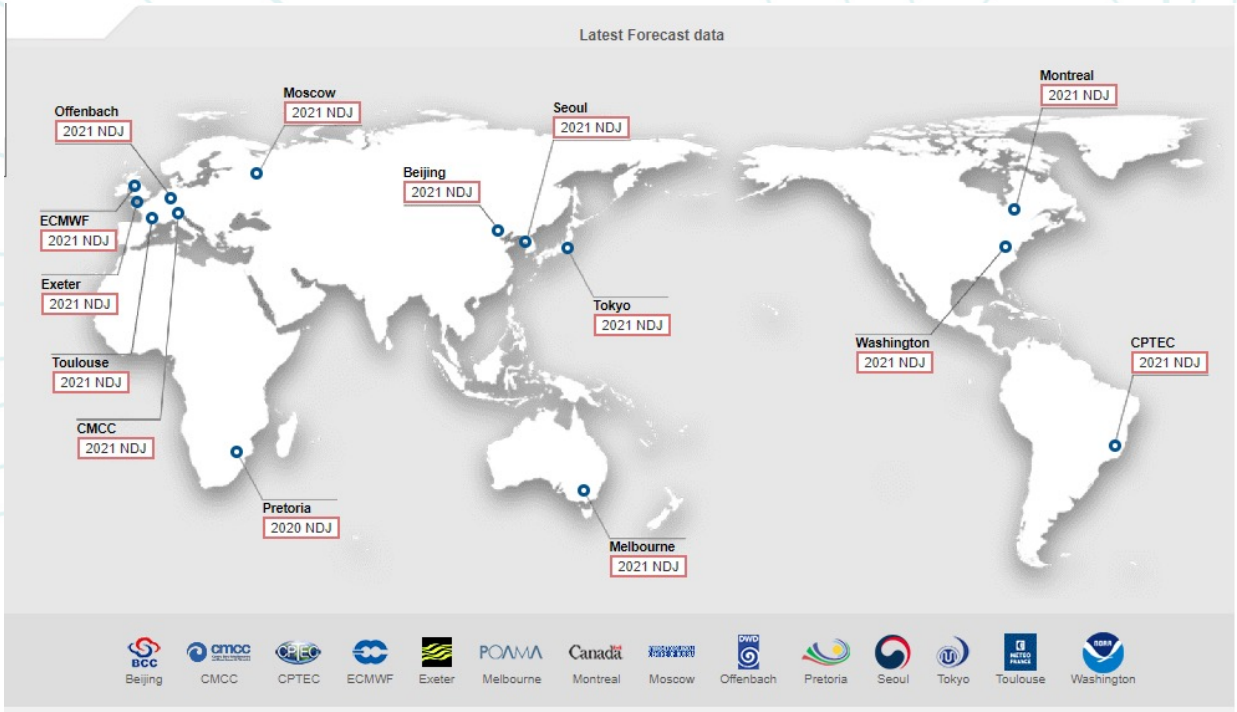
PACIFIC METEOROLOGICAL COUNCIL
SINCE 2011 Celebrating 10 years of service to the region

Looking Forward – Seasonal and Intra-seasonal guidance for 2021/21

i. Atmosphere

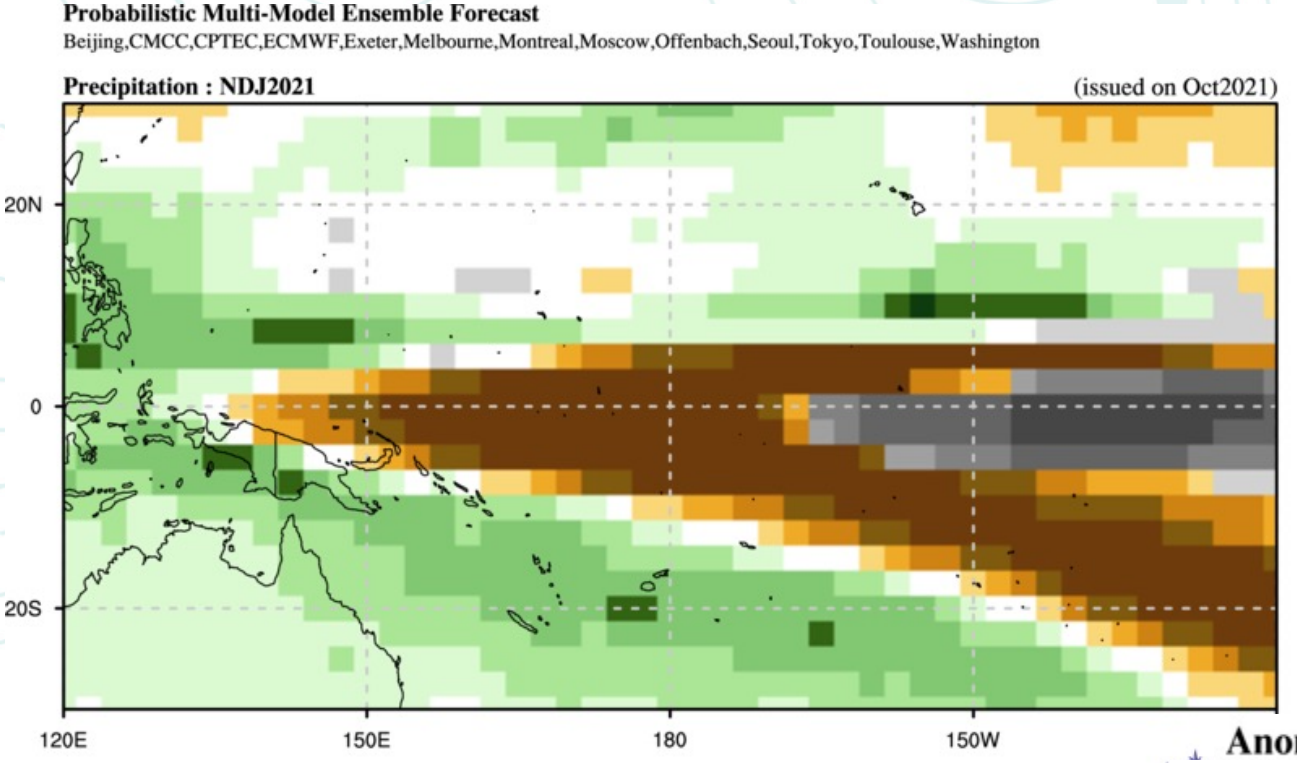
[Simon McGree, Bureau of Meteorology]

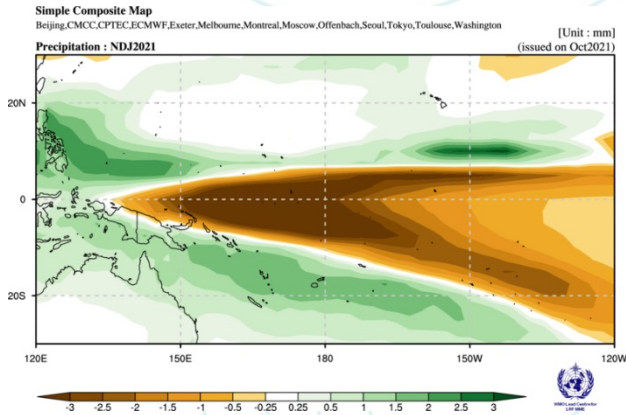
WMO Lead Centre for LRF MME

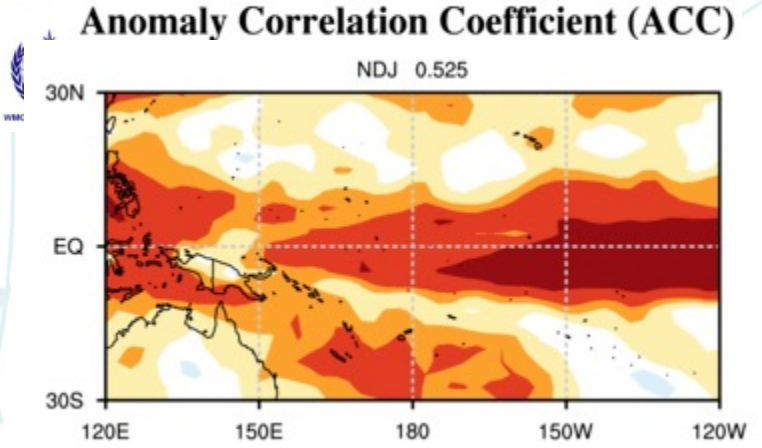


- WMO LC MME official outlooks for PICOF
- Continue using outlooks and tailored products from RCC Network partners
- WMO LC MME based on 13 GPC LRF models.
- Many other national and research models in existence.
- Model skill varies significantly from model to model depending on a range of factors, such as model physics, initial conditions, length of hindcast, number of ensemble members etc.

