

Agenda 5. Looking Forward:

Seasonal IntraSeasonal Guidance for 2020/21

APEC Climate Center (APCC)

by WonMoo Kim

NIWA/NOAA/BoM/APCC/SPREP
& MF



Climate Outlook 2020/21

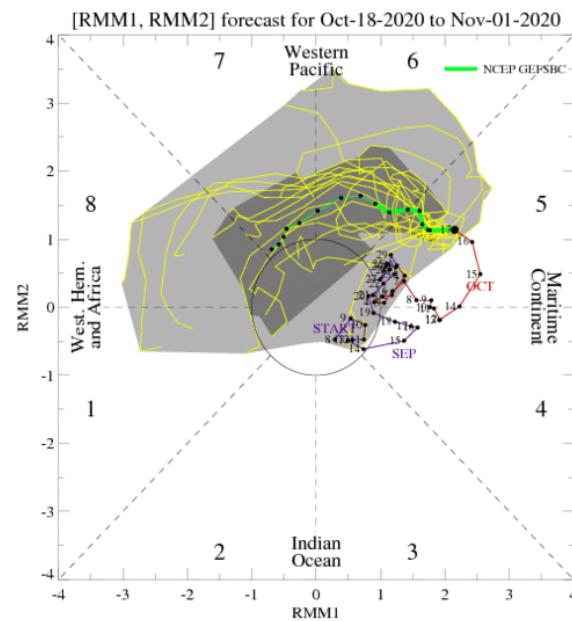
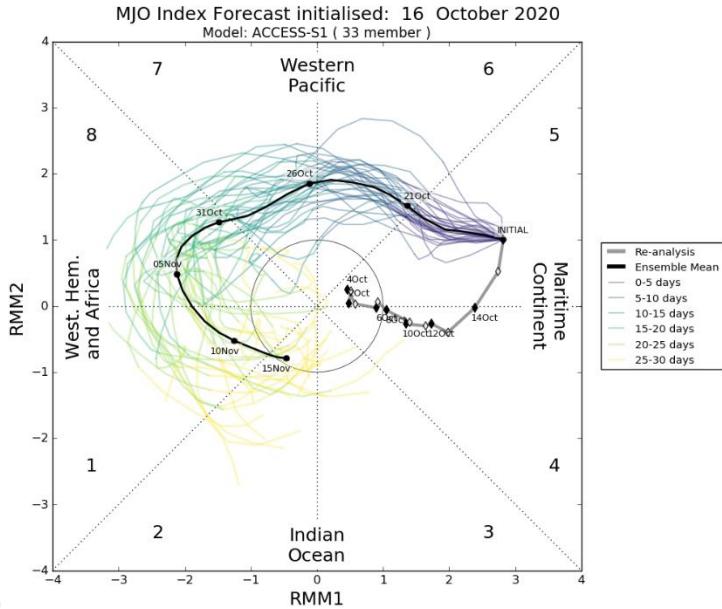
La Niña (**NDJFM_A**) + IDO⁻⁰ + wQBO:

Overview

Western Pacific + MTC + SubTr > warmer & wetter

Central to Eastern Pacific > cooler & drier

IntraSeasonal MJO > ph8 early Nov. cf. active/slower, but wQBO may interrupt the relationship



Precipitation (NDJ)

Wet SubTr, Dry EQ-CP

WMO

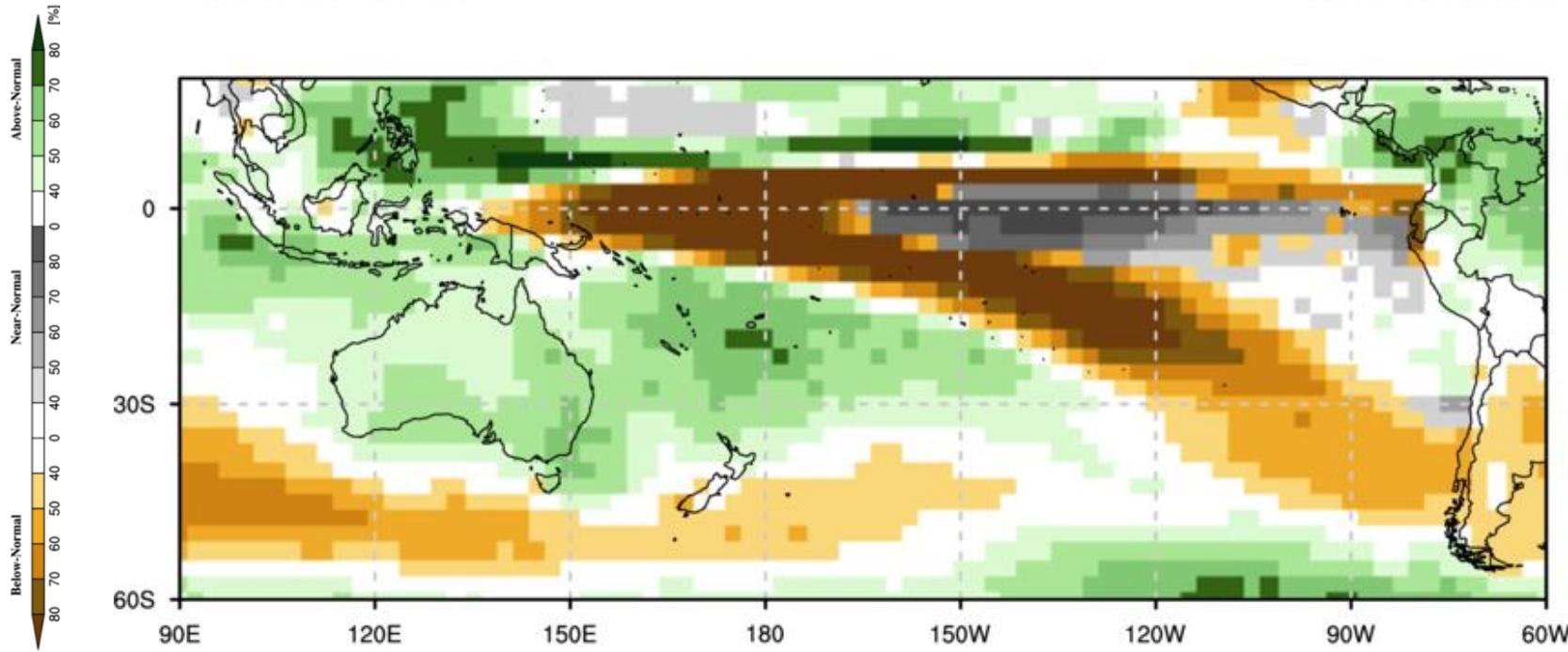


Probabilistic Multi-Model Ensemble Forecast

Beijing, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington

Precipitation : NDJ2020

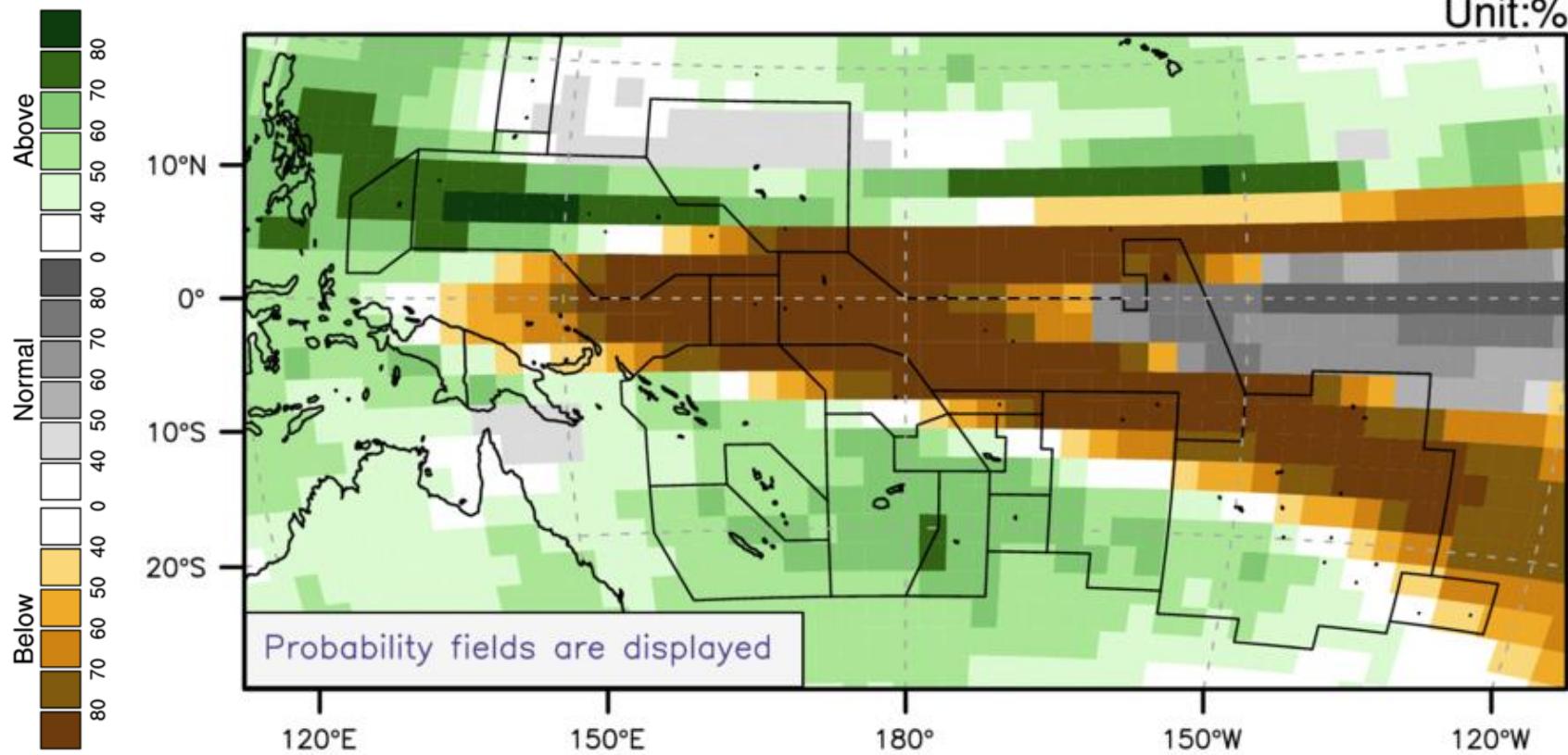
(issued on Oct2020)



