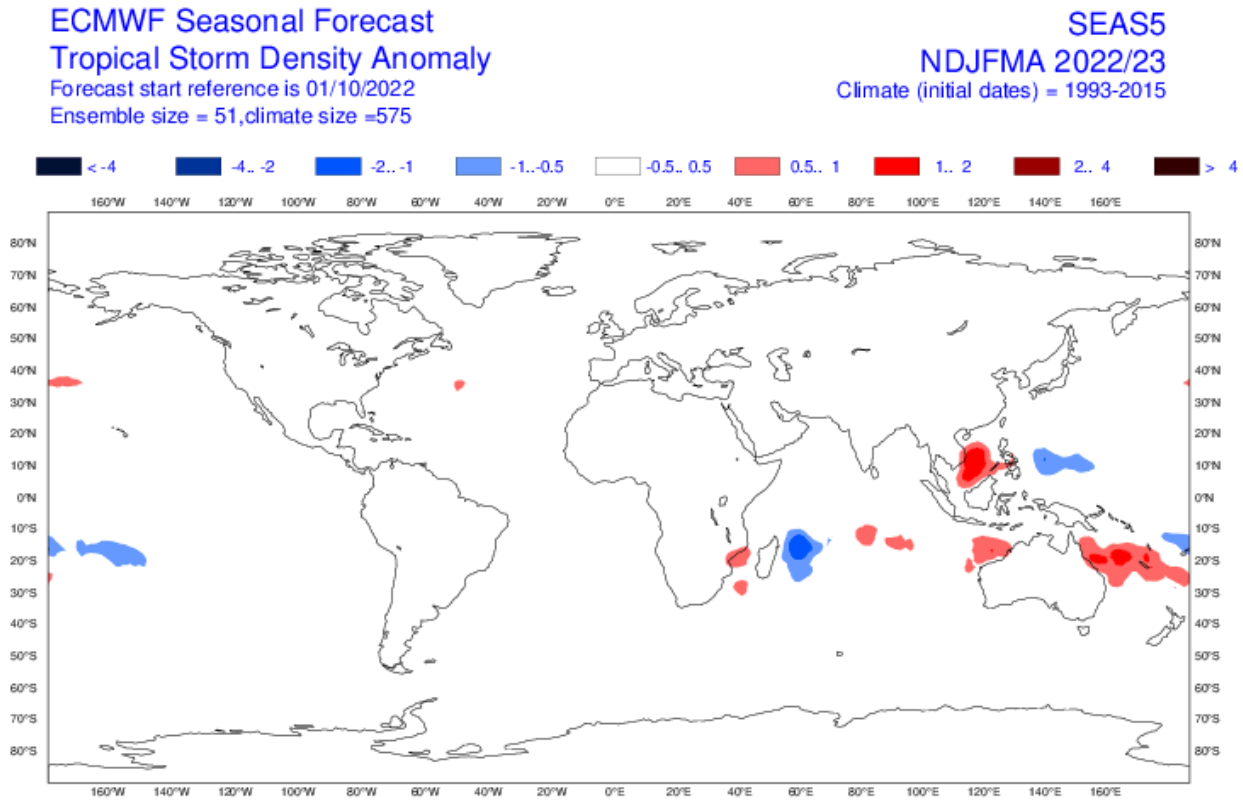
- Vanuatu and New Caledonia typically experience the greatest TC activity. For this season, elevated TC activity is expected for areas around the Coral Sea and Vanuatu.
- Normal or elevated activity is expected for New Caledonia and Papua New Guinea. The Solomon Islands and Austral Islands are expected to have normal TC activity.
- Near normal or below normal TC activity is expected for Fiji, Tuvalu, and the southern Cook Islands. Below normal TC activity is forecast for Tuvalu and most other islands near or to the east of the International Date Line.
- At least three severe TCs reaching Category 3 or higher might occur anywhere across the region, so all communities should remain prepared.