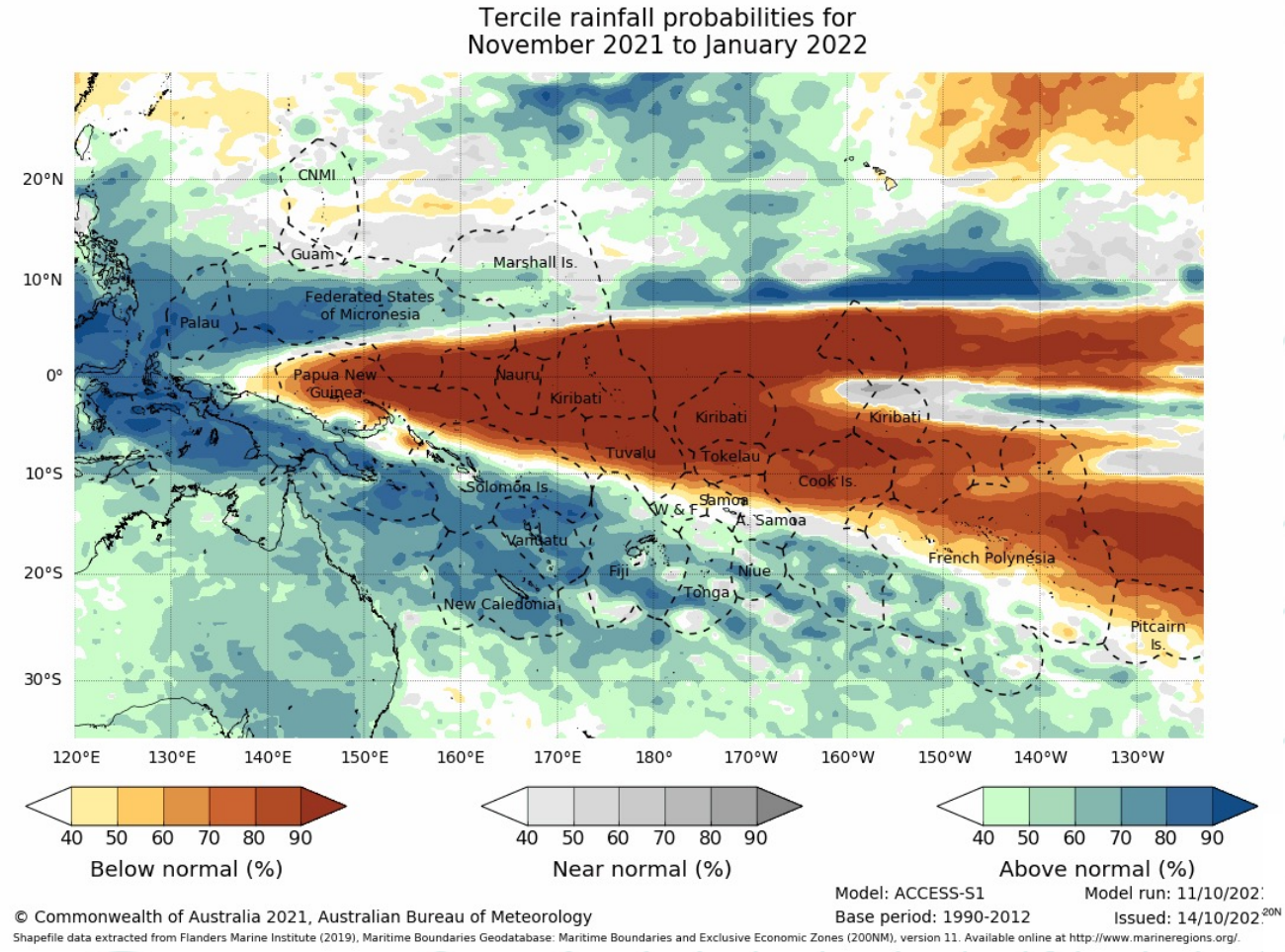
WMO Lead Centre for LRF MME



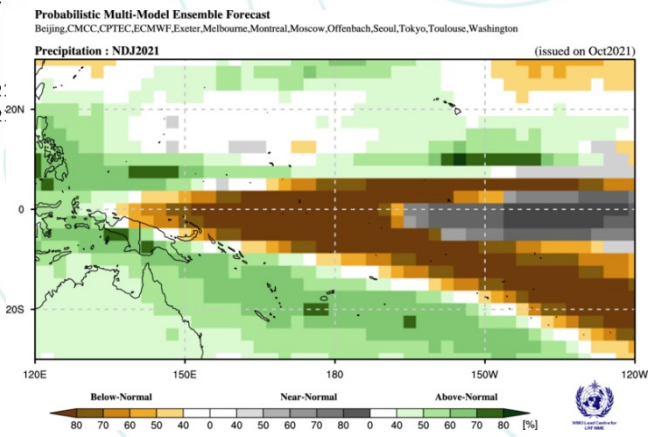




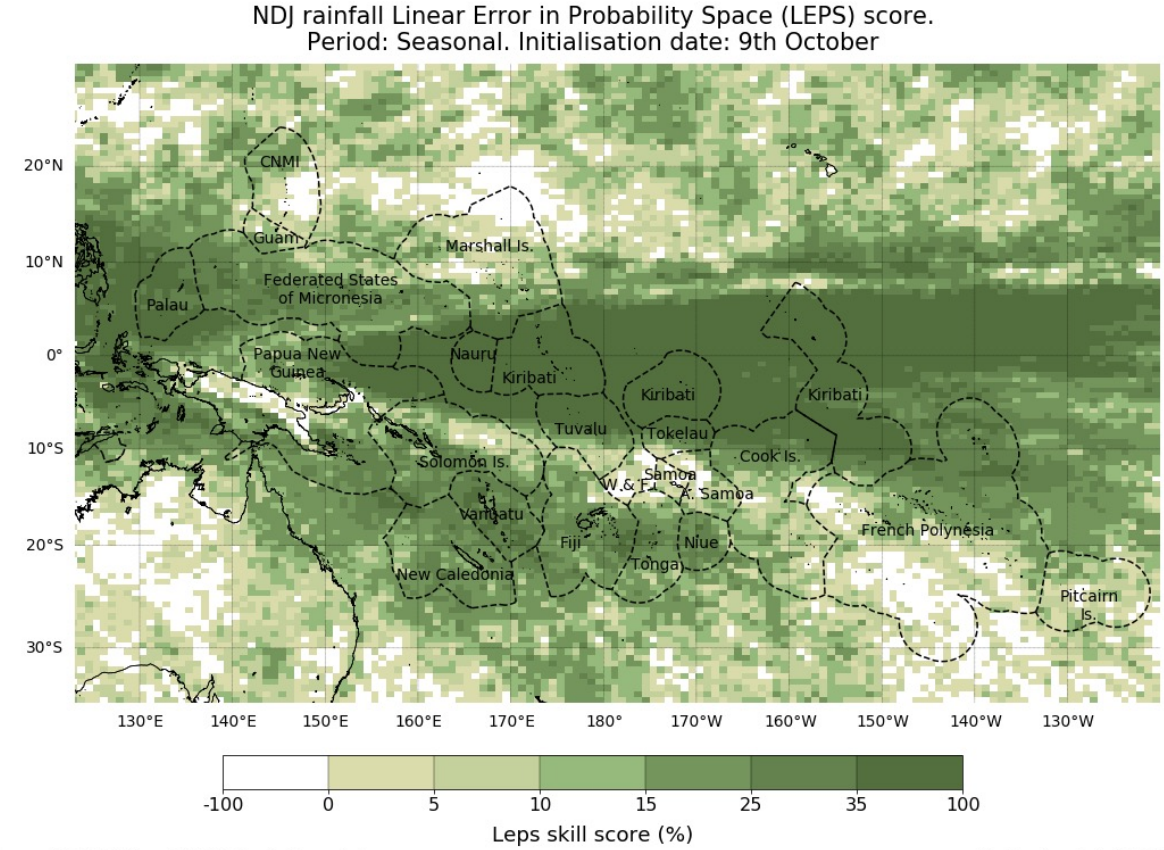
Melbourne GPC LRF ACCESS-S

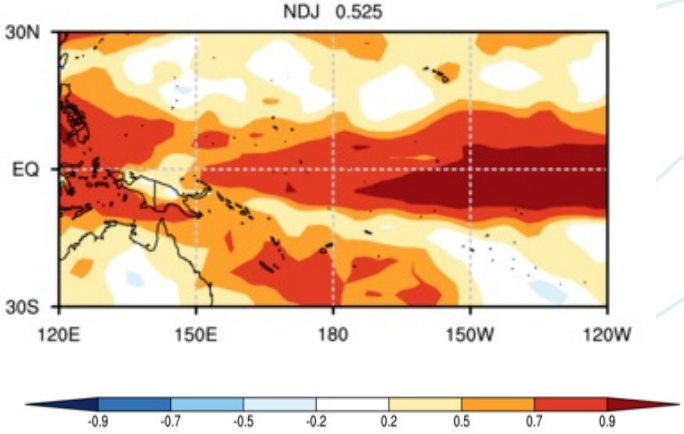


Shapefile data extracted from Flanders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 11. Available online at http://www.marineregions.org/.



ACCESS-S skill Nov-Jan





Source: ACCESS-S1 and ERA5 Climate Reanalysis
Hindcast period: 1990-2012

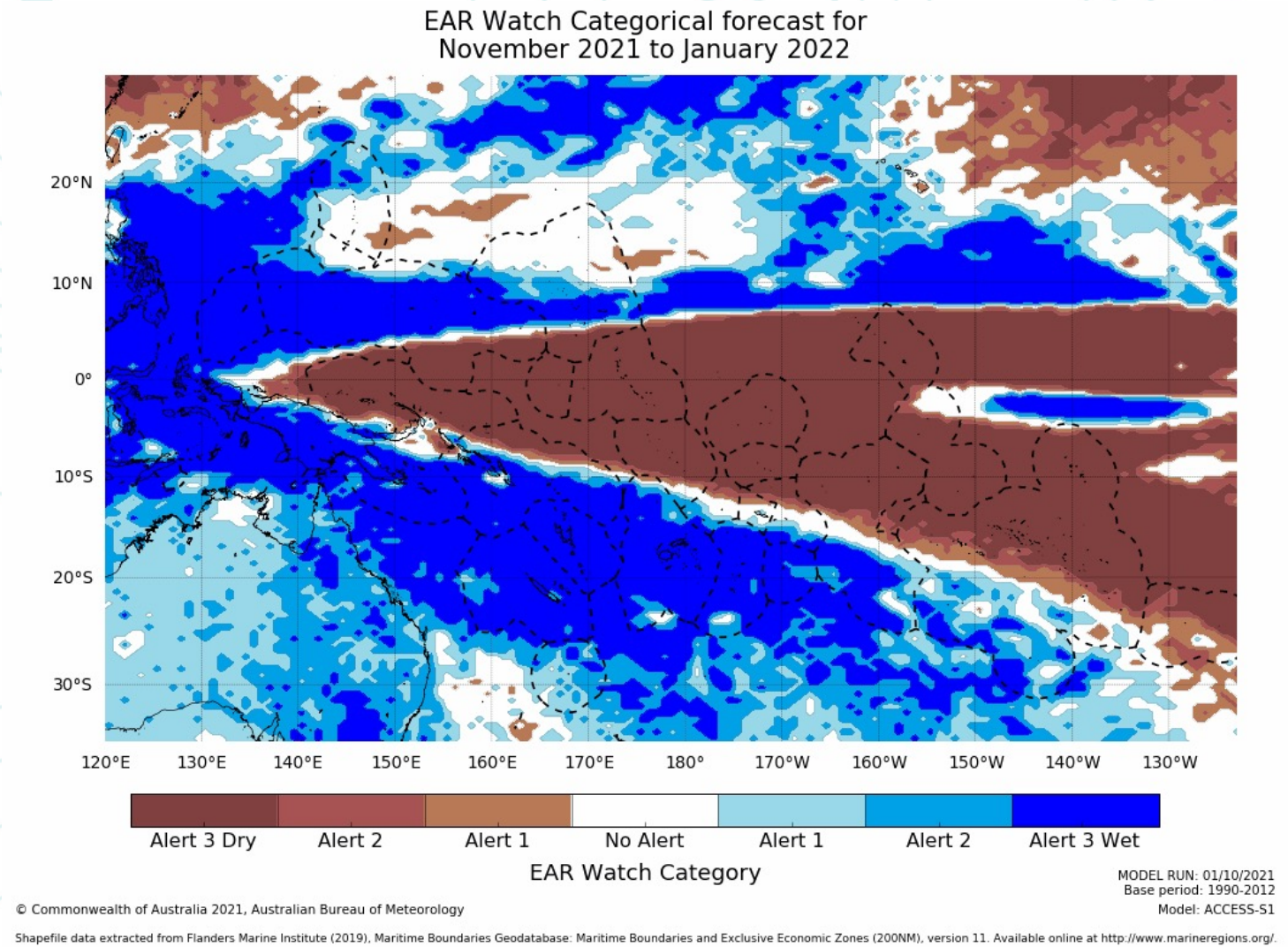
Created: 06/05/2021

The X LEPS % score has been categorised as follows:

Very Low: X < 0.0 **Low: 0 ≤ X < 5** **Moderate 5 ≤ X < 10** **Good: 10 ≤ X < 15** **High: 15 ≤ X < 25**

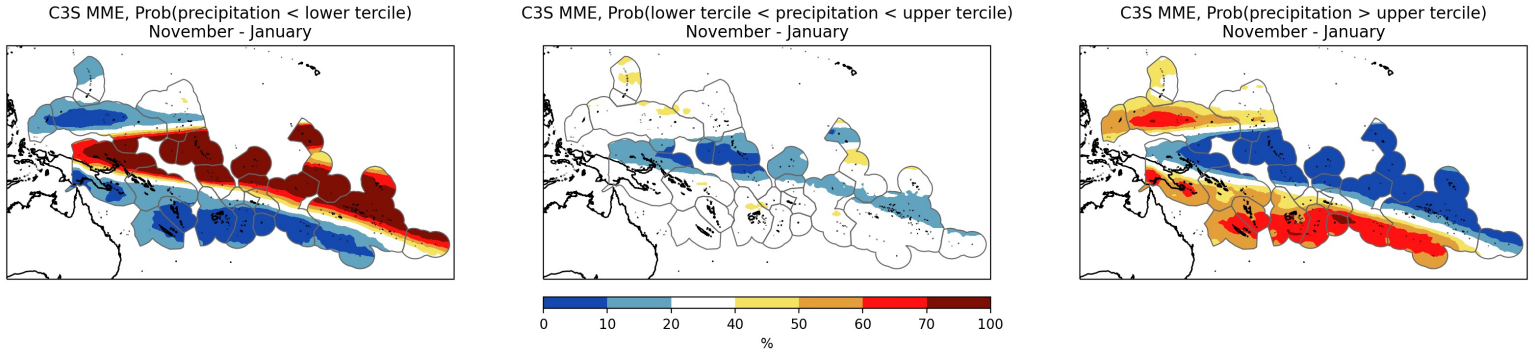
Very High: 25 ≤X < 35 **Exceptional: X ≥ 35**