Precipitation (NDJ)

Wet SubTr, Dry EQ-CP

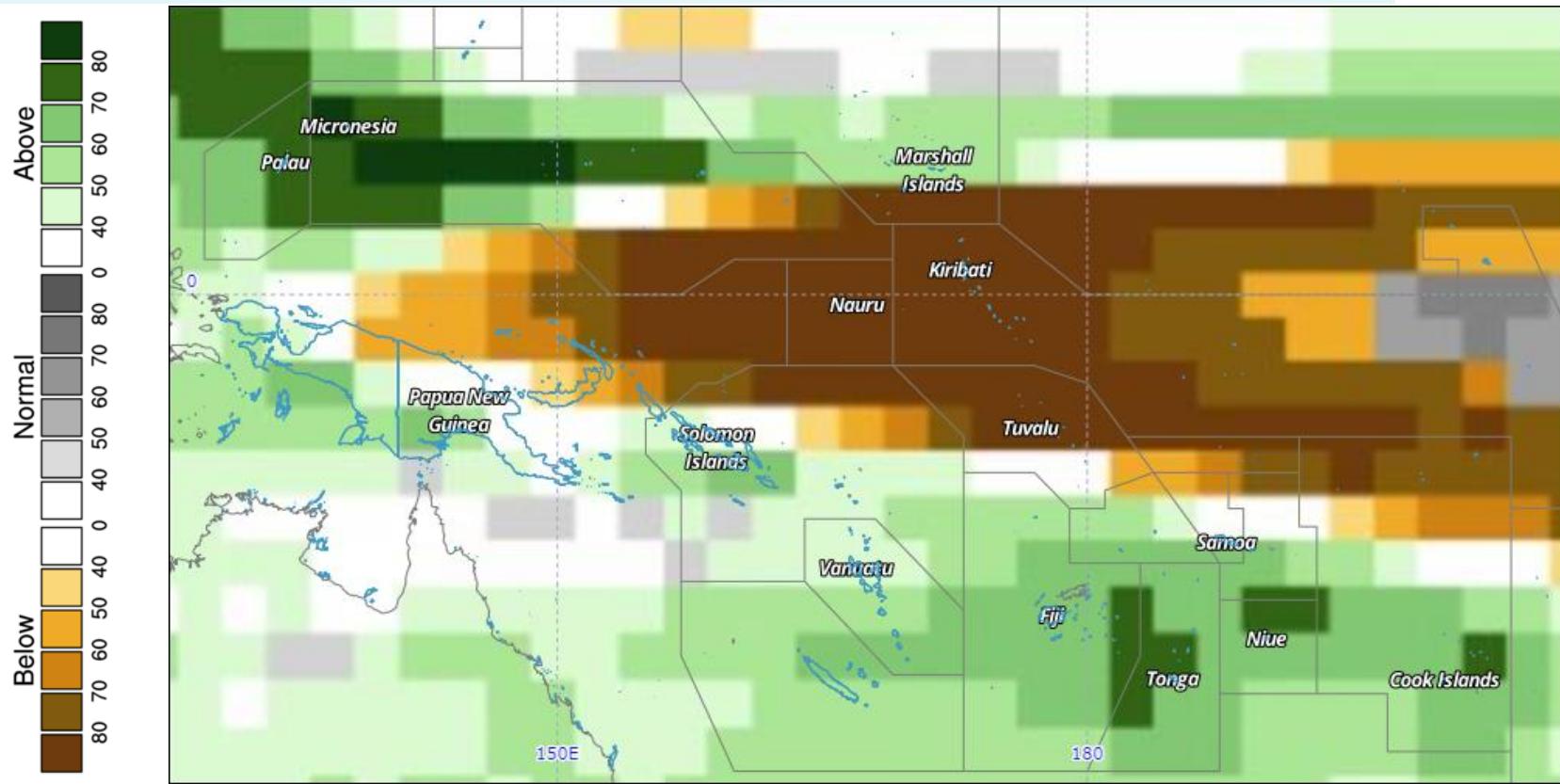
APCC
Unit:%



Precipitation (NDJ)

Wet SubTr, Dry EQ-CP

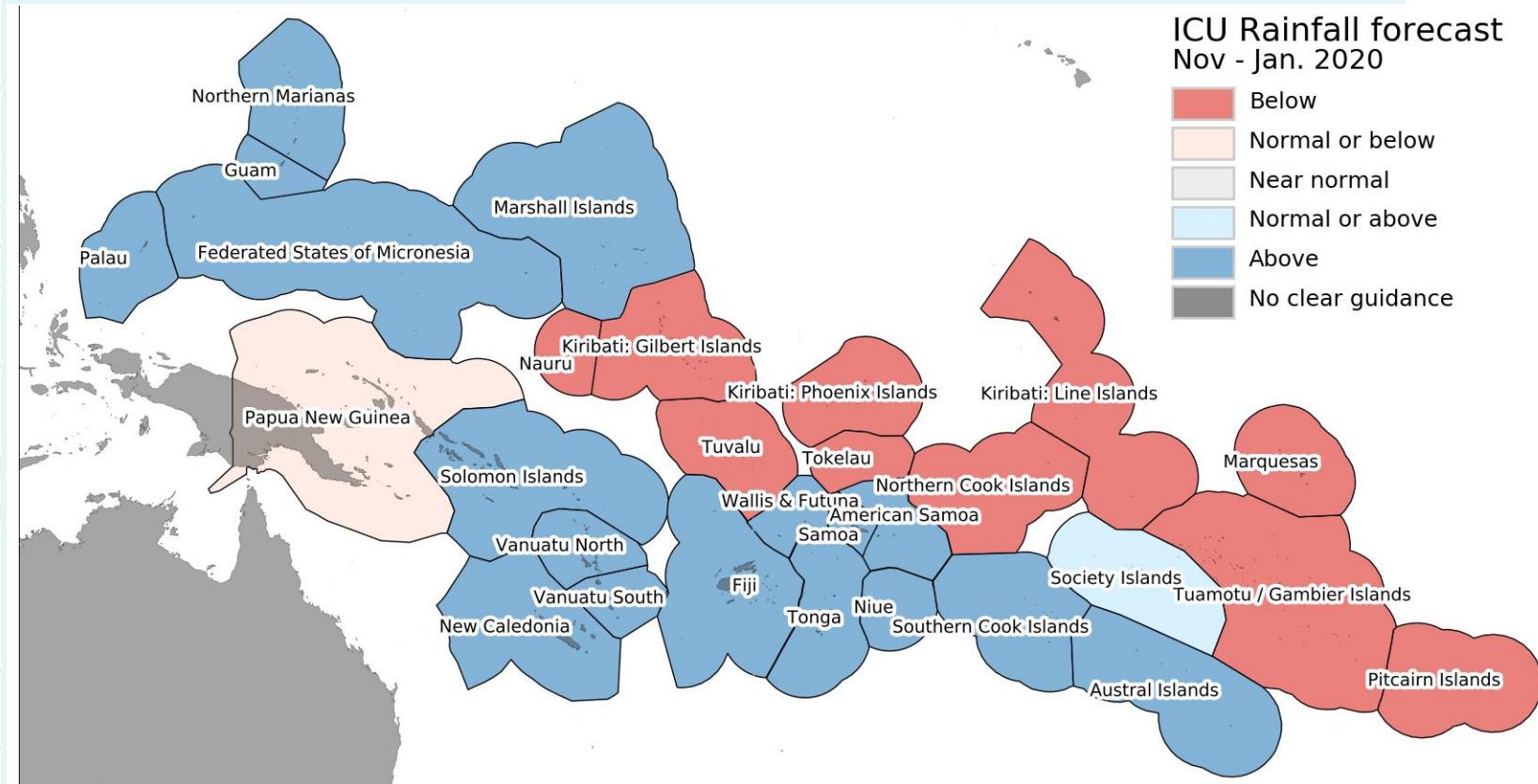
CliKp
SPREP



Precipitation (NDJ)

Wet SubTr, Dry EQ-CP

NIWA



Precipitation (NDJ)