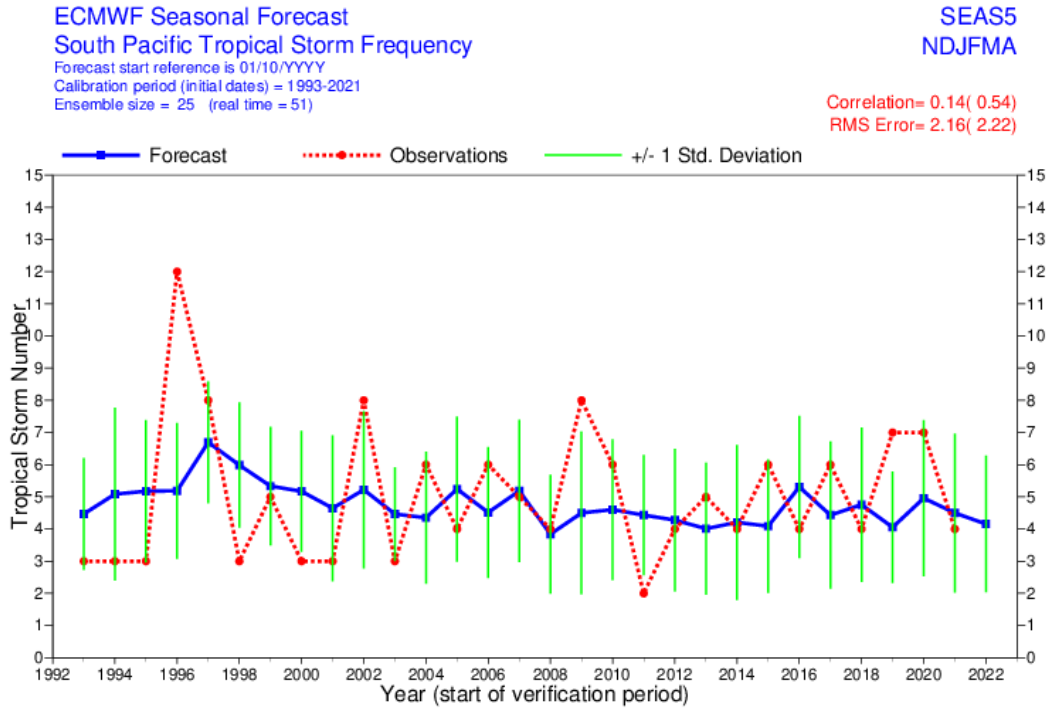
ECMWF – TC outlook Nov-Apr 2022-23



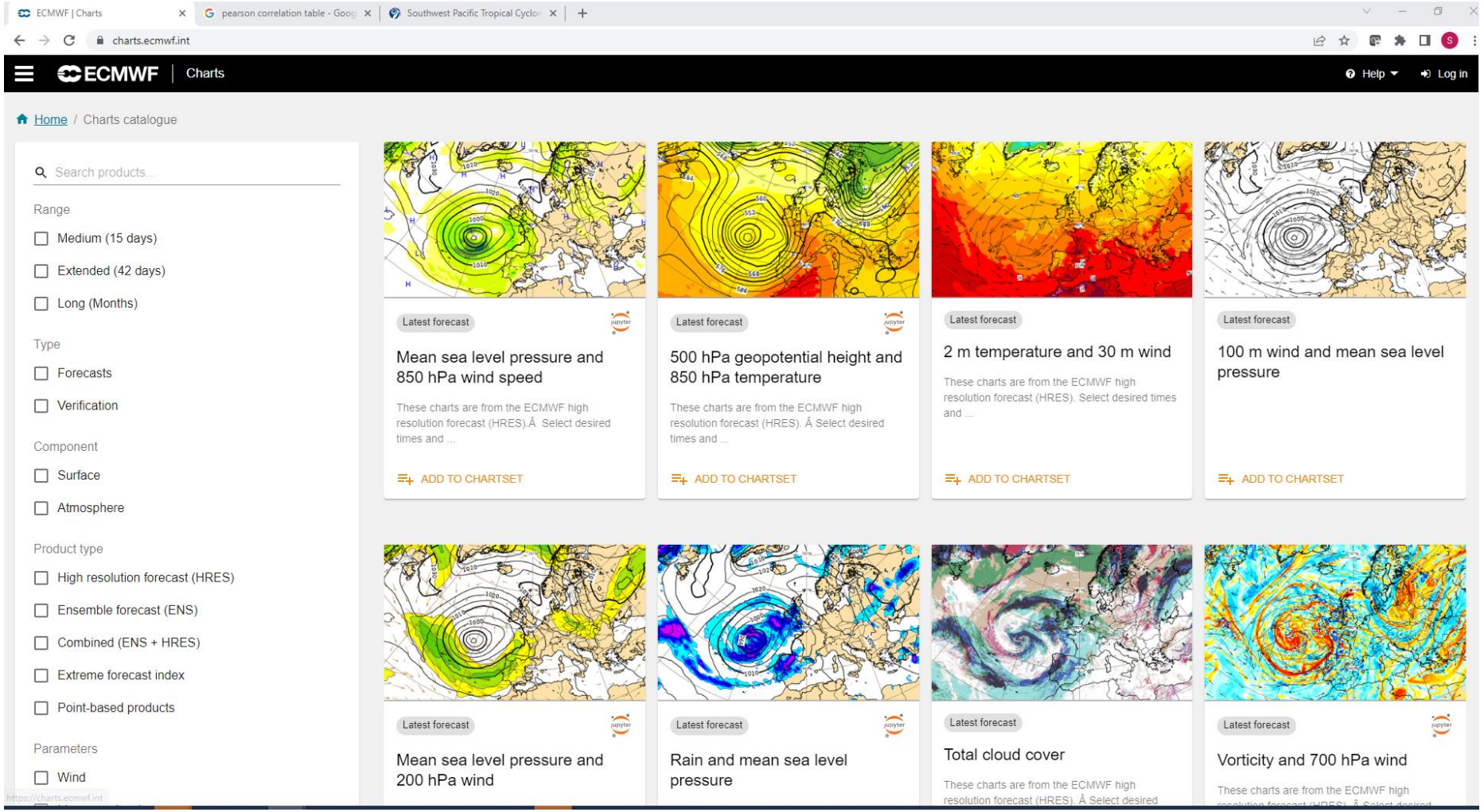
- Reduced numbers of tropical cyclones in the Northwest Pacific;
- Enhanced numbers of tropical cyclones in the western South Pacific (Vanuatu-New Caledonia) and in the sub-tropics south and east of Vanuatu;
- Reduced numbers of tropical cyclones in the eastern South Pacific around Fiji-Tonga, Cook Is.-French Polynesia region.