Melbourne ACCESS-S prob+skill outlook

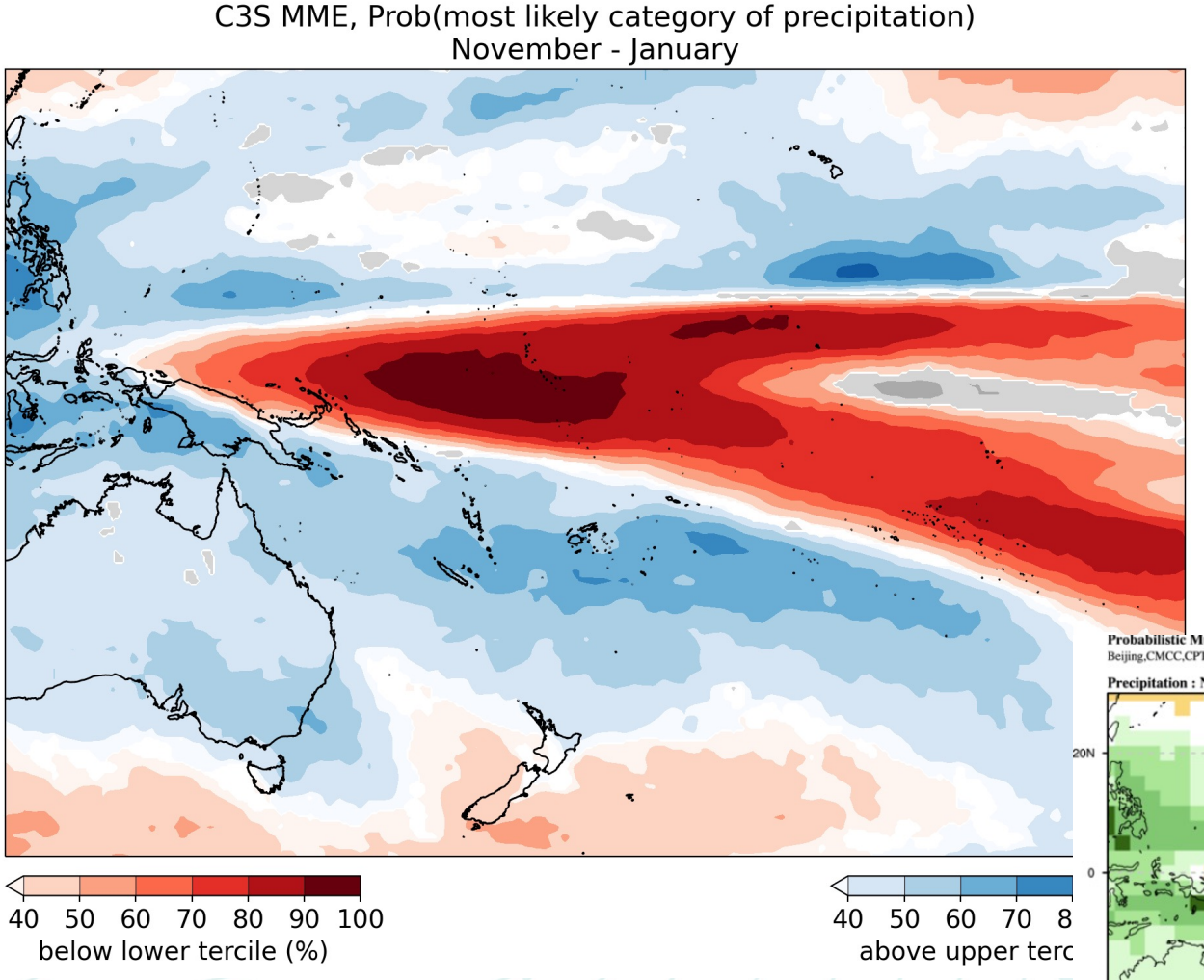


NIWA Island Climate Update

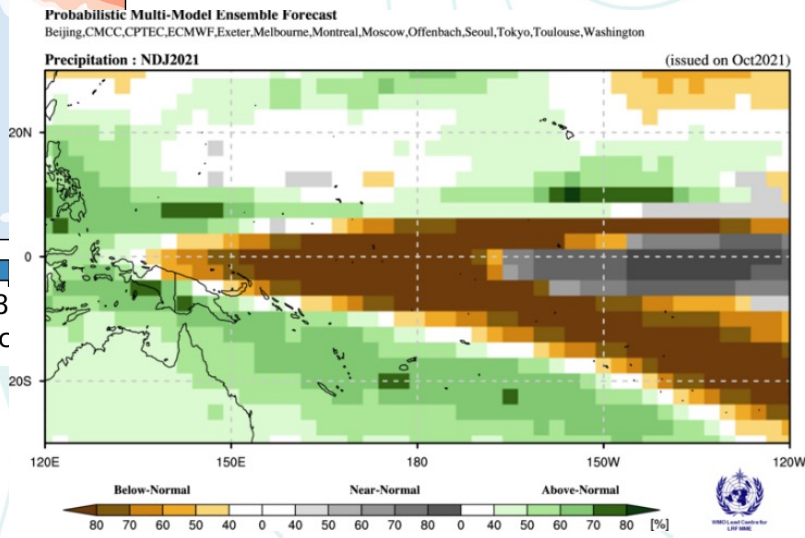
- The ICU monthly and seasonal climate forecast products are based on the Copernicus Climate Change Service (C3S) Multi-Model Ensemble (MME)
- 8 models: ECMWF, UKMO, Météo-France, DWD, CMCC, NCEP, JMA, and ECCC: More than 470 ensemble members
- All climatologies are derived from the corresponding GCMs hindcasts (1993 – 2016)
- Hindcasts and forecast data processed at NIWA once per month



NIWA ICU: most likely precipitation category over the coming seasons

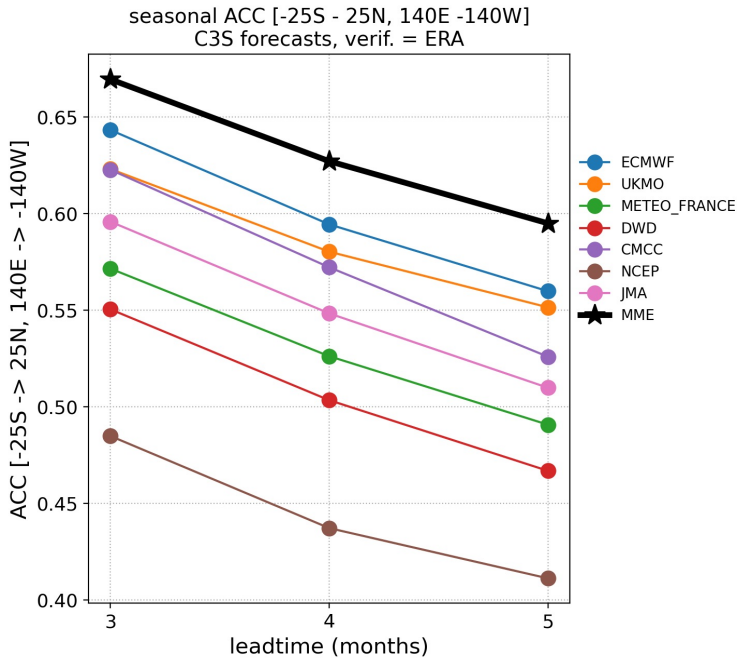


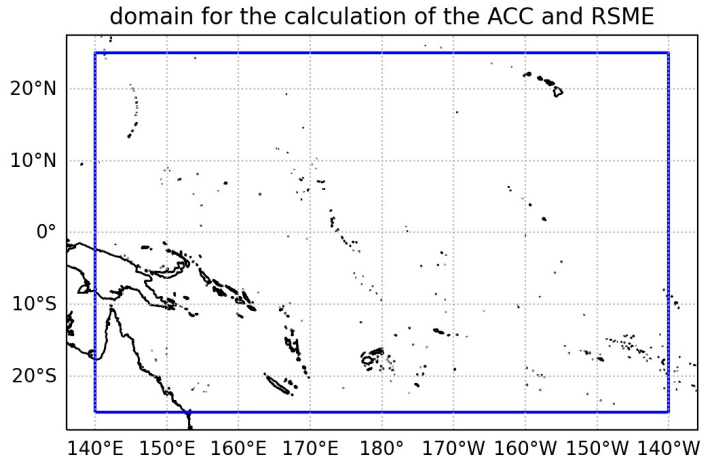
- 8 models subset of WMO LC 14. Missing Melbourne, Seoul, Pretoria, Moscow, CPTEC and Beijing
- WMO LC hindcast 1993-2009; C3S hindcast 1993-2016

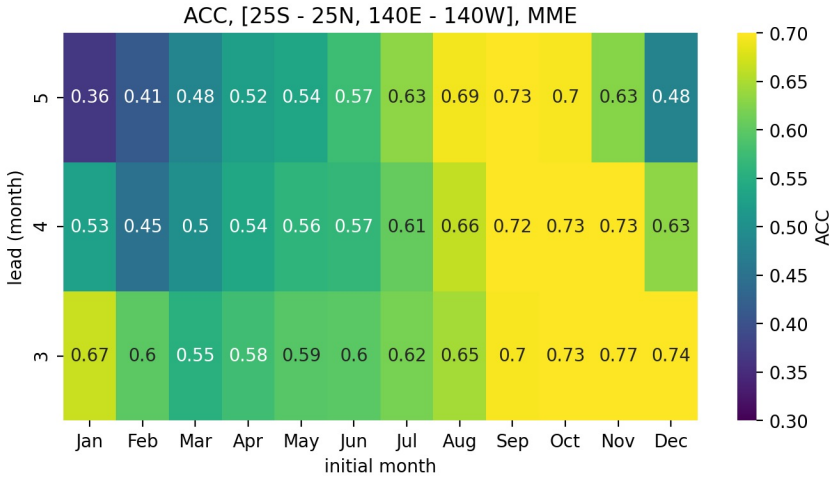


NIWA Island Climate Update skill scores

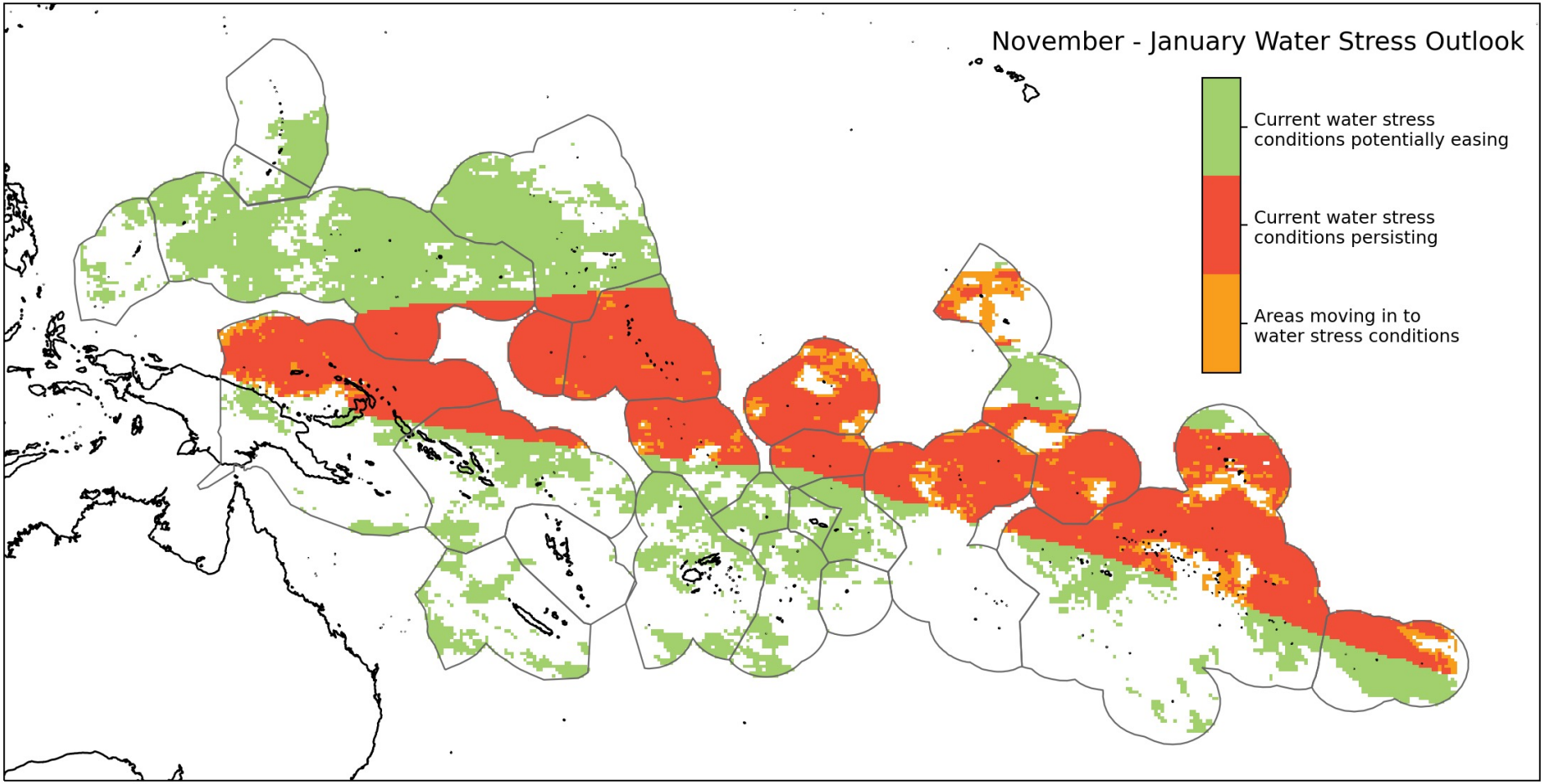
- C3S MME vs ERA5 for monthly and seasonal precipitation
- MMEs outperform the best individual models
- Outlooks issued in September – December tend to have the best skill, as influenced by the peak of ENSO events