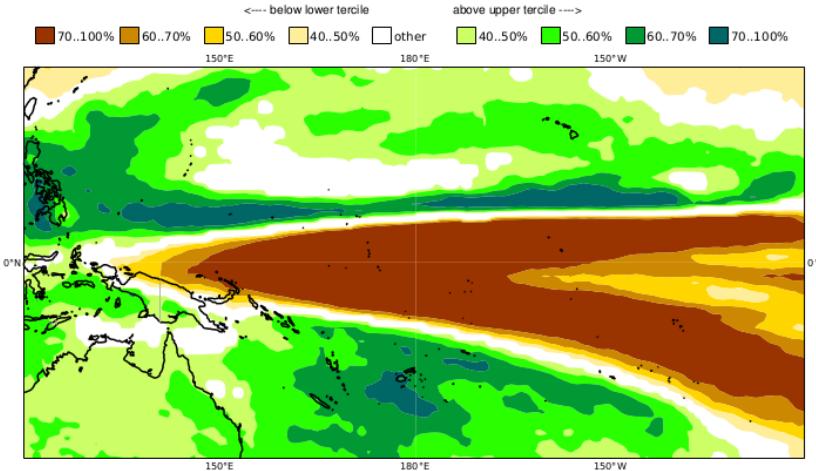
Wet SubTr Dry EQ

C3S

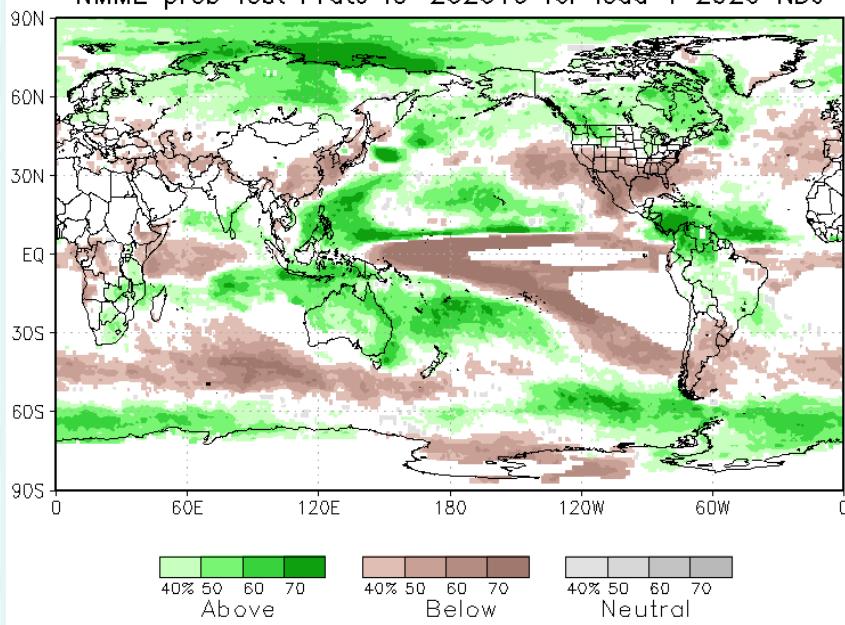
*experimental
NMME

C3S multi-system seasonal forecast
Prob(most likely category of precipitation)
Nominal forecast start: 01/10/20
Unweighted mean

ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA
NDJ 2020/21



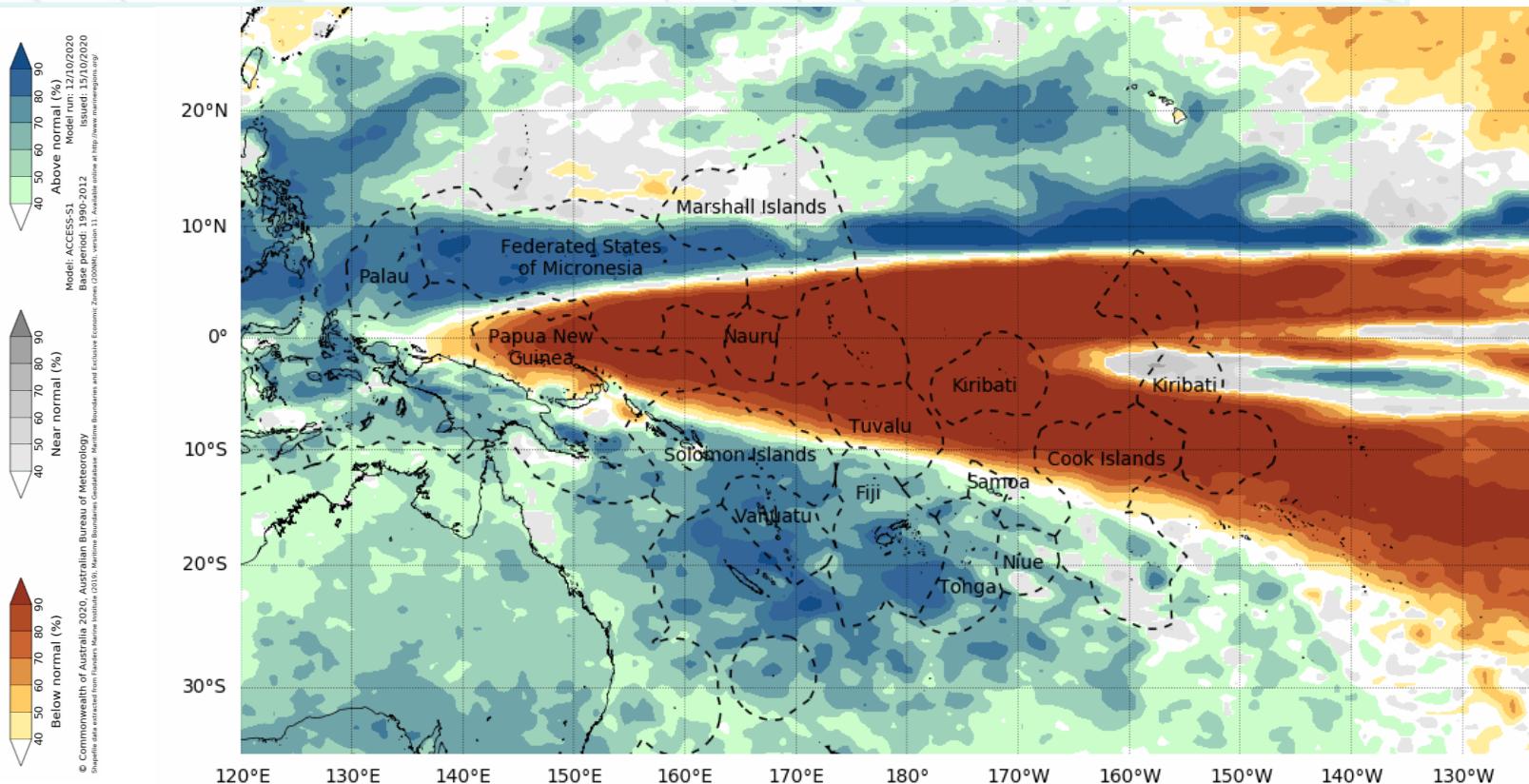
NMME prob fcst Prate IC=202010 for lead 1 2020 NDJ



Precipitation (NDJ)