ECMWF – TC outlook Nov-Apr 2022-23





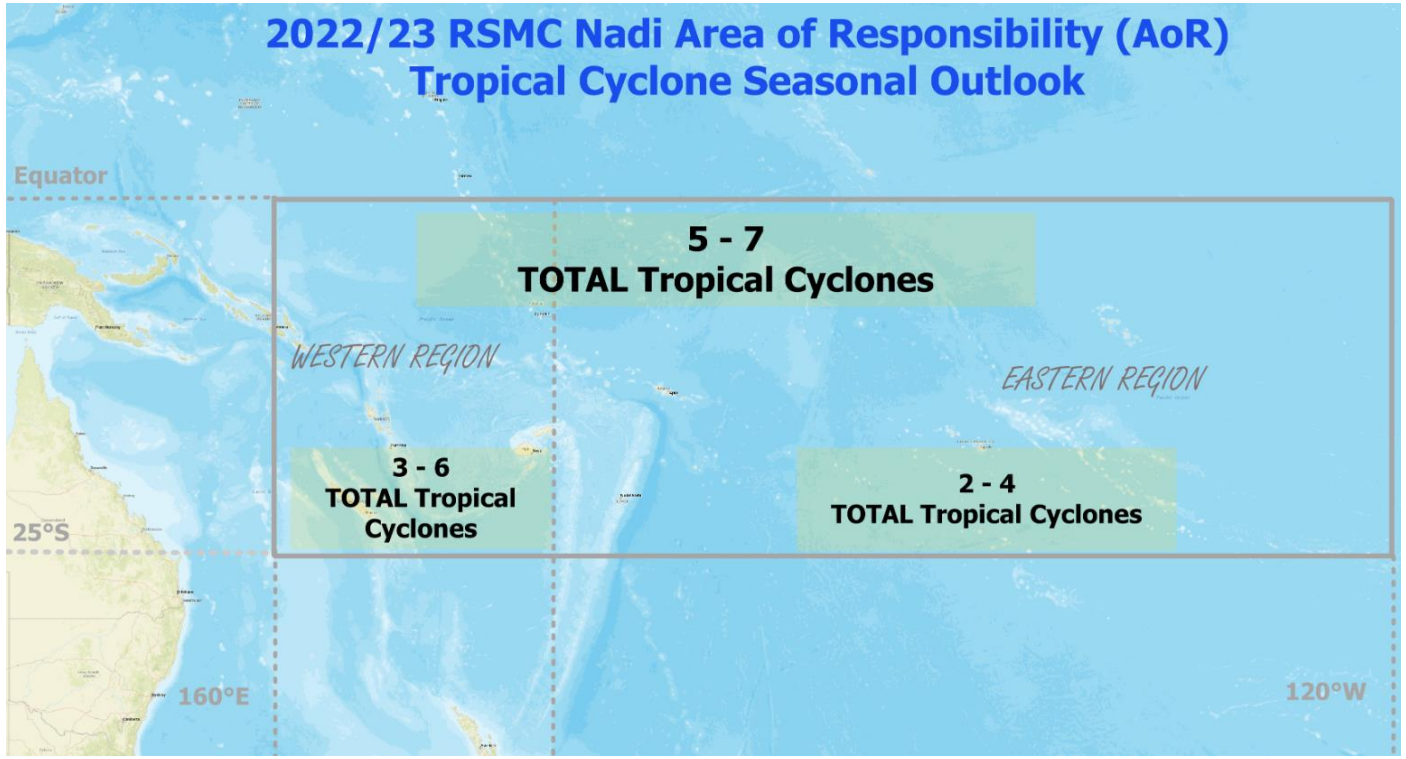
ECMWF – TC outlook Nov-Apr 2022-23



Look this up yourself!!