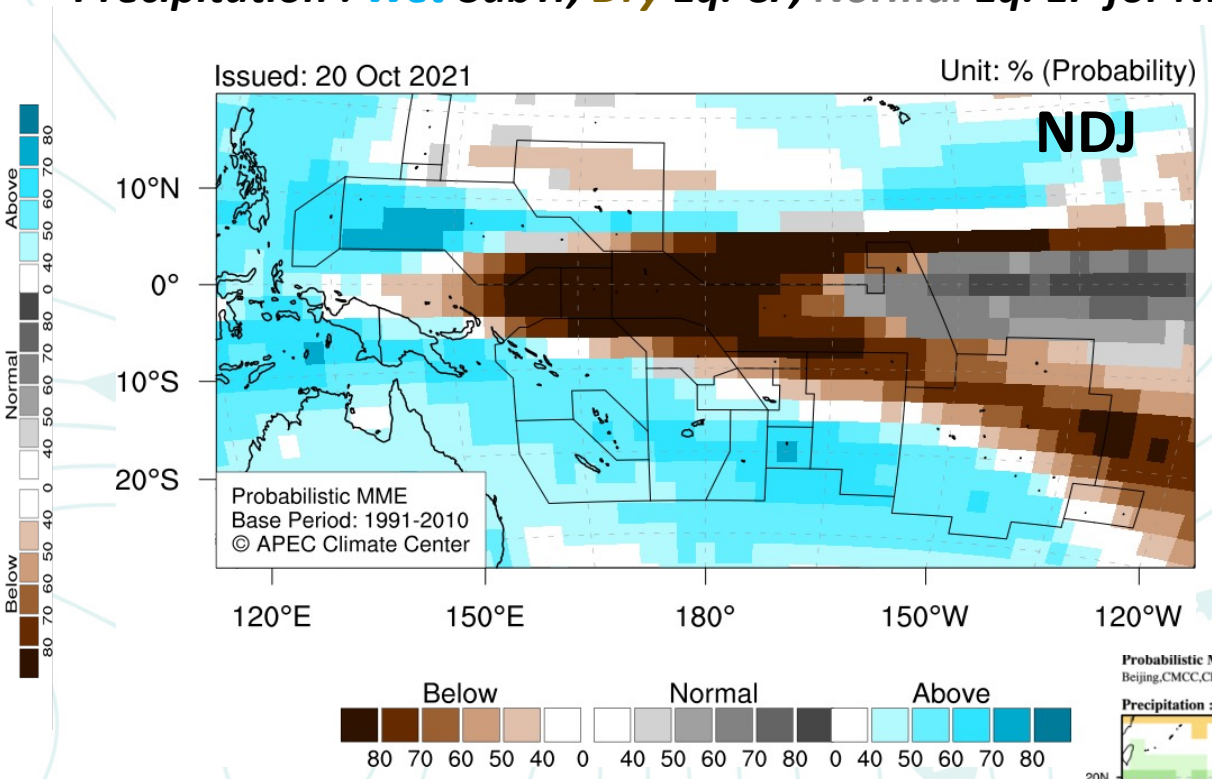
ICU "Water Watch" – combines satellite rainfall monitoring with the forecast



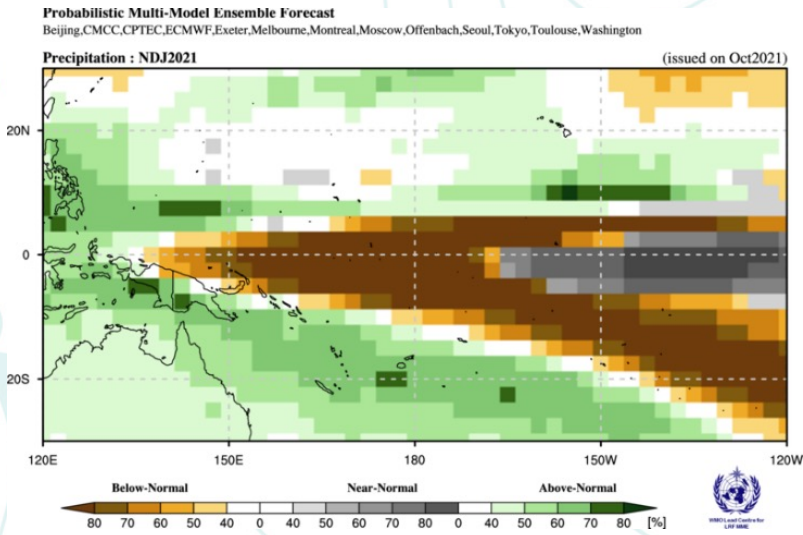
PACIFIC METEOROLOGICAL COUNCIL
SINCE 2011 Celebrating 10 years of service to the region

APCC MME Outlook

Precipitation : Wet SubTr, Dry Eq. CP, Normal Eq. EP for NDJ



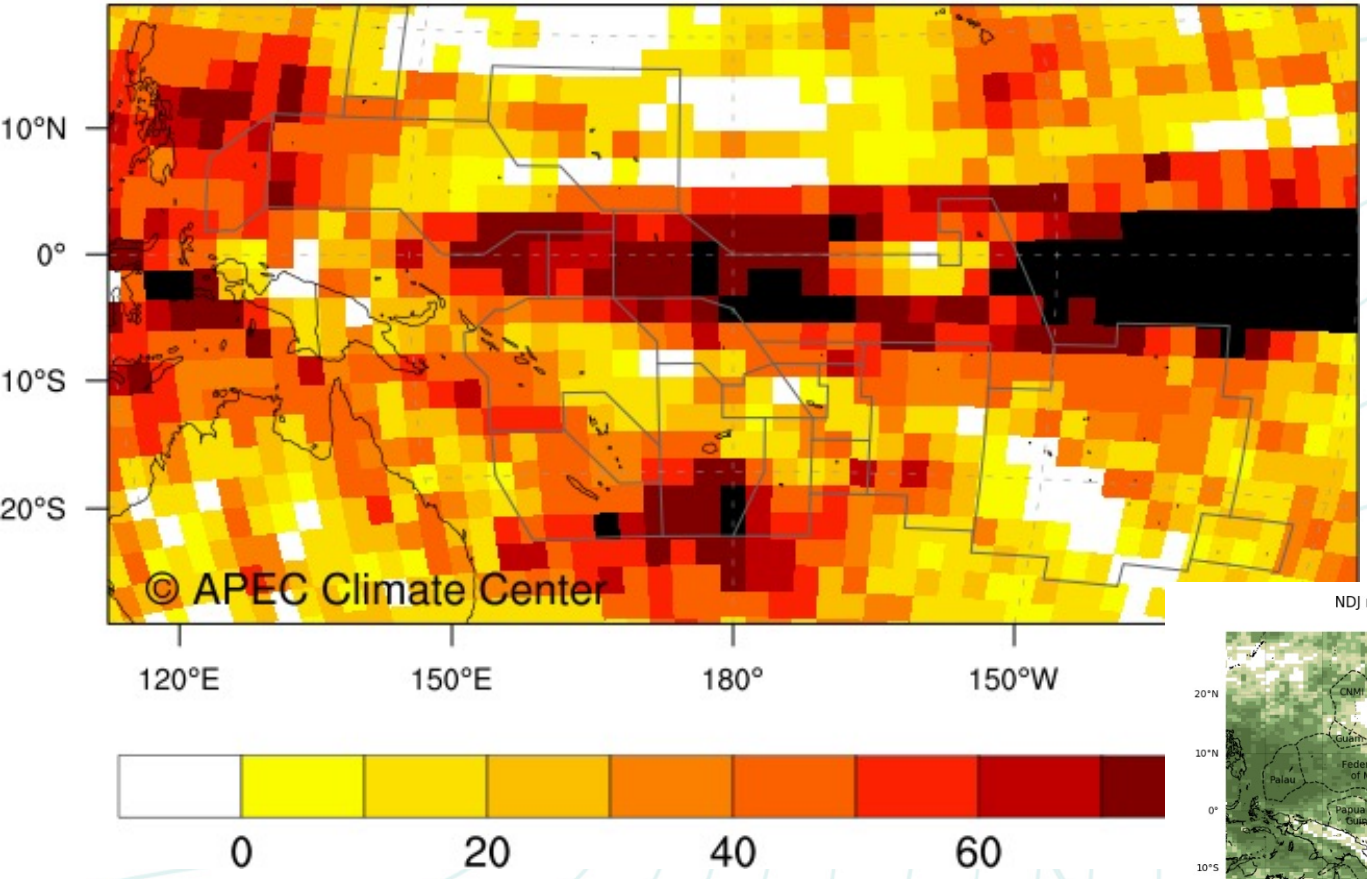
- ✓ APCC: APEC Climate Center
- ✓ BCC: Beijing Climate Center
- ✓ BOM: Bureau of Meteorology
- ✓ CMCC: Centro Euro-Mediterraneo sui Cambiamenti Climatici
- ✓ CWB: Central Weather Bureau
- ✓ HMC: Hydrometeorological Centre of Russia
- ✓ JMA: Japan Meteorological Agency
- ✓ KMA: Korea Meteorological Administration
- ✓ METFR: Météo-France
- ✓ MSC: Meteorological Service of Canada
- ✓ MGO: Voeikov Main Geophysical Observatory
- ✓ NASA: National Aeronautics and Space Administration
- ✓ NCEP: National Centers for Environmental Prediction
- ✓ PNU: Pusan National University
- ✓ UKMO: United Kingdom Met Office



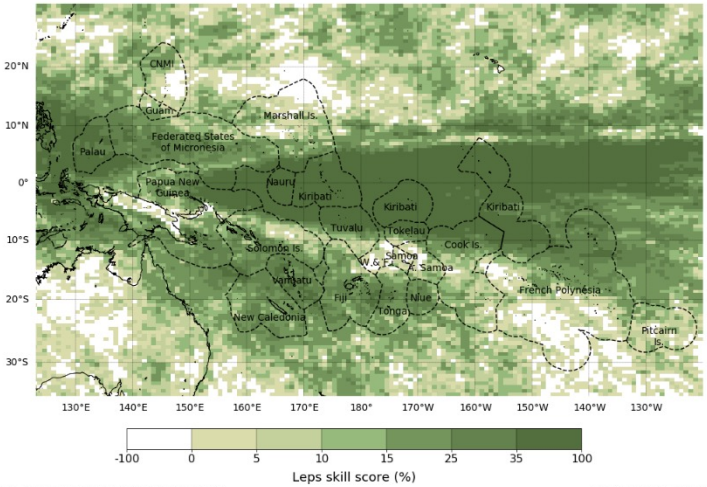
PACIFIC METEOROLOGICAL COUNCIL
SINCE 2011 Celebrating 10 years of service to the region

APCC MME Outlook

Heidke Skill Score (1991-2010)



NDJ rainfall Linear Error in Probability Space (LEPS) score.
Period: Seasonal. Initialisation date: 9th October

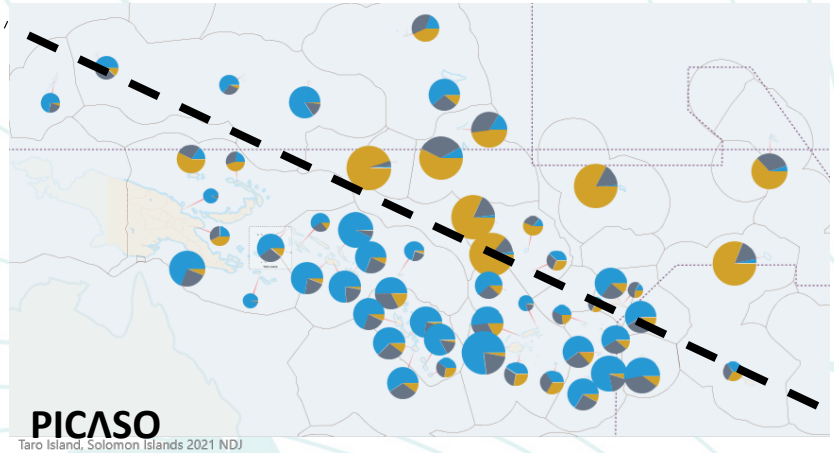


Source: ACCESS-S1 and ERA5 Climate Reanalysis
Hindcast period: 1990-2012

Created: 06/05/2021

PICASO Regional/Local P Outlook

Wet SubTr, Dry Eq. Pac.



The Equatorial Pacific is expected to have drier than normal conditions (with high reliability) in the next season.

In particular, the probability of drier then normal condition is likely to be greater than 50% in Penrhyn, Kiritimati, Tarawa, Kanton, Nauru, Momote, Nanumea, Nui, Fanufuti.

While, the most subtropical islands will experience wetter than normal conditions.