Wet SubTr, Dry EQ-CP

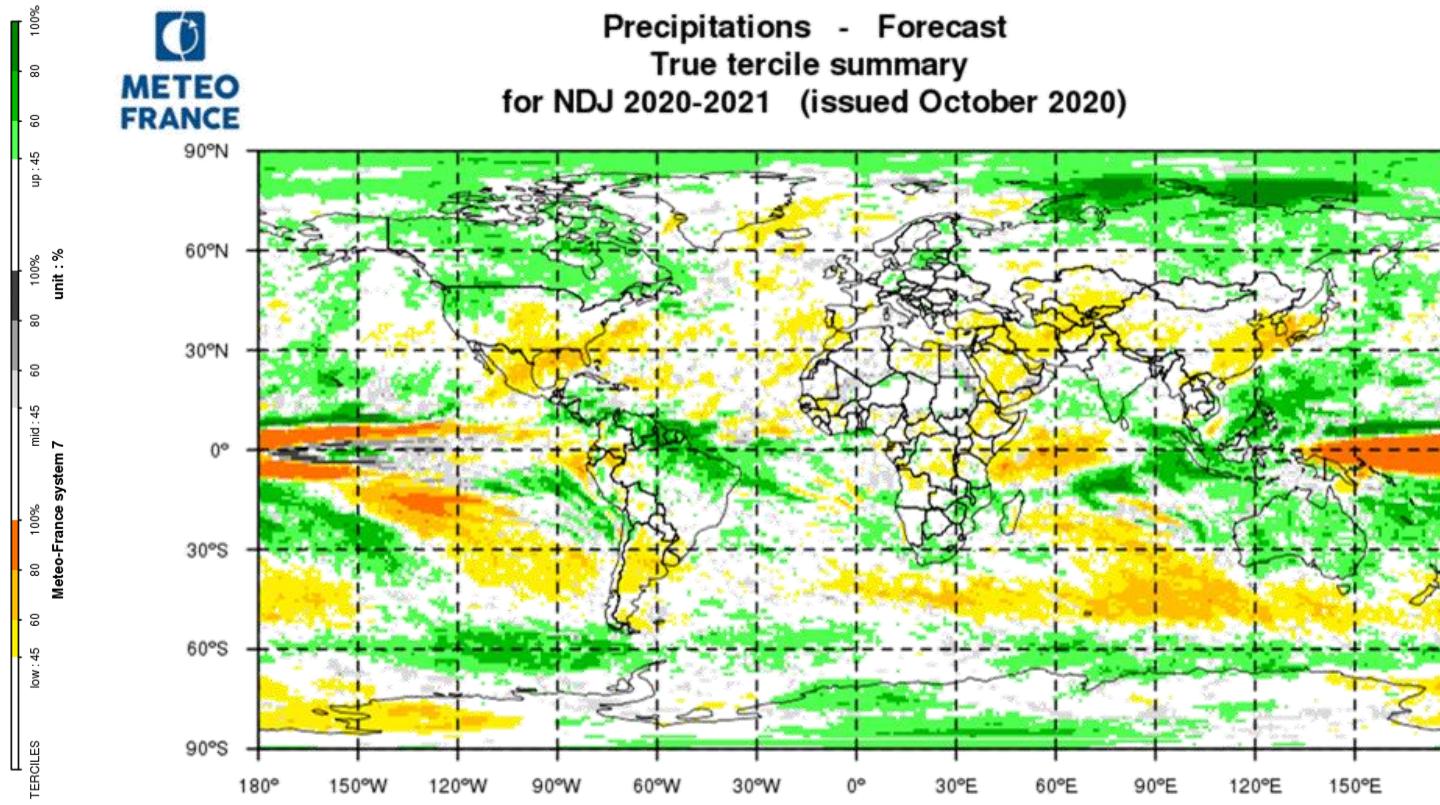
BoM



Precipitation (NDJ)

Wet SubTr, Dry EQ-CP

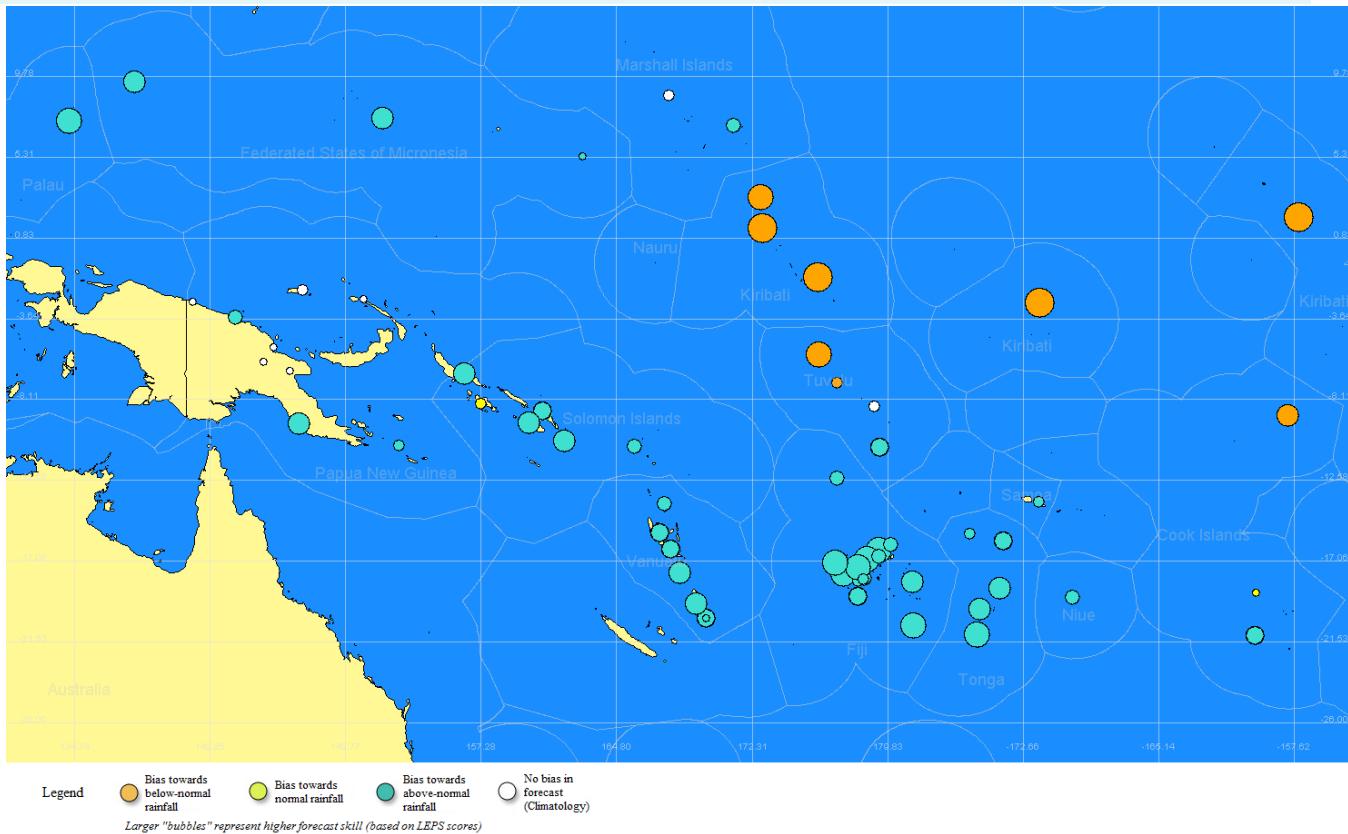
MetFr



Precipitation (NDJ)

Wet SubTr, Dry EQ-CP

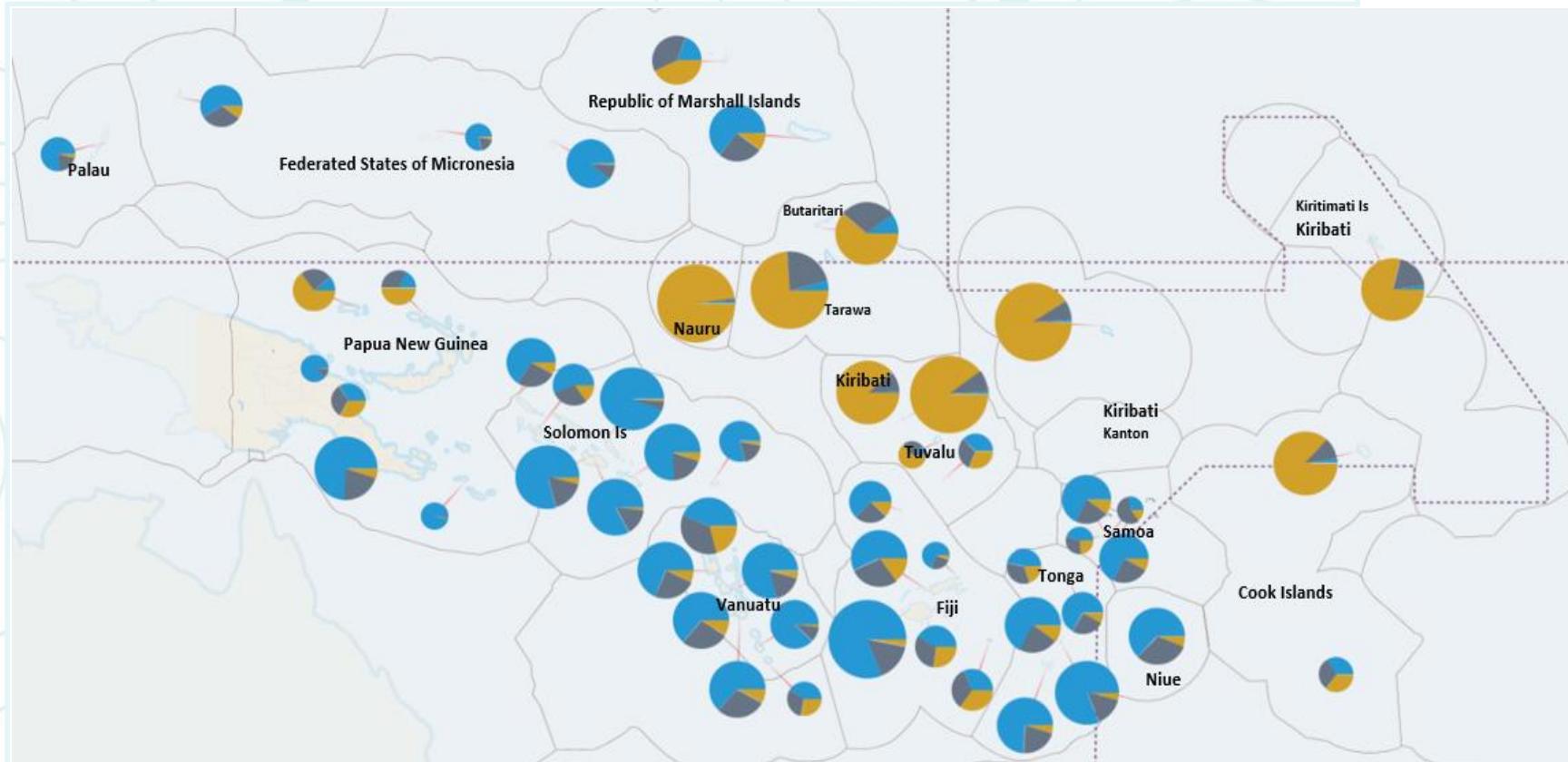
SCOPIC



Precipitation (NDJ)