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

RSMC Nadi TC outlook Nov-Apr 2022-23

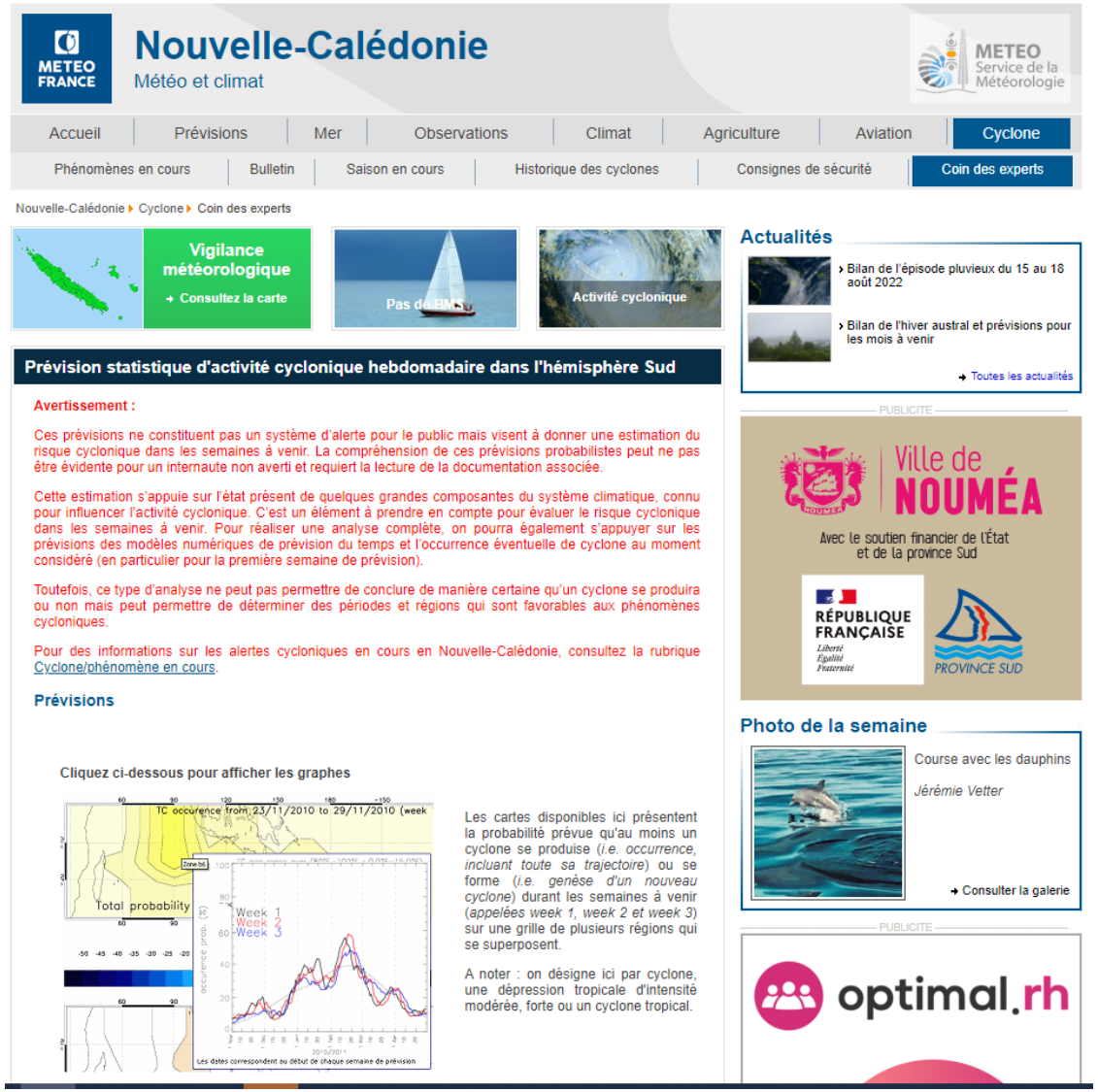


- Five to seven TCs are expected. On average, around seven TCs affect the RSMC Nadi-TCC AoR per season. Thus, average or below average number of TCs.
- On average, around four TCs affect west of Dateline and around three affect east of Dateline per season. Tropical cyclone numbers to the west of Dateline in the RSMC-Nadi TCC AoR is likely to be three to six or average to above average TC activities, while numbers to the east is likely to be two to four TCs or average this season.
- For severe TCs (Category 3 or above), average or below average severe TCs are anticipated this season, with one to four severe TCs expected. On average, around three severe TCs affect the RSMC Nadi-TCC AoR per season.
- TC outlook is greatly driven by the return of….La Nina event…persist until end of the 2022.

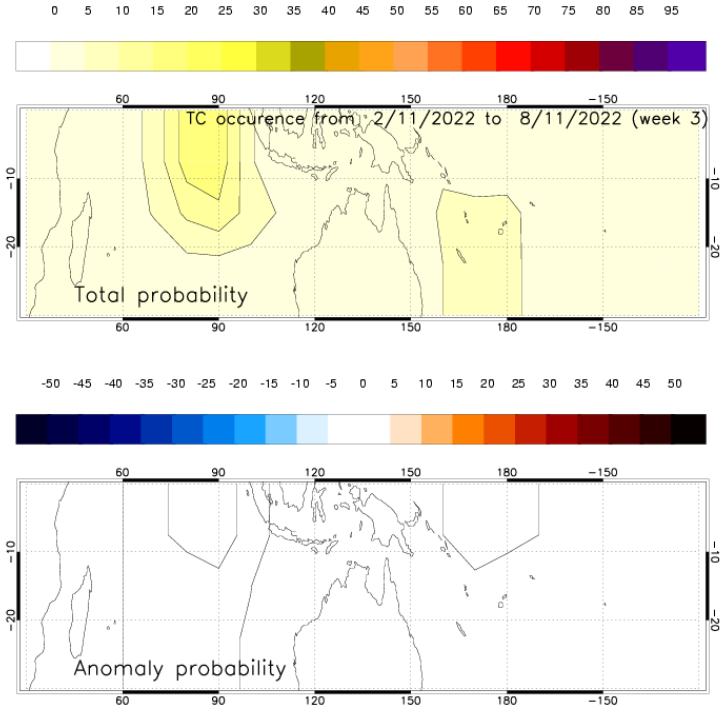
Multi-week TC outlooks – from the Bureau

- 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)