Cook Islands			
Penrhyn	81%	16%	
Rarotonga	34%	31%	35%
Fiji			
Rotuma	12%	26%	62%
Udu Point	19%	78%	
Nabouwalu	17%	31%	52%
Nadi Airport	20%	77%	
Suva	28%	31%	41%
Ono I Lau	33%	33%	34%
Kiribati			
Kiritimati	63%	32%	5
Butaritari	48%	36%	16%
Tarawa	57%	35%	8
Kanton	83%	16%	

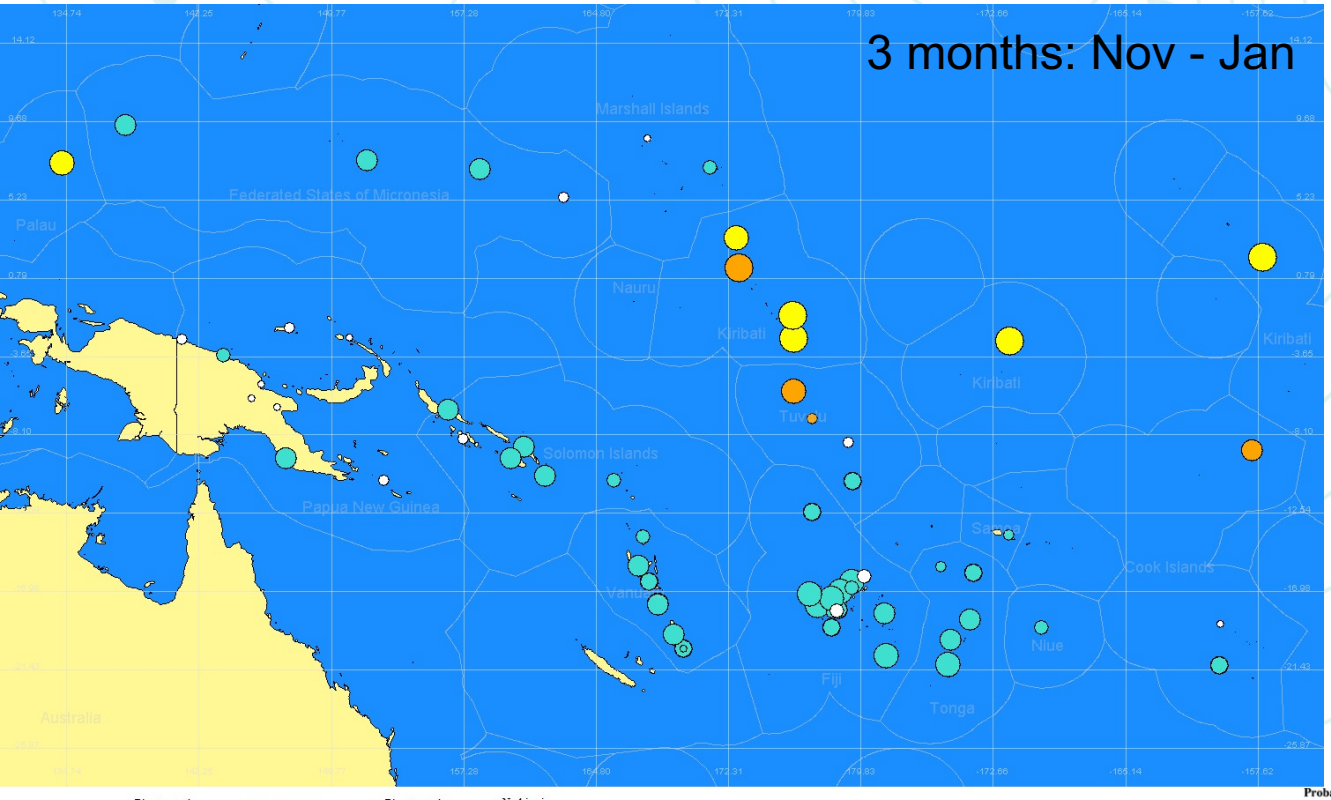
Marshall Islands			
Kwajalein Bucholz Aaf	43%	38%	19%
Majuro	11	28%	61%
Micronesia			
Chuuk WSO AP	6	29%	65%
Pohnpei	14%	84%	
Yap Island WSO Airport	12	35%	53%
Nauru			
Nauru	95%		
Niue			
Hanan Airport	10	37%	53%
Palau			
Koror	5	23%	72%
Papua New Guinea			
Madang	6	93%	

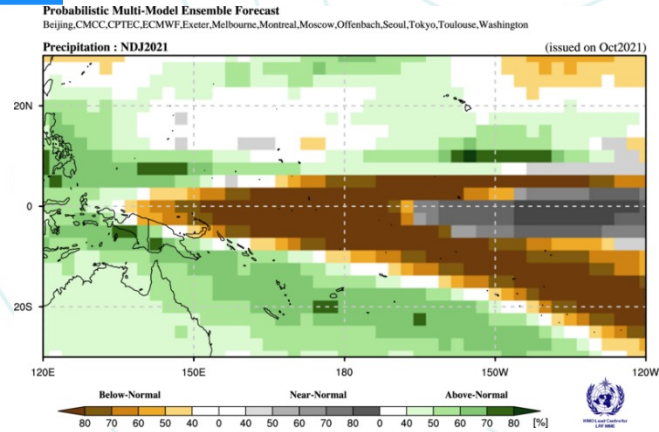
Port Moresby	6	25%	69%
Momote	58%	27%	15%
Nadzab	43%	32%	25%
Kavieng	45%	33%	22%
Misima	5	94%	
Samoa			
Afiamalu	12	29%	59%
Laulii	27%	57%	16%
Faleolo	33%	32%	35%
Apia	11	24%	65%
Solomon Islands			
Taro Island	11	29%	60%
Munda	14%	27%	59%
Auki	6	93%	
Honiara	6	21%	73%

Honiara Henderson	21%	76%
Kira Kira	7	24%	69%
Santa Cruz	5	23%	72%
Tonga			
Niuafoou	23%	34%	43%
KeppelMata'aho Airport	11	30%	59%
Lupepau'u	13	27%	60%
Haapai	5	17%	78%
Nuku'alofa	8	26%	66%
Tuvalu			
Nanumea	82%	16%	
Nui	86%	12	
Funafuti	56%	30%	14%
Niulakita	31%	31%	38%
Vanuatu			

Sola (Vanua Lava)	17%	33%	50%
Pekoa Airport (Santo)	7	24%	69%
Lamap (Malekula)	5	22%	73%
Bauerfield (Efate)	10	27%	63%
Port Vila	10	31%	59%
White Grass Airport	14%	83%	
Aneityum	28%	32%	40%

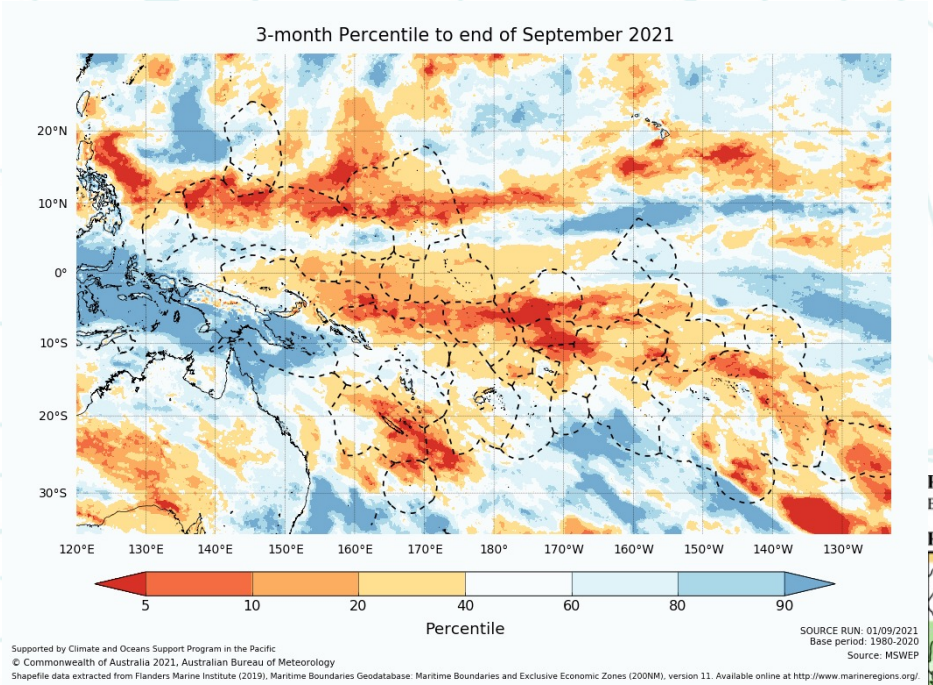
SPREP SCOPIC (statistical model)

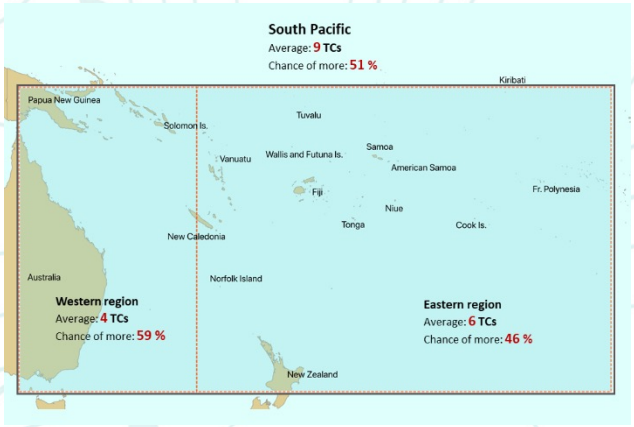


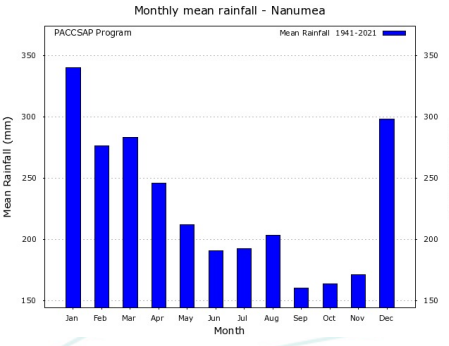


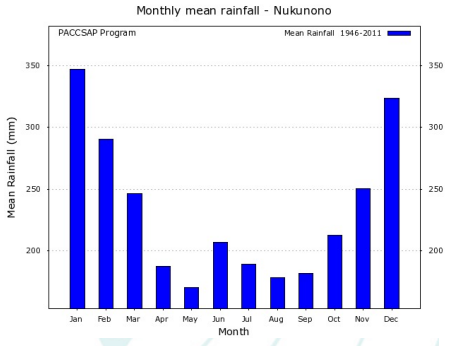
- SCOPIC using August + September NINO3.4 SSTa as predictor
- Not taking into account October ENSO conditions or ENSO forecast