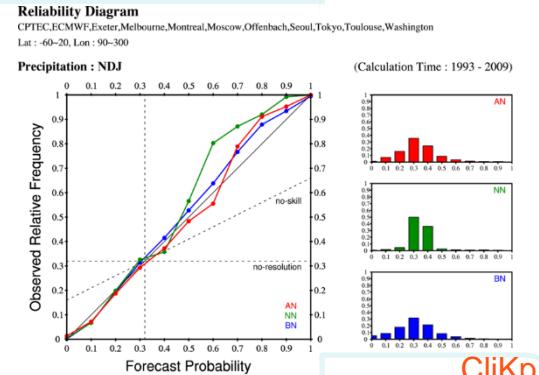
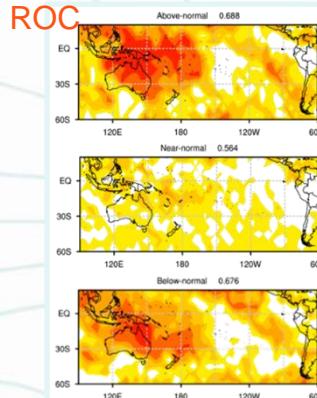
Wet SubTr, Dry EQ-CP

PICASO

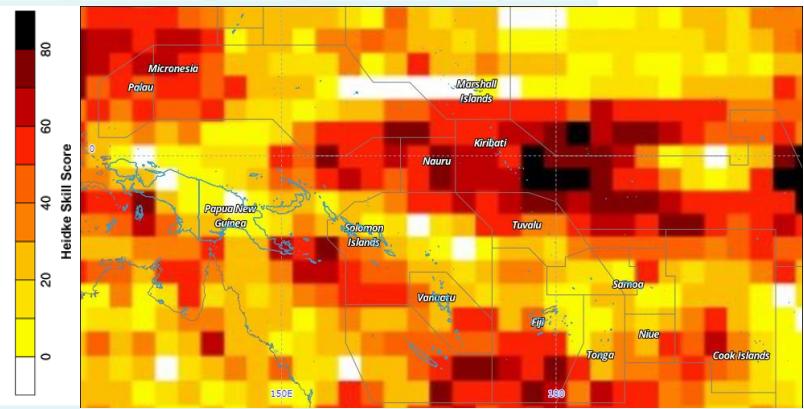


Prediction Skills* (NDJ)

Precipitation

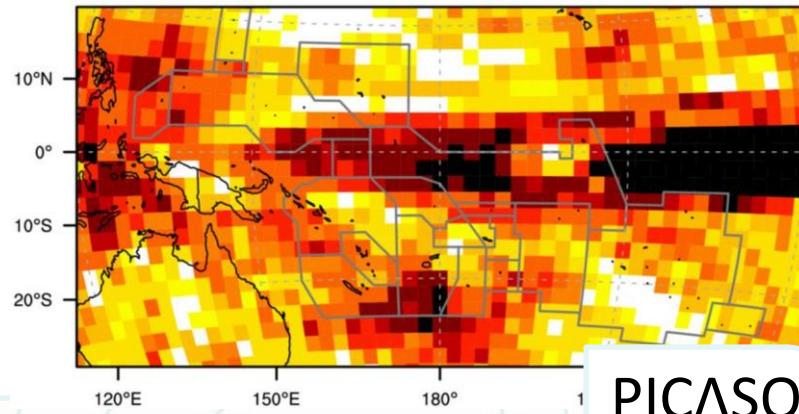


H93-09
WMO



CliKp
SPREP

H91-10
APCC



PICASO



Precipitation (FMA)

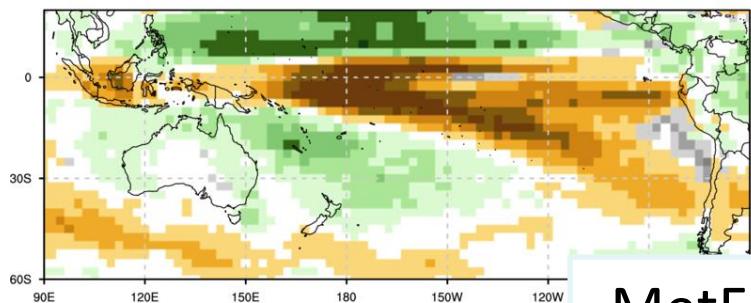
Wet SubTr Dry EQ

wmo

Probabilistic Multi-Model Ensemble Forecast
Beijing, Montreal, Seoul, Washington

Precipitation : FMA2020

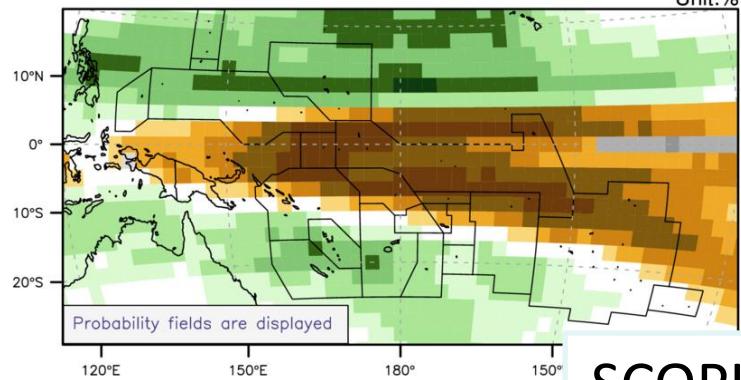
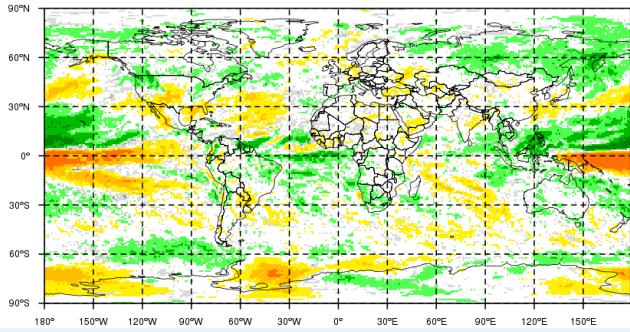
(issued on Oct2020)



MetFr



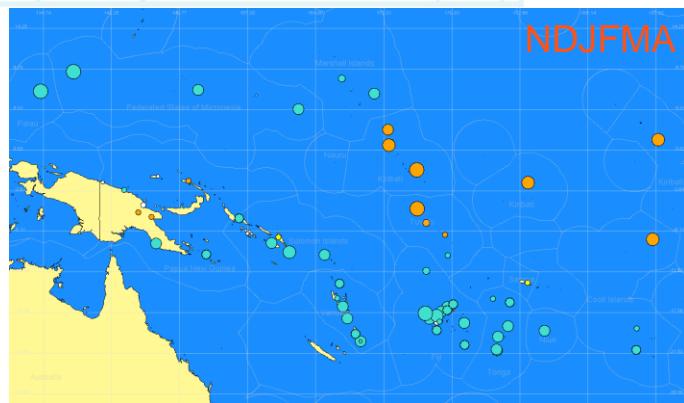
Precipitations - Forecast
True tercile summary
for FMA 2021 (issued October 2020)



APCC

Unit:%

SCOPIC



NDJFMA

Temperature (NDJ)