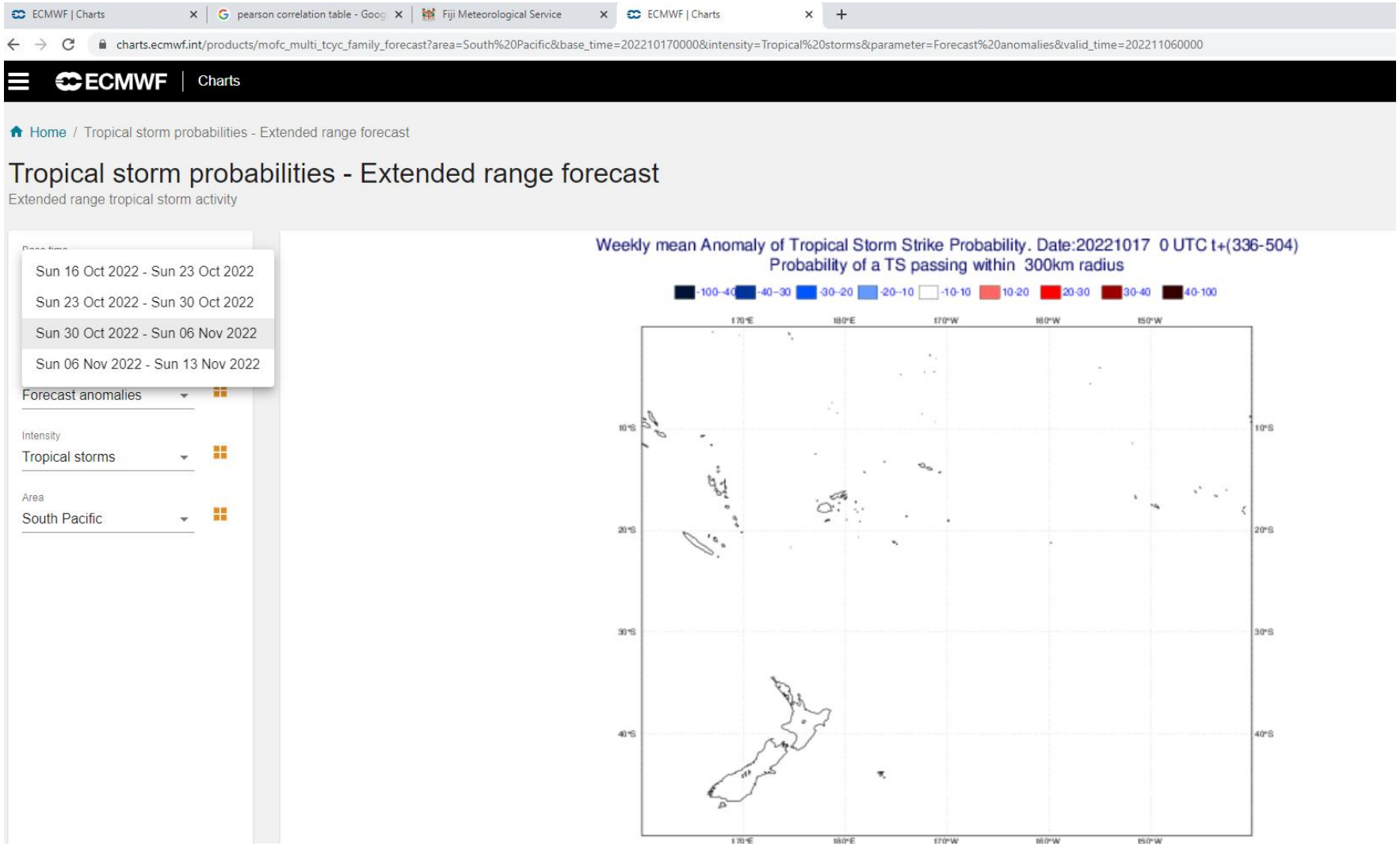
Multi-week TC outlooks – from MeteoFrance New Caledonia