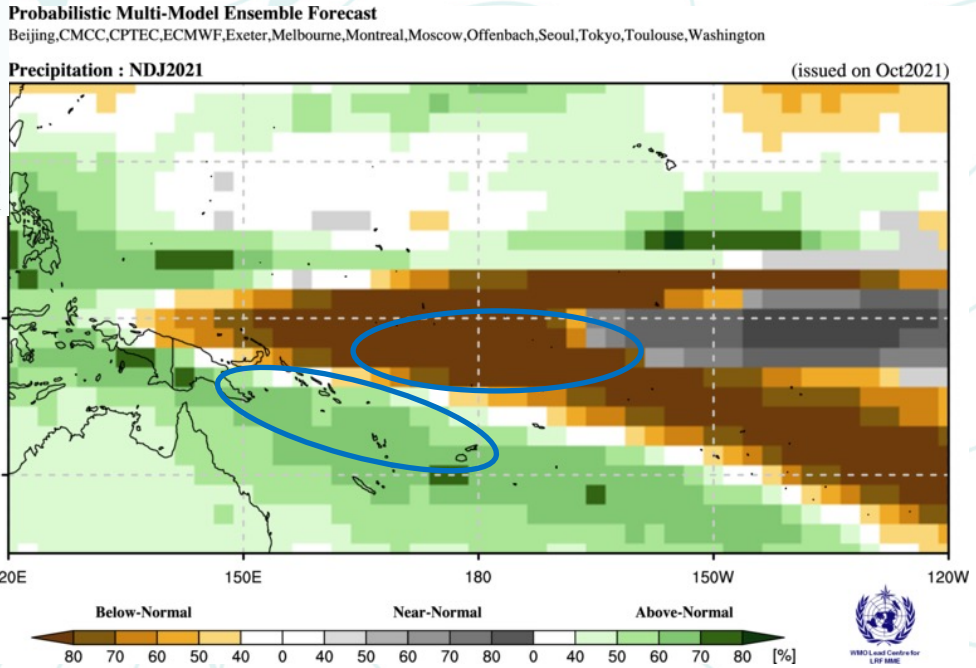
Areas of greatest concern







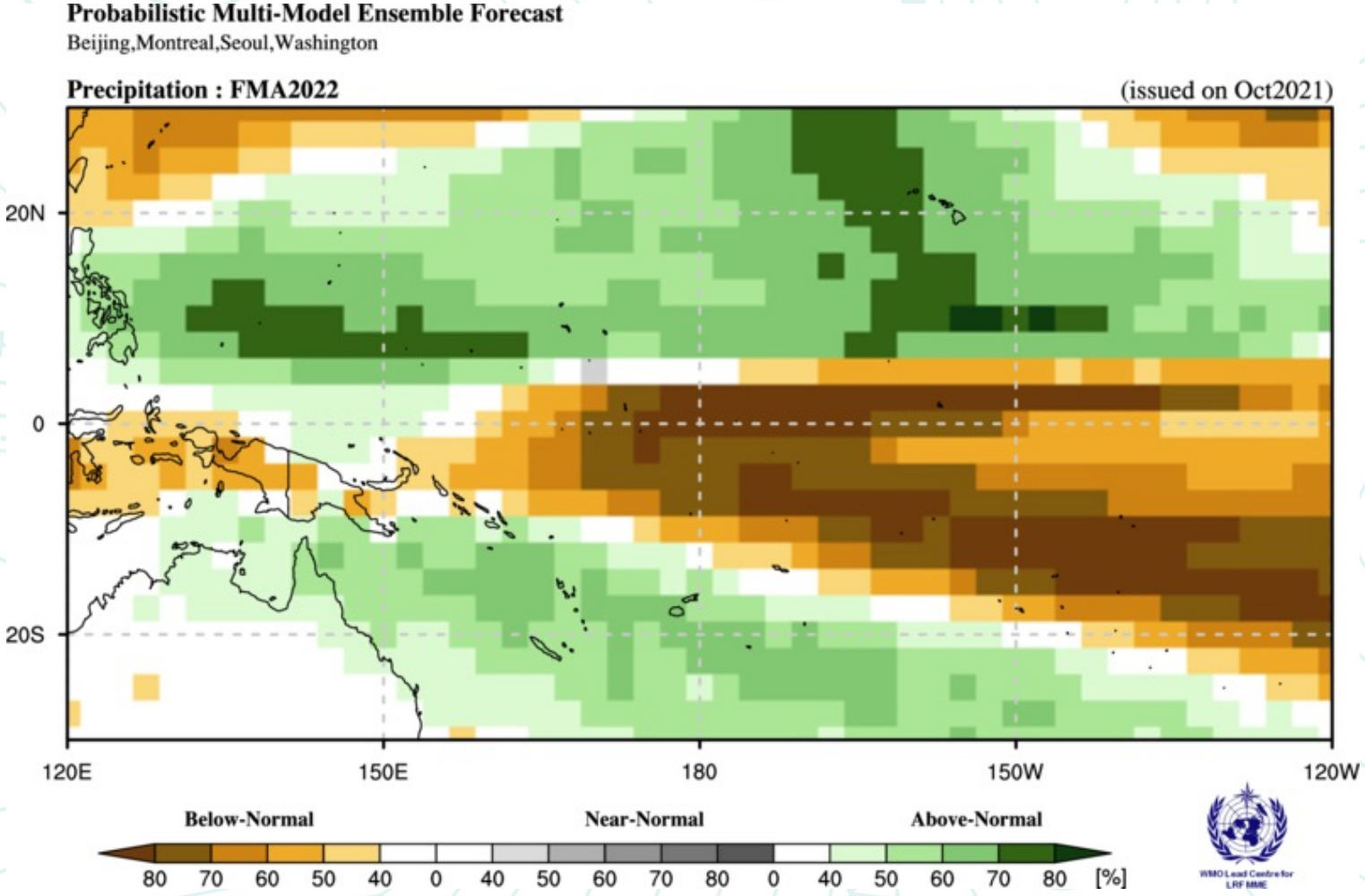




Rainfall Outlook Feb-Apr 2022

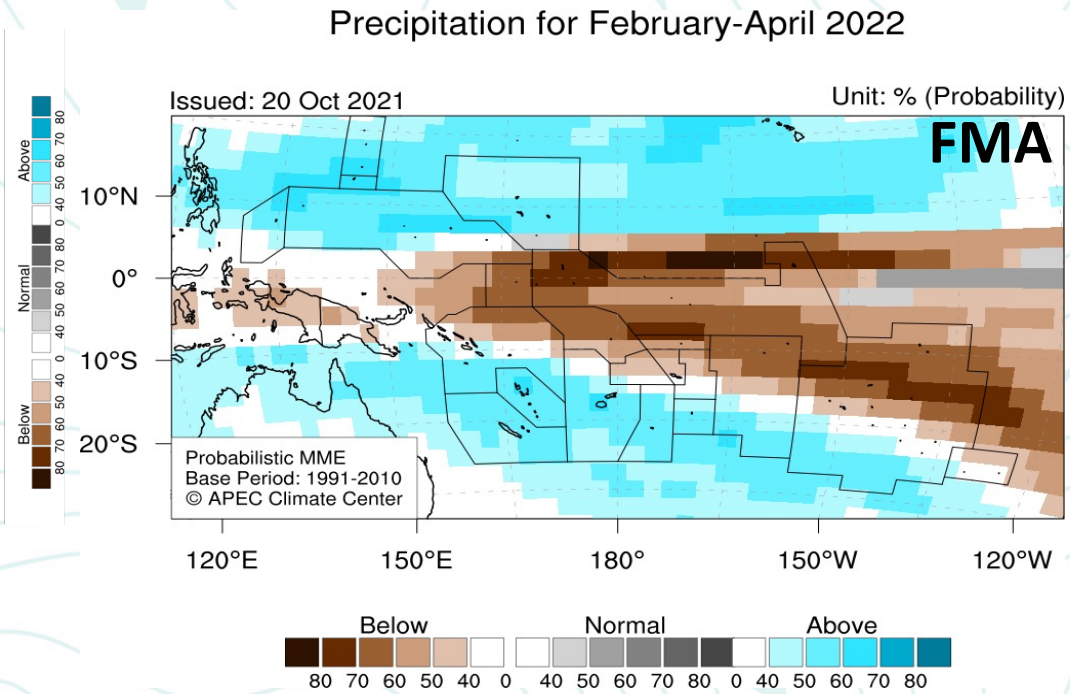
- WMO LC MME has a limited number of dynamical models available (Beijing, Montreal, Seoul, Washington)
- APCC MME
- SCOPIC
- Warning! Skill not great for this period, but useful early indication of likely conditions. Obtain updates as they become available.

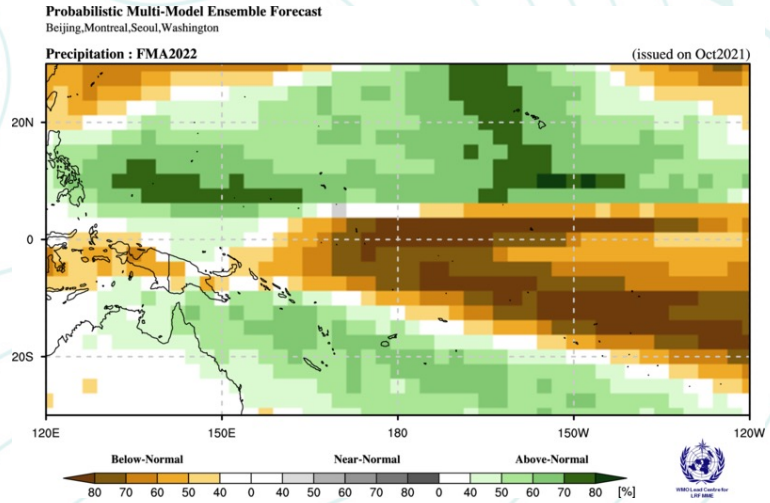
WMO Lead Centre for LRF MME

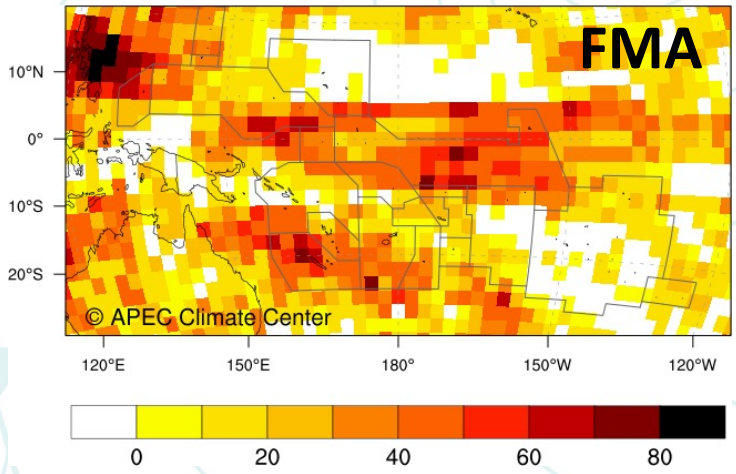


PACIFIC METEOROLOGICAL COUNCIL
SINCE 2011 Celebrating 10 years of service to the region