Warm WP and Cool EP

WMO

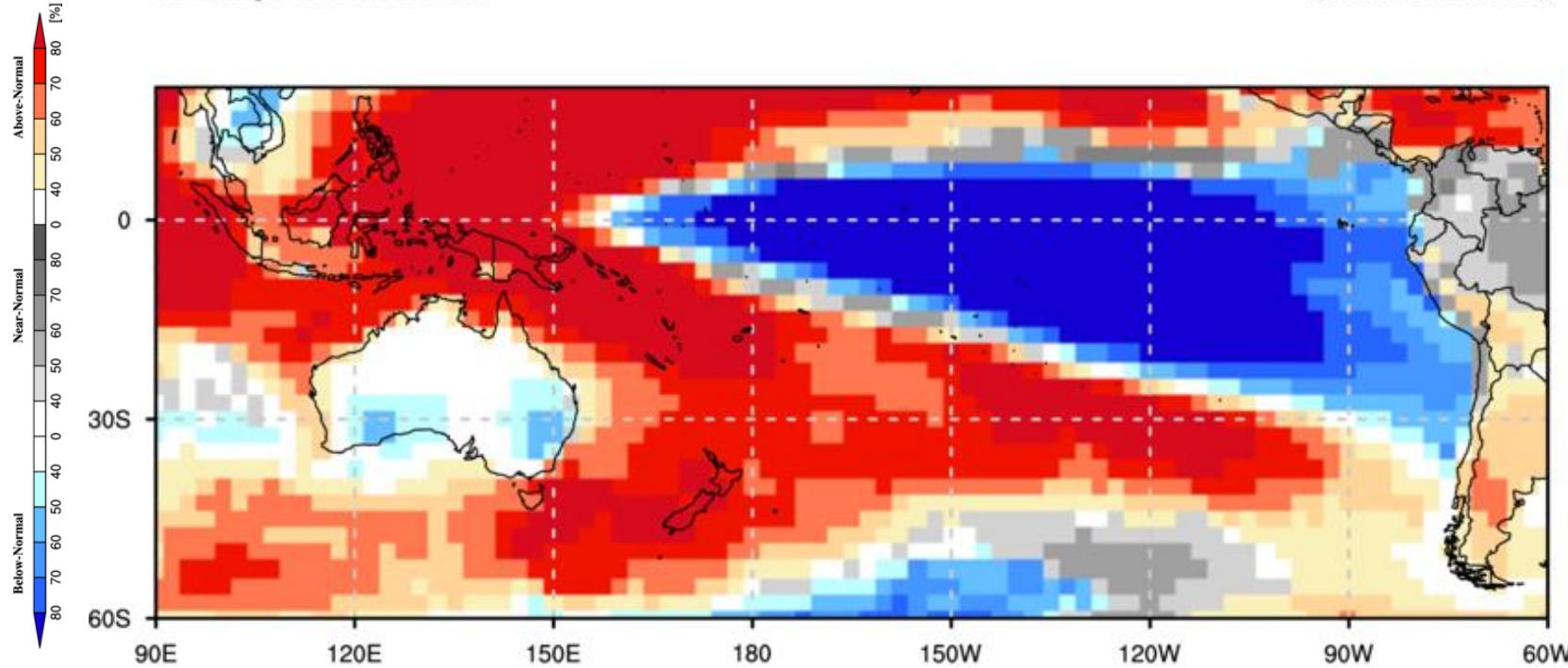


Probabilistic Multi-Model Ensemble Forecast

Beijing, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington

2m Temperature : NDJ2020

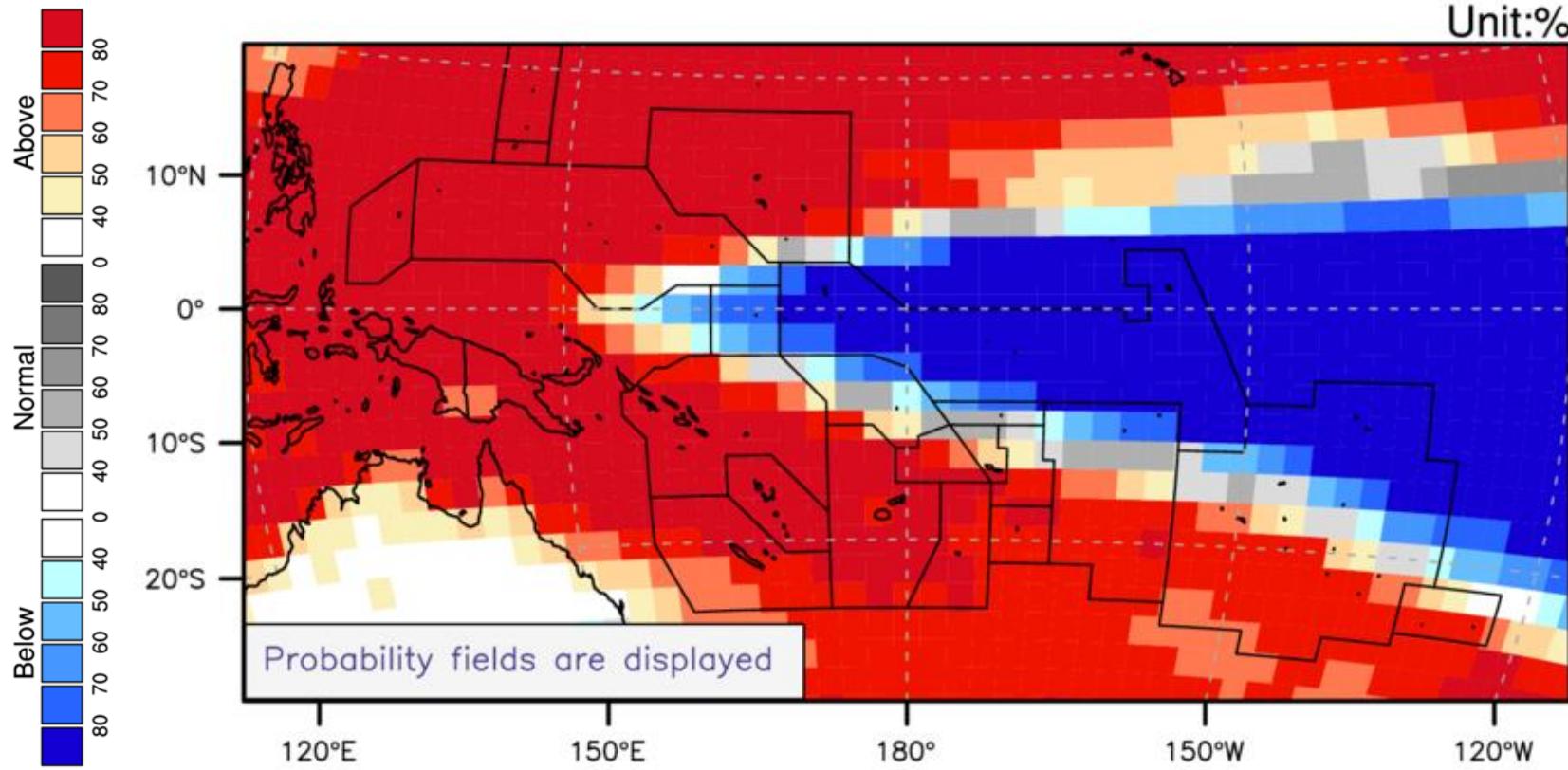
(issued on Oct2020)



Temperature (NDJ)

Warm WP and Cool EP

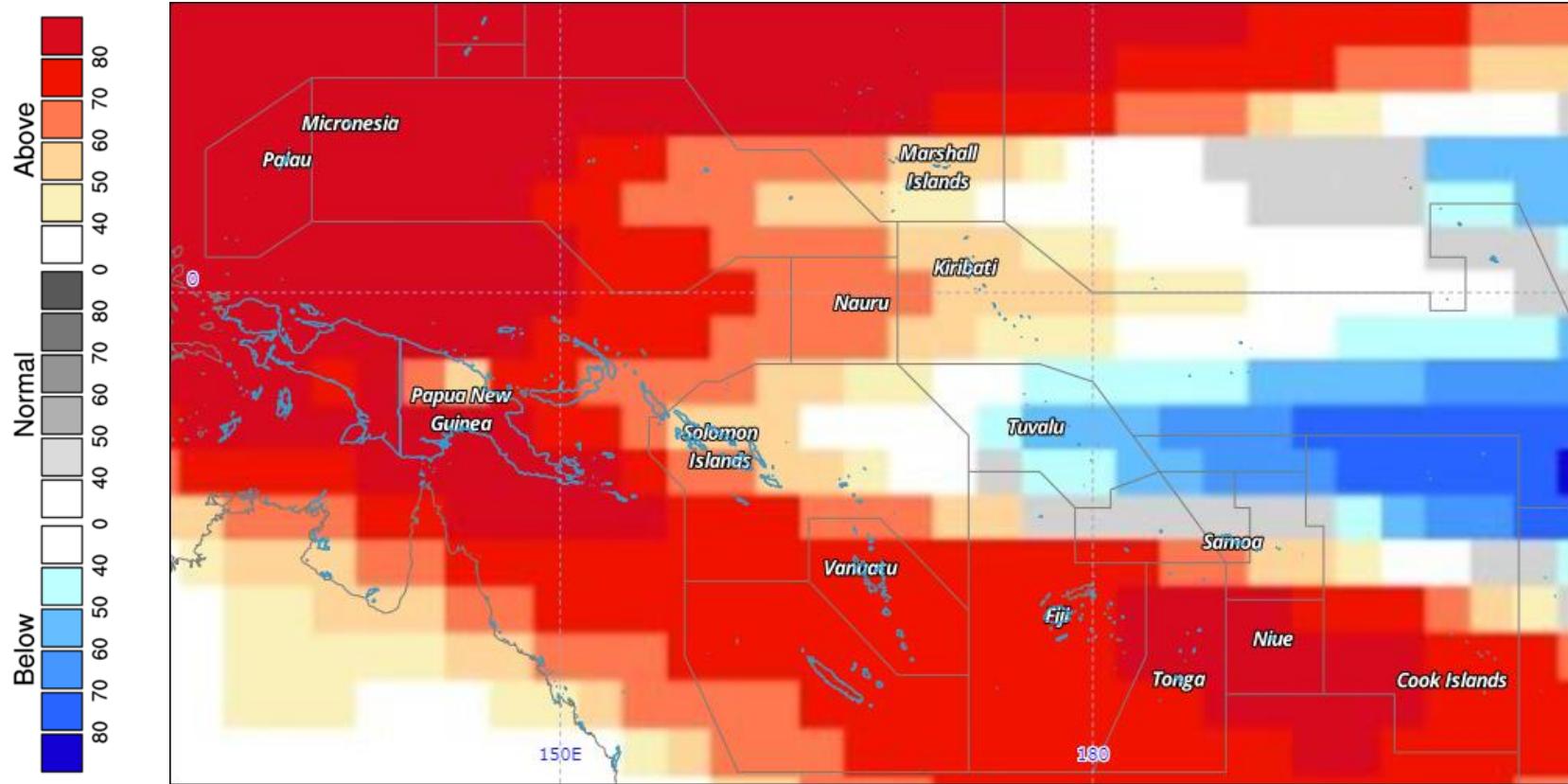
APCC
Unit:%



Temperature (NDJ)

Warm WP and Cool EP

CliKp
SPREP



Temperature (NDJ)

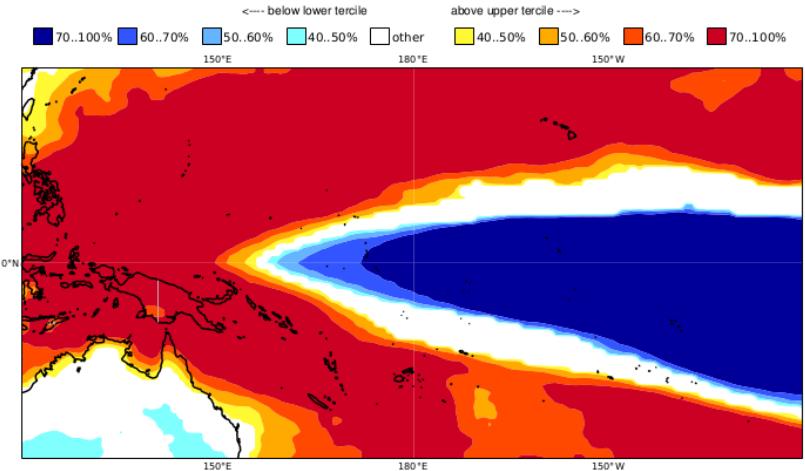
+ WP and - EP

C3S

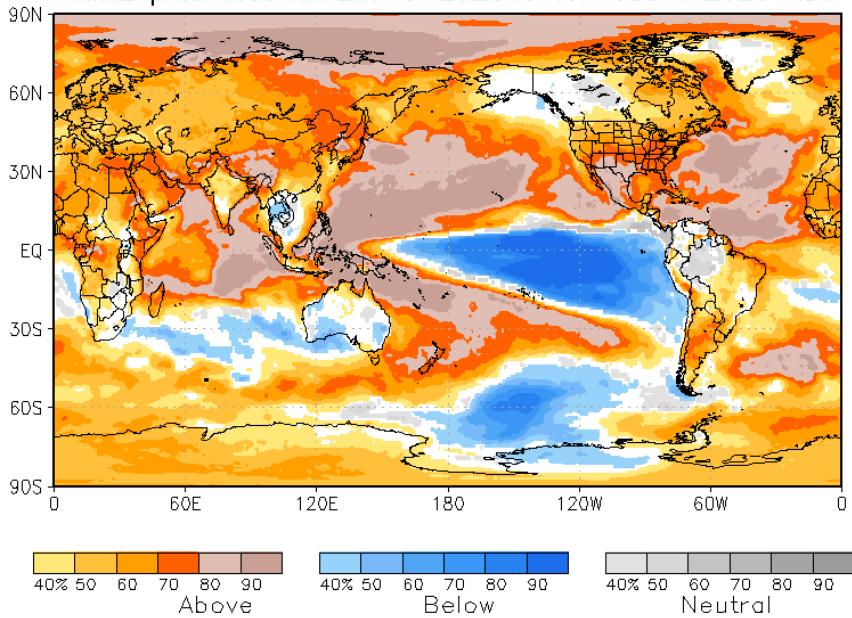
*experimental
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C3S multi-system seasonal forecast
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/10/20
Unweighted mean

ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA
NDJ 2020/21



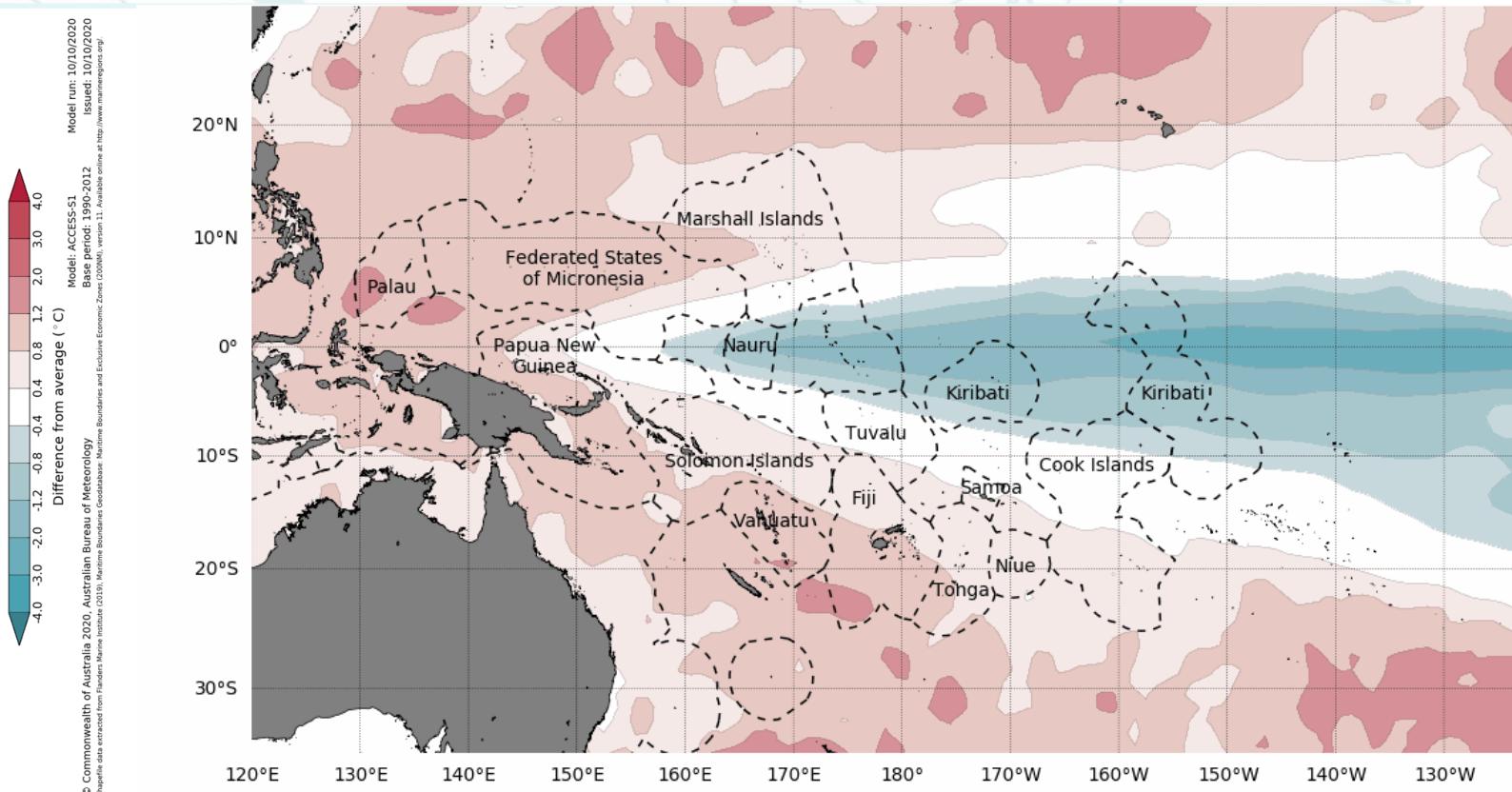
NMME prob fcst TMP2m IC=202010 for lead 1 2020 NDJ



Temperature (NDJ)

Warm WP and Cool EP

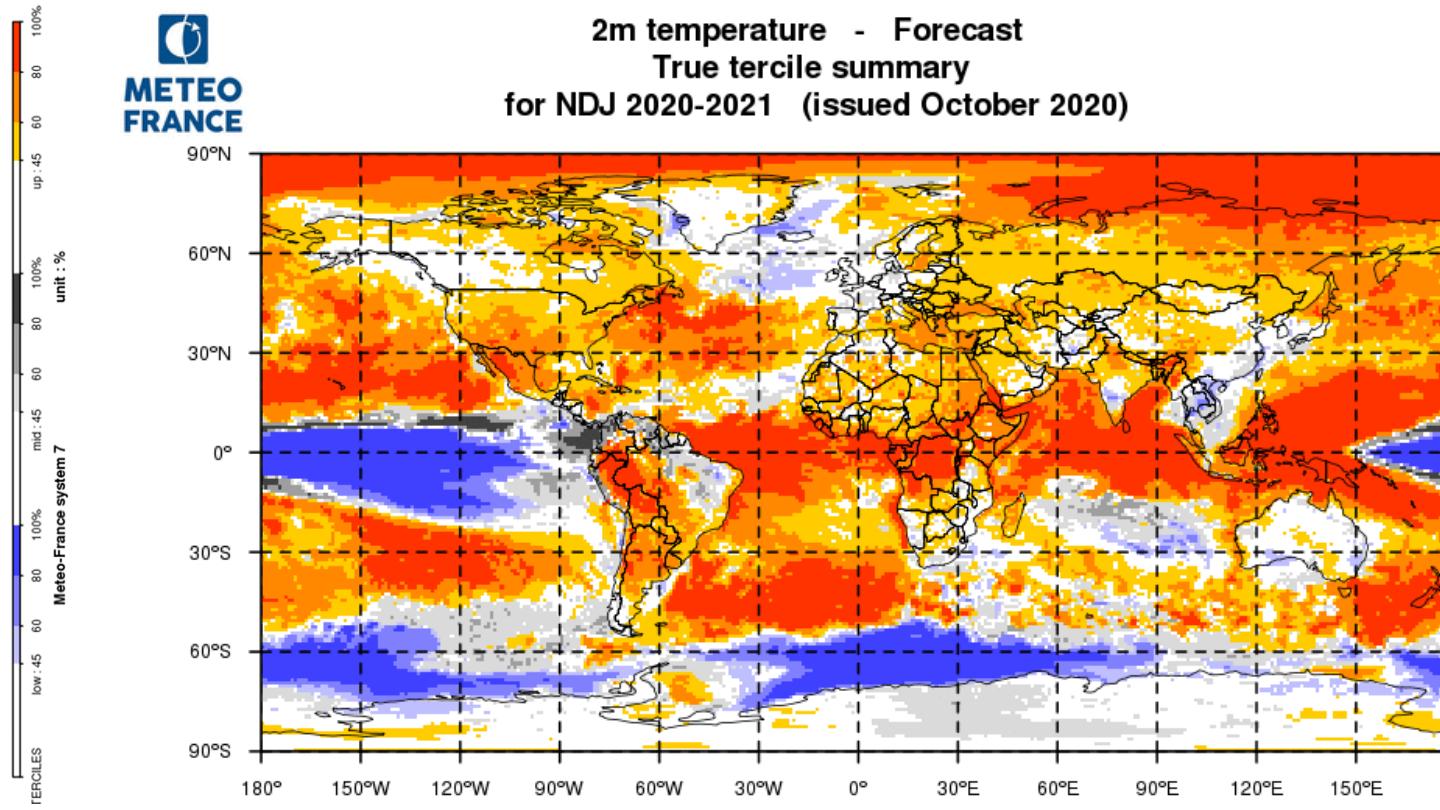
*SST
BoM



Temperature (NDJ)

Warm WP and Cool EP

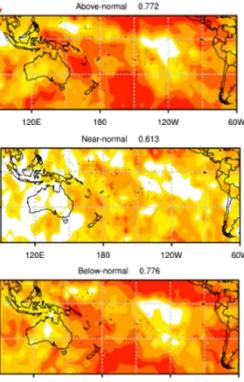
MetFr



Prediction Skills* (NDJ)

Temperature

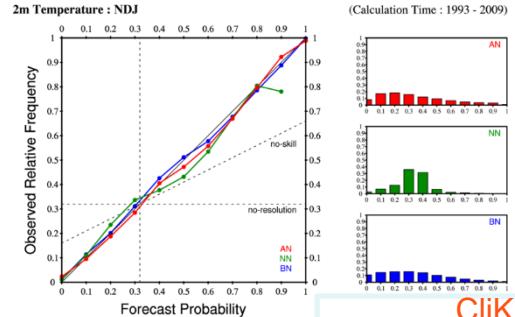
ROC



Reliability Diagram

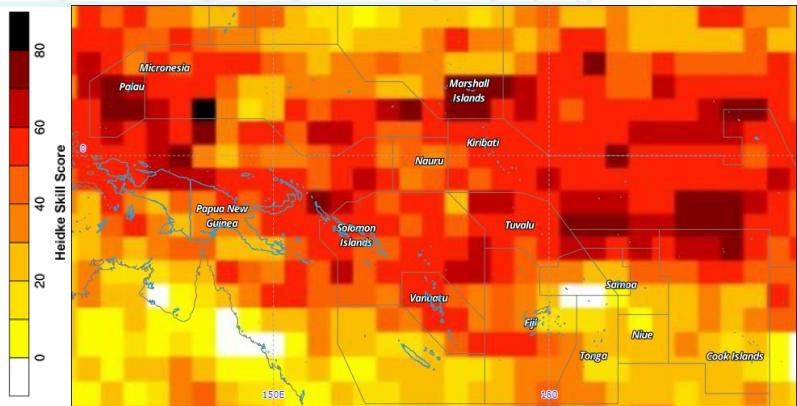
CPTEC,ECMWF,Exeter,Melbourne,Montréal,Moscow,Offenbach,Seoul,Tokyo,Toulouse,Washington
Lat : -60~30°, Lon : 90~300

2m Temperature : NDJ

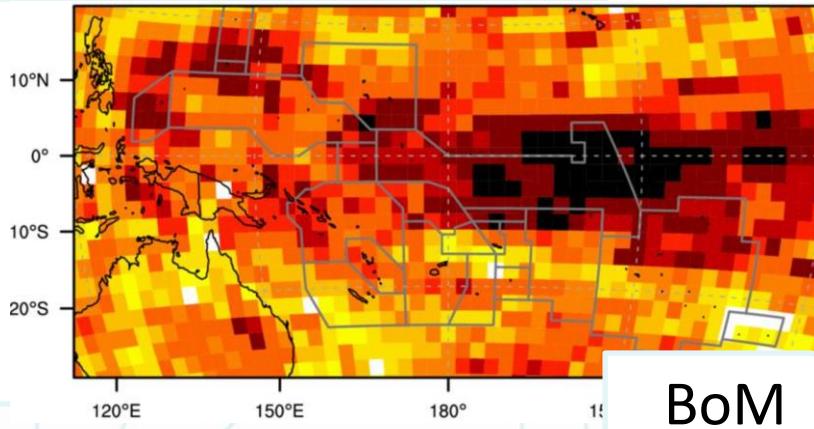


H93-09
WMO

CliKp
SPREP

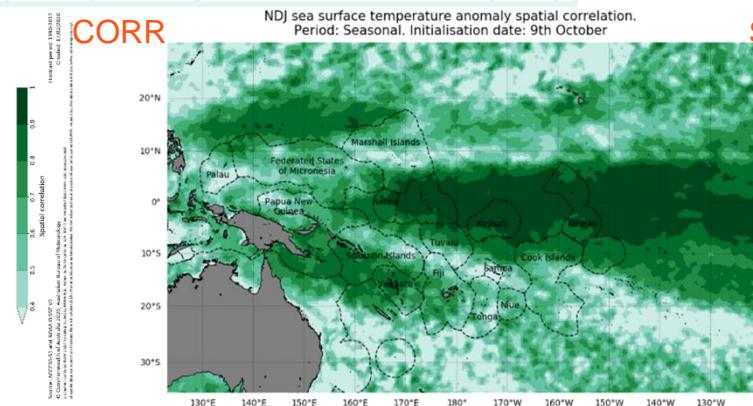


H91-10
APCC



BoM

SST



Temperature (FMA)

+ WP and - EP

WMO

APCC

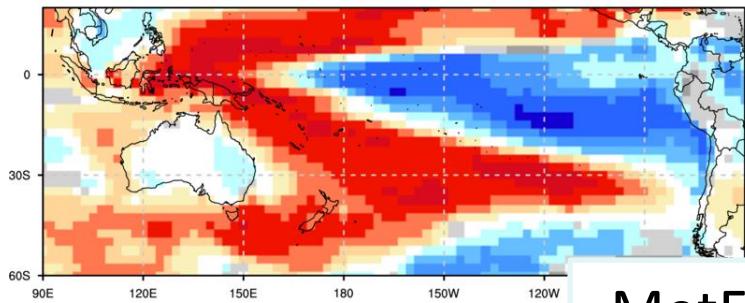
Unit:%

Probabilistic Multi-Model Ensemble Forecast

Beijing, Montreal, Seoul, Washington

2m Temperature : FMA2020

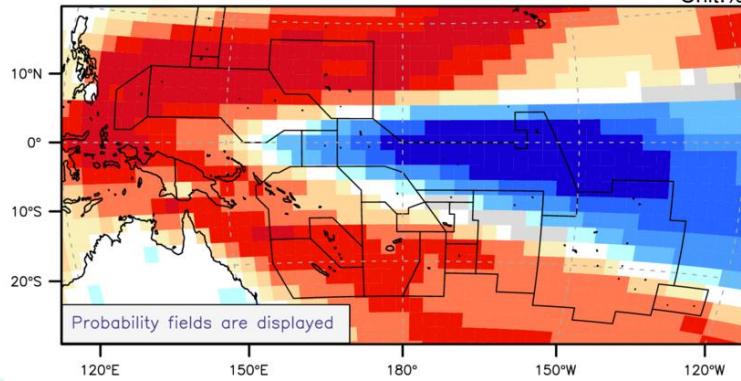
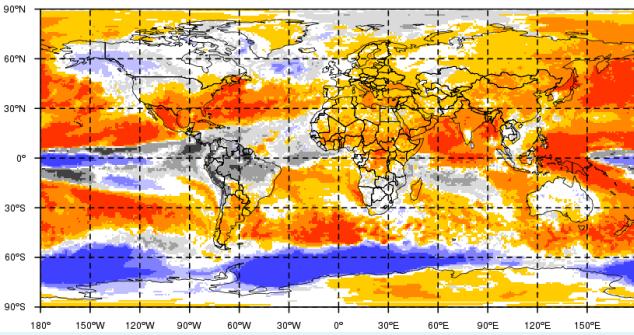
(issued on Oct2020)



MetFr



2m temperature - Forecast
True tercile summary
for FMA 2021 (issued October 2020)



5. Looking Forward

Summary

Seasonal and IntraSeasonal Guidance

Climate Outlook 2020/21

Climate Drivers

La Niña (**NDJFMA**) + IDO⁻⁰ + wQBO

IntraSeasonal Var.

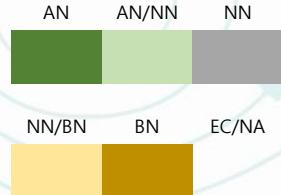
TCs to S/W, MJO ph8 early Nov = marginal

Climate Outlook