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

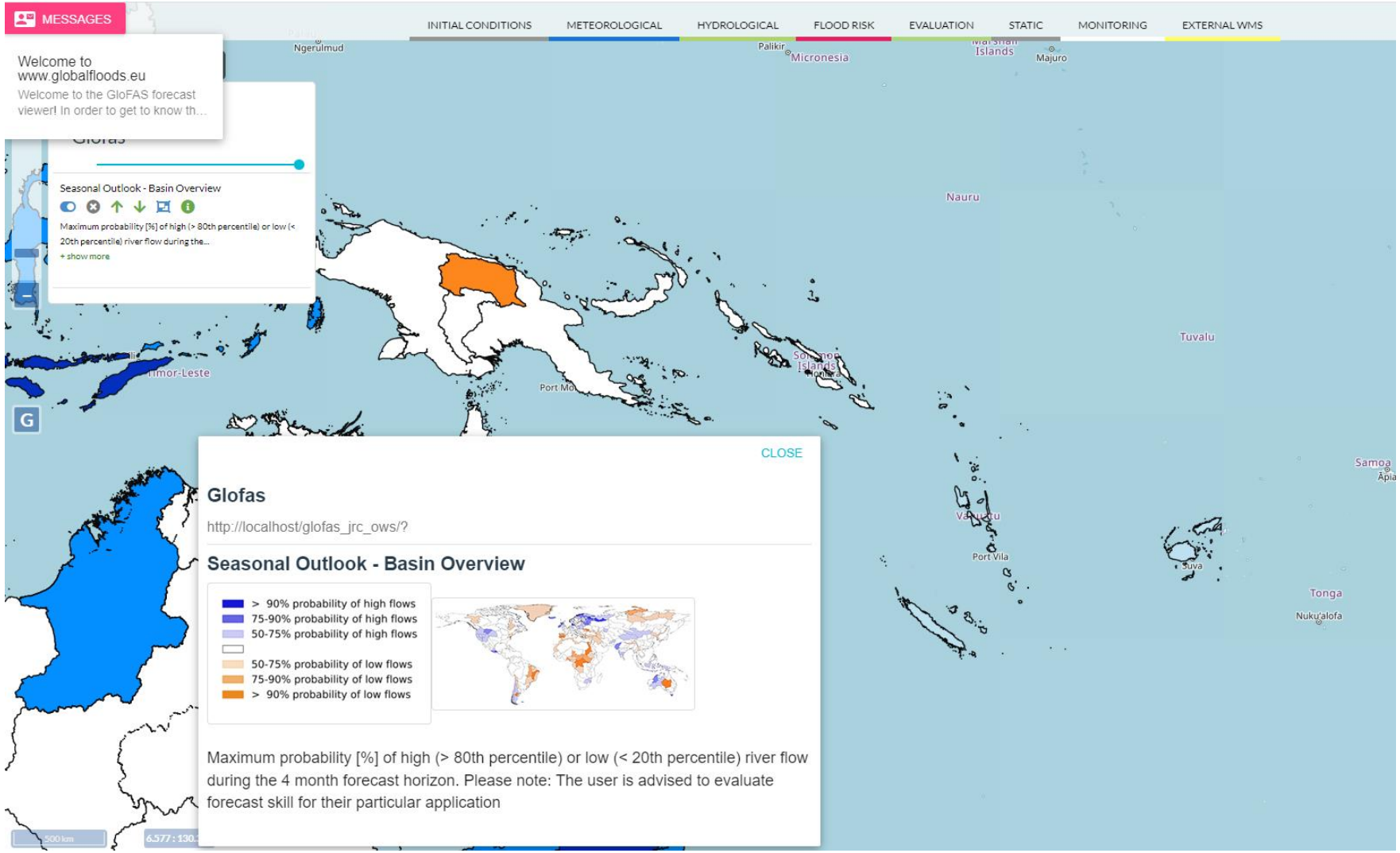


Multi-week TC outlooks – from ECMWF



- 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

Copernicus flood system seasonal basin outlook



- Source = https://www.globalfloods.eu/glofas-forecasting/
- For Vanuatu, New Caledonia and Fiji there is a 50-75% chance of high flows
- High flows > 80% percentile
- In other words 50-75% chance river flows will be in the upper 20% of historical river flows over the next four months

Summary slide

- An established La Niña in the tropical Pacific Ocean has influenced the Northwest Pacific and South Pacific tropical cyclone outlook.
- Northwest Pacific tropical storm activity is likely to be below average west of the Dateline.
- South Pacific tropical cyclone season extends from November to April. Vanuatu and New Caledonia typically experience greatest TC activity.
- Above-average numbers of tropical cyclones are likely in the Coral Sea and western South Pacific region this season. Near average to below-average numbers of tropical cyclones favoured further east. At least three severe TCs reaching Category 3 or higher may occur anywhere across the region.
- It does not take a severe TC to produce severe impacts. Flooding rainfall can occur with a weaker or former TC especially when high flows are present due to recent wetter than normal conditions. All communities should remain vigilant, monitor tide predictions and follow forecast information provided by their National Meteorological and Hydrological Service (NMHS).

The Bureau of Meteorology

Thank you