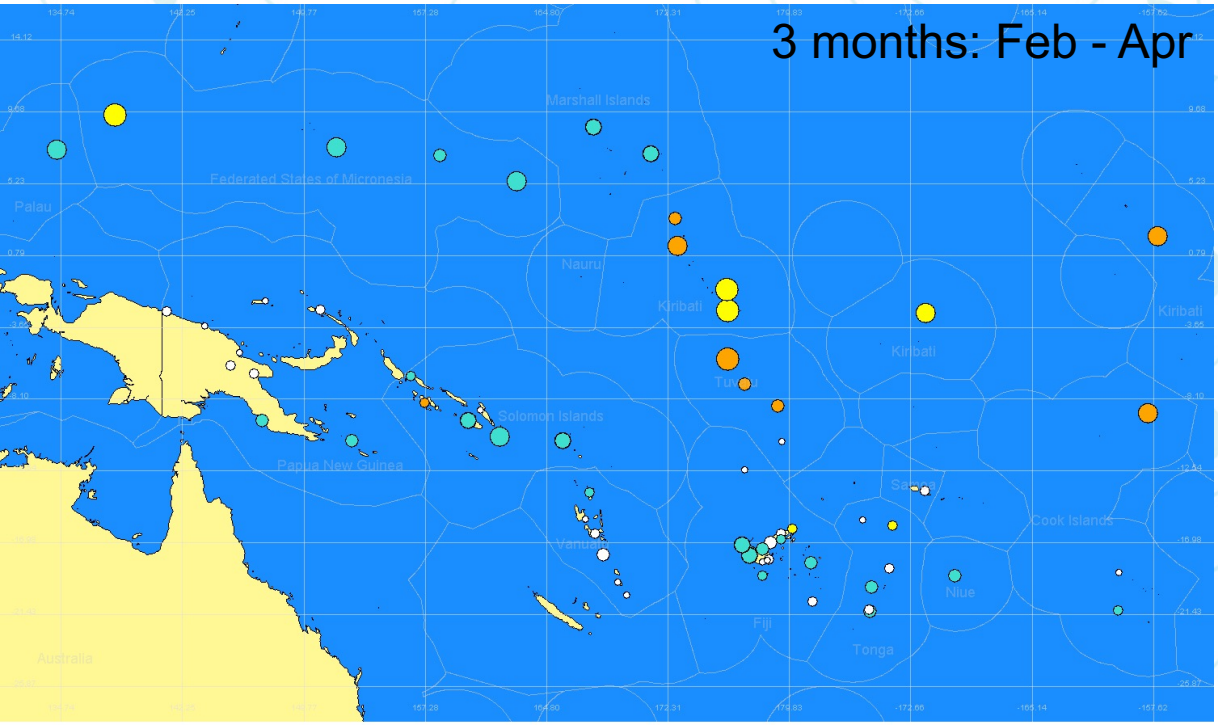
APCC MME Outlook

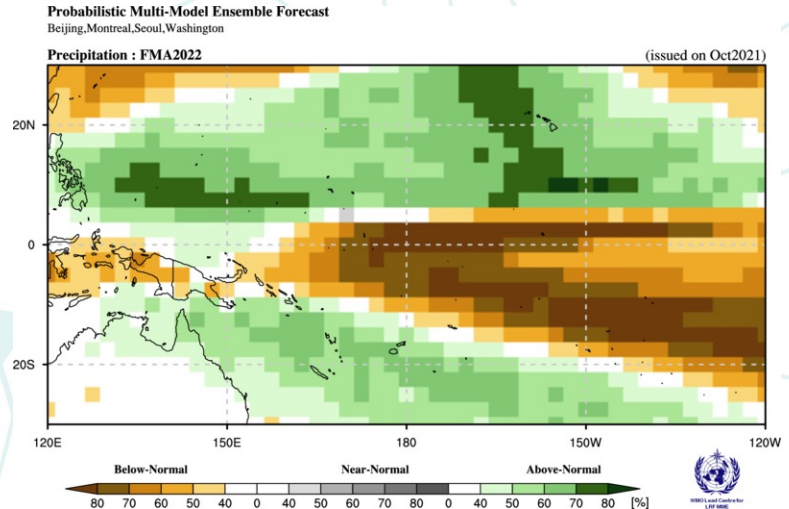




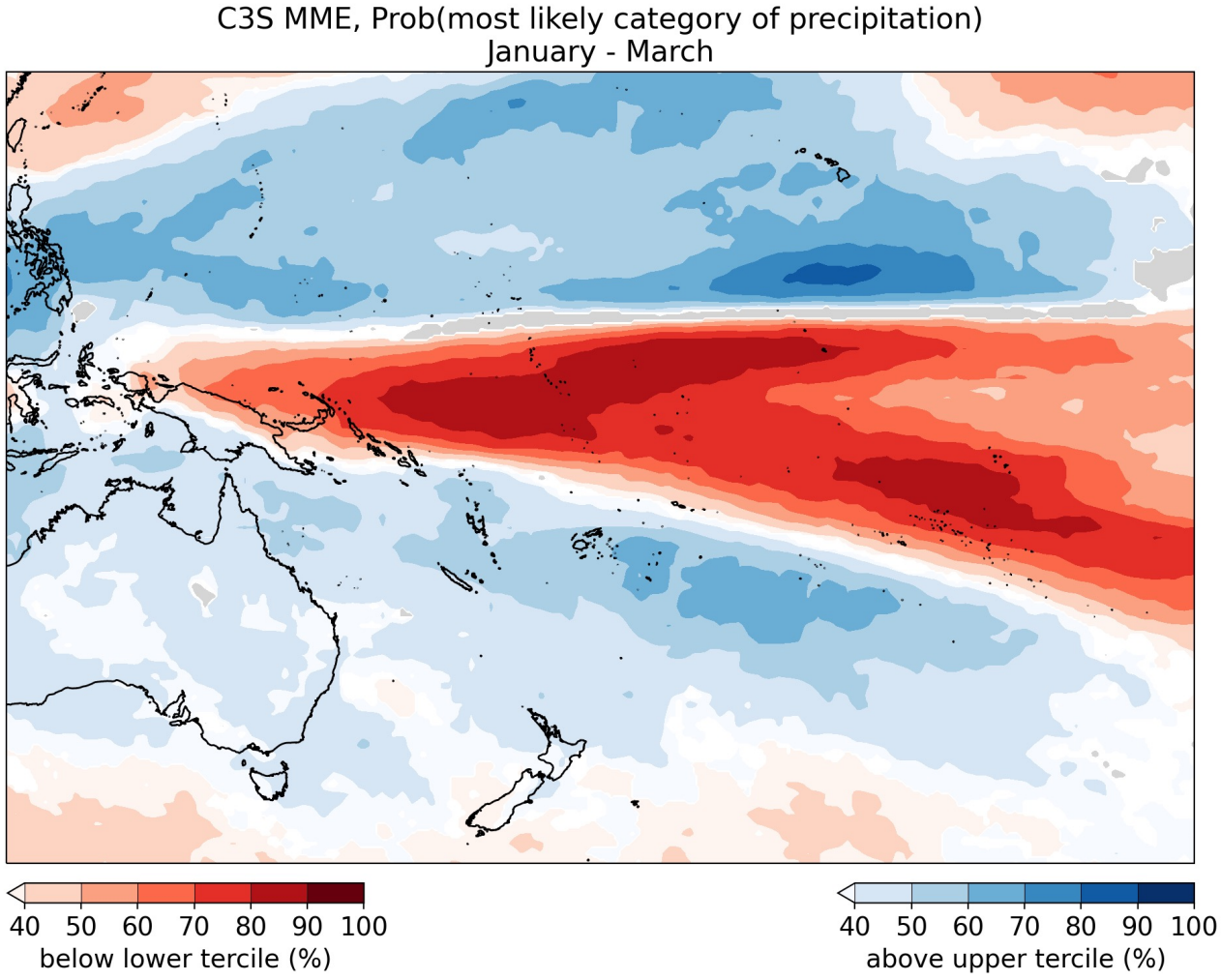


SPREP SCOPIC (statistical model)



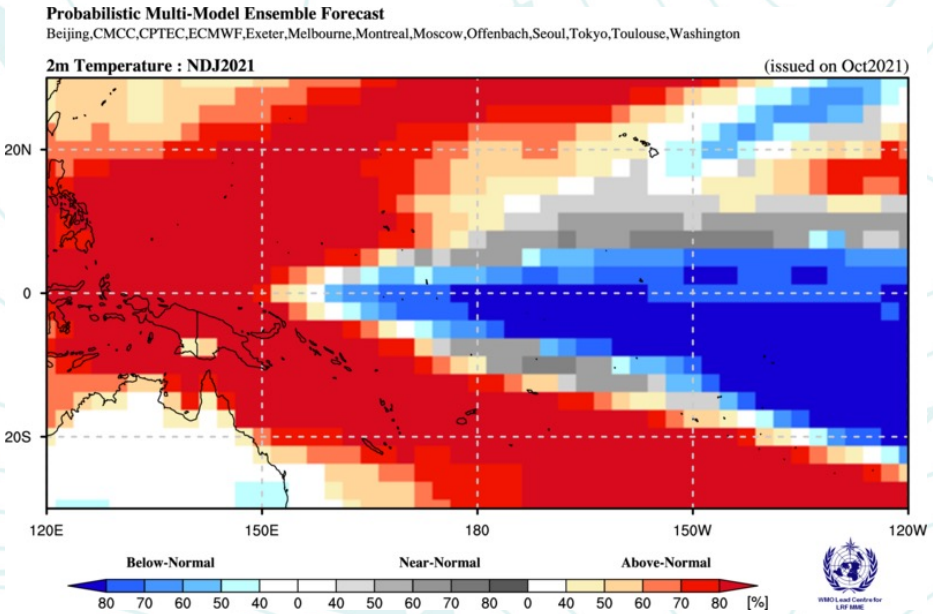


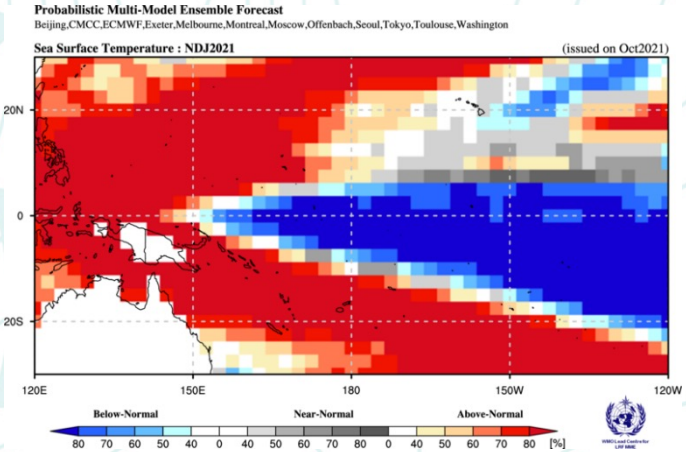
NIWA ICU: most likely precipitation category over the coming seasons

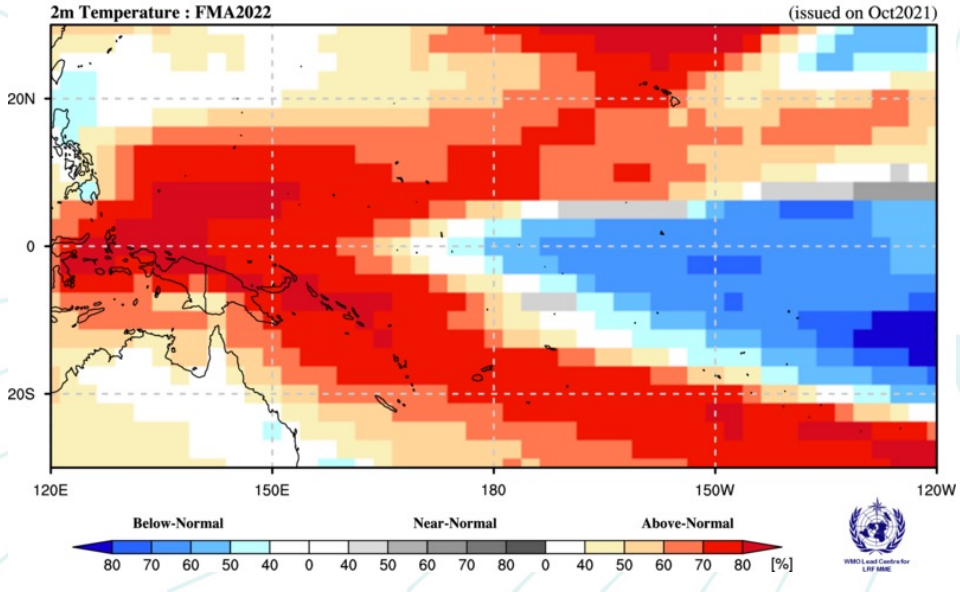


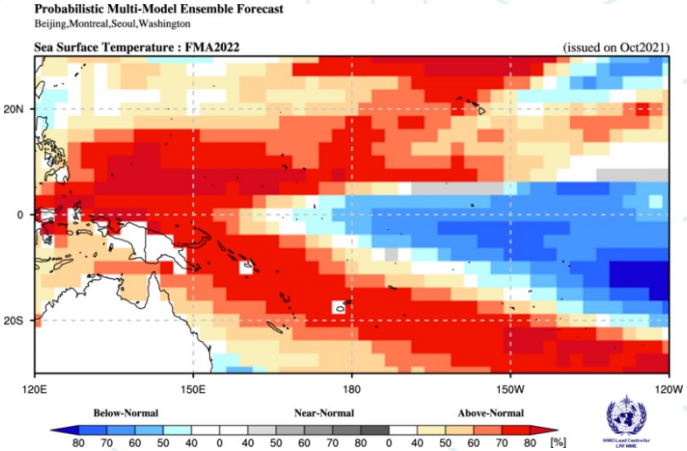
Air Temperature, MSLP and Wind Outlooks
Nov-Jan 2022

WMO LC Centre LRF MME

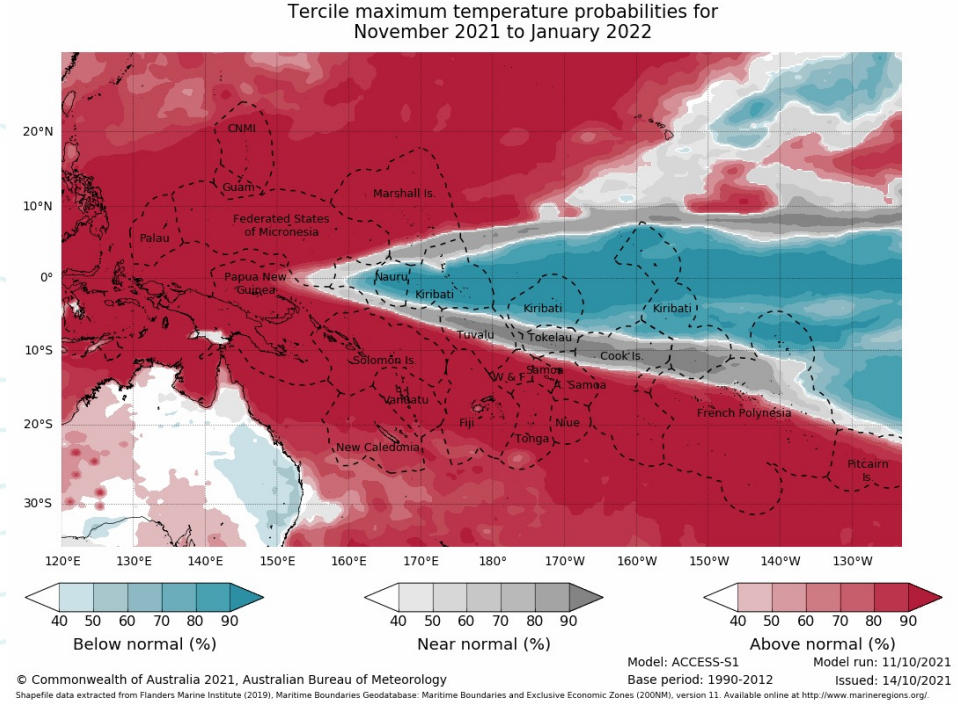


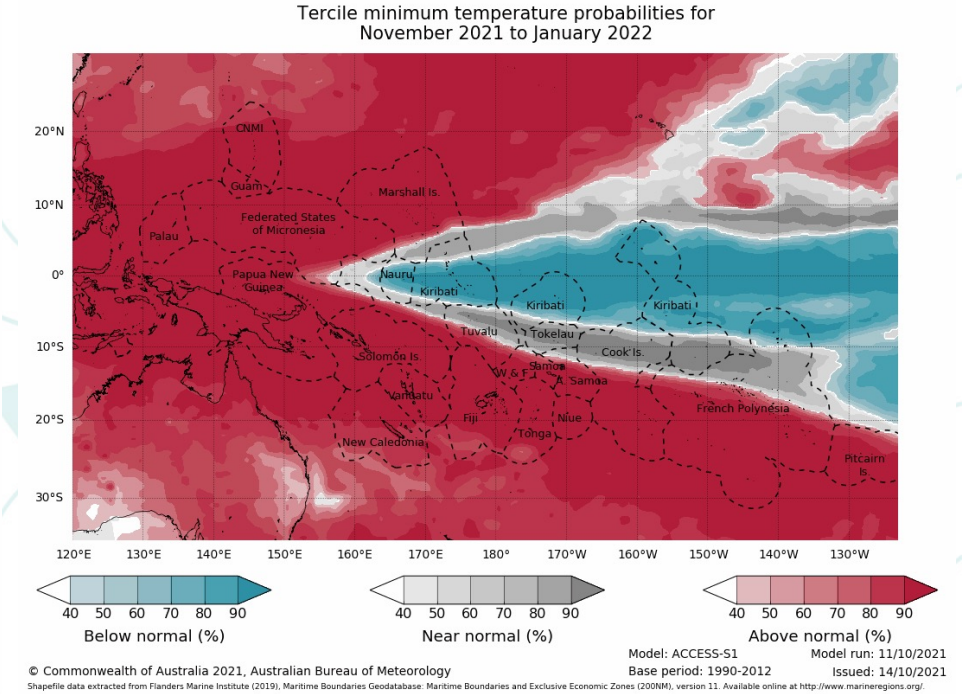






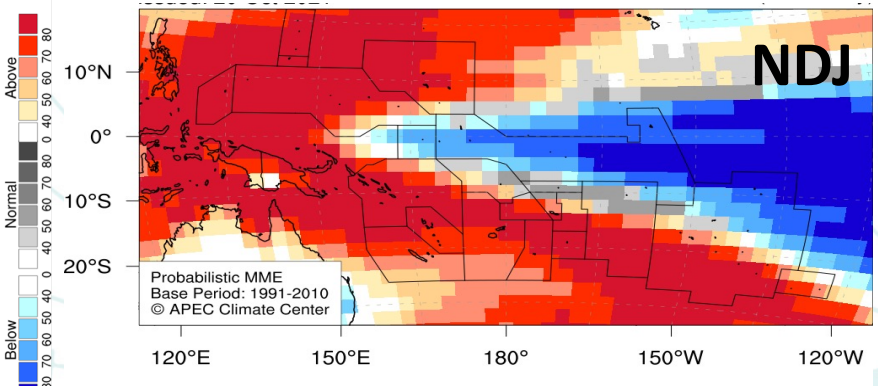
Melbourne ACCESS-S



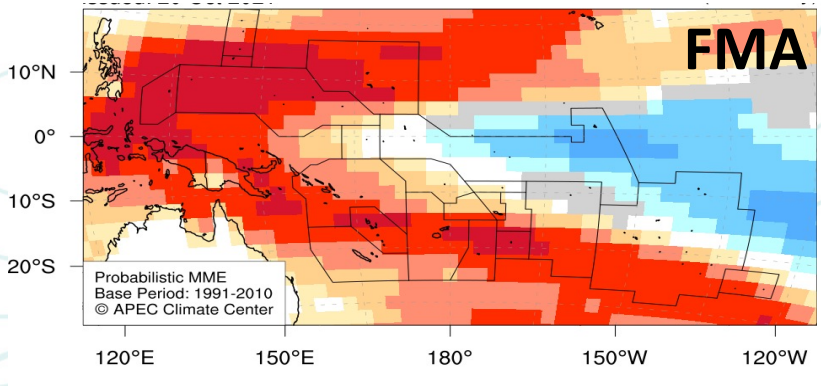


APCC MME Regional T Outlook

Temperature: Warm WP - SubTr, Cool EP

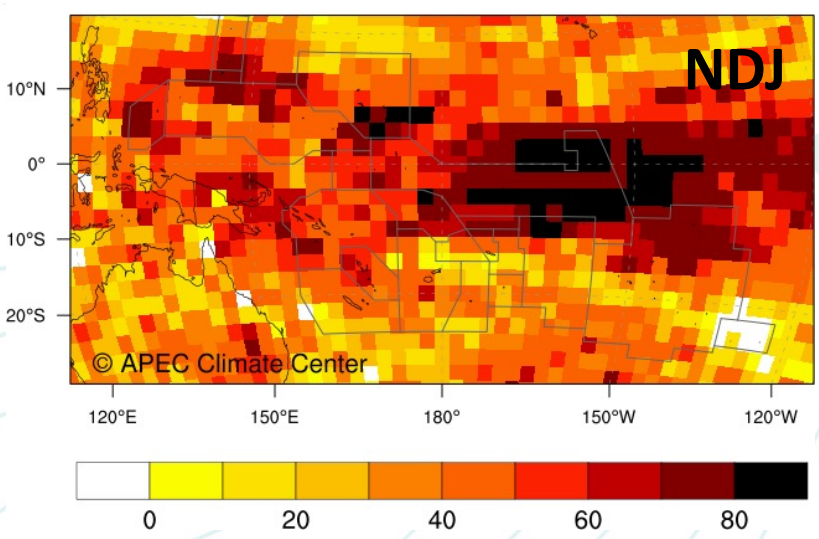


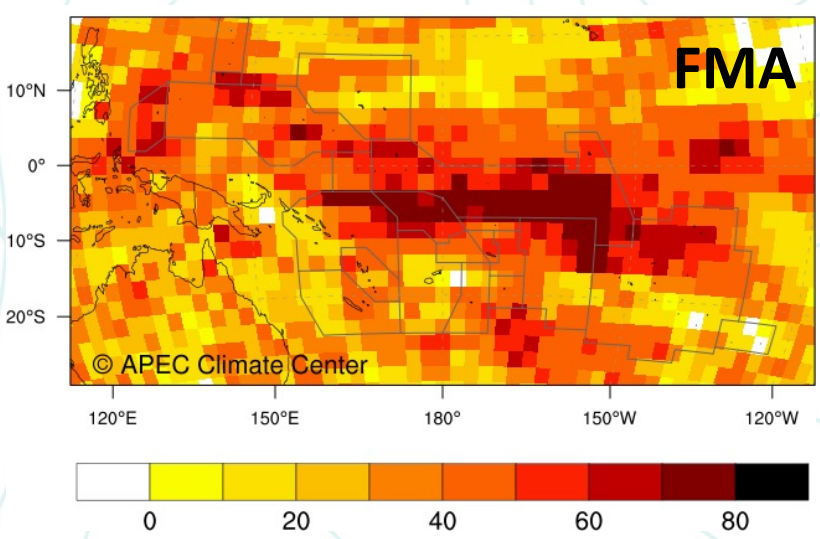
Warm WP - SubTr, Slightly Cool EP



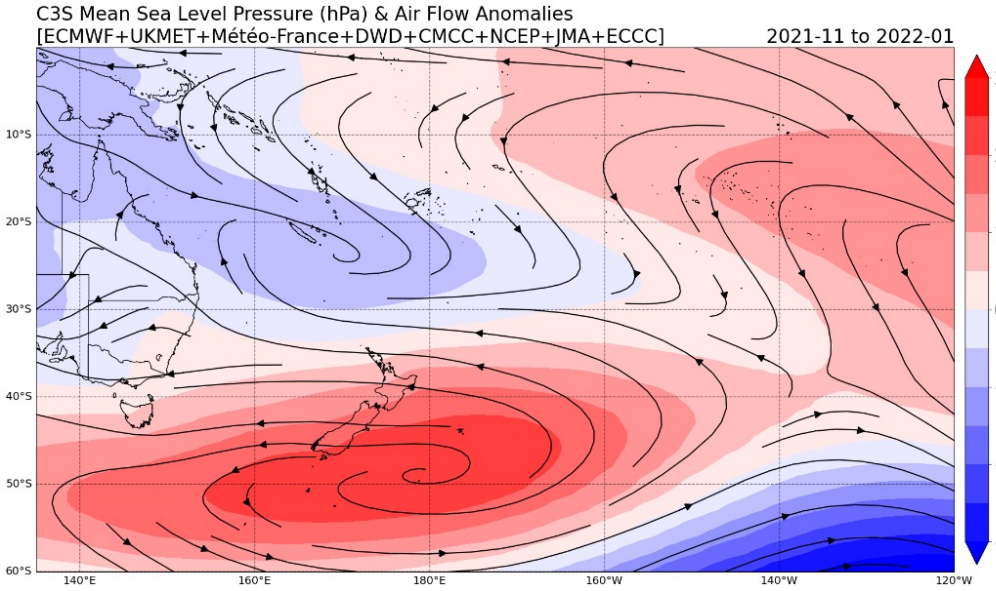
Hotter than normal conditions are expected in many of the islands located along the ITCZ/SPC axis in the next two seasons, particularly during NDJ. On the hand, the eastern Pacific is expected to be within the cooler than normal condition.

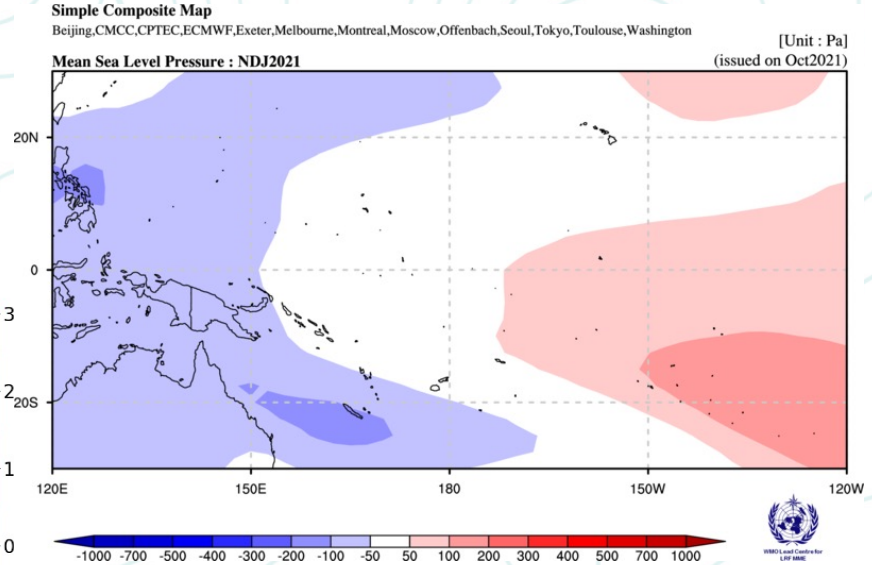
Heidke Skill Score (1991-2010)

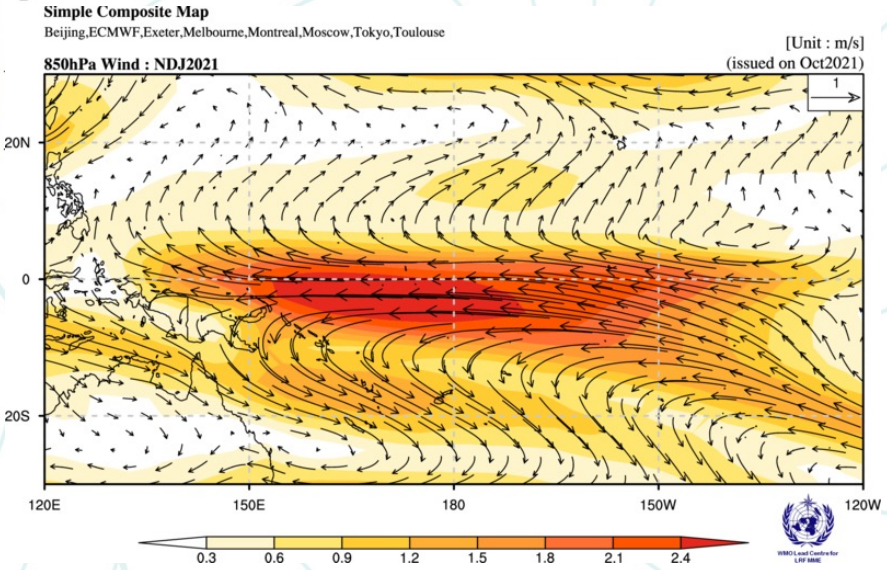




MSLP and Air flow







Summary paragraphs

- The transition from neutral to a La Niña-like ENSO state is evident in the rainfall, air temperature and wind seasonal outlooks for November 2021 to January 2022 and February to April 2022. The outlooks are largely consistent with conditions experienced over the same period in the past when a La Niña-like ENSO state has been present.
- Drier than normal conditions are favoured for island groups near and west of the Dateline that are located close to the equator (excluding the area west of New Guinea). The expanse of drier than normal conditions extends northeast and southeast from the dateline towards the subtropics (Fig X). Islands in this region that have experienced low rainfall during or since the last La Niña event are likely to continue to experience these conditions. Forecast confidence for this region is high. Wetter than normal conditions are favoured for islands located between Palau and the central Marshall Islands in the north Pacific and southeast PNG to southernmost French Polynesia in the South Pacific. Forecast confidence for this region is moderate to high. A similar pattern is favoured for February to April 2020 with minor differences. Consistent with signs of a La Nina event maturity and declining, the chances of drier than normal conditions ease near and west of the dateline. The chances of wetter than normal conditions also ease in the South Pacific but become stronger and are more extensive in the north Pacific.
- Associated with ocean surface temperature patterns, warmer than normal air temperatures are expected for many island groups, particularly in the western equatorial Pacific, extending northeast and southeast towards the subtropics (Fig. 2). Cooler than normal air temperatures are more likely closer to and off the equator near and east of the Dateline. The air temperature outlook pattern for February to April 2022 period is similar but less emphatic.
- Wind outlooks show a stronger than normal easterly air flow along the equator over November to January with a larger than normal flow of warm and moist air into the northern and southern hemisphere in the western Pacific. This pattern is consistent with the warmer and wetter outlook presented above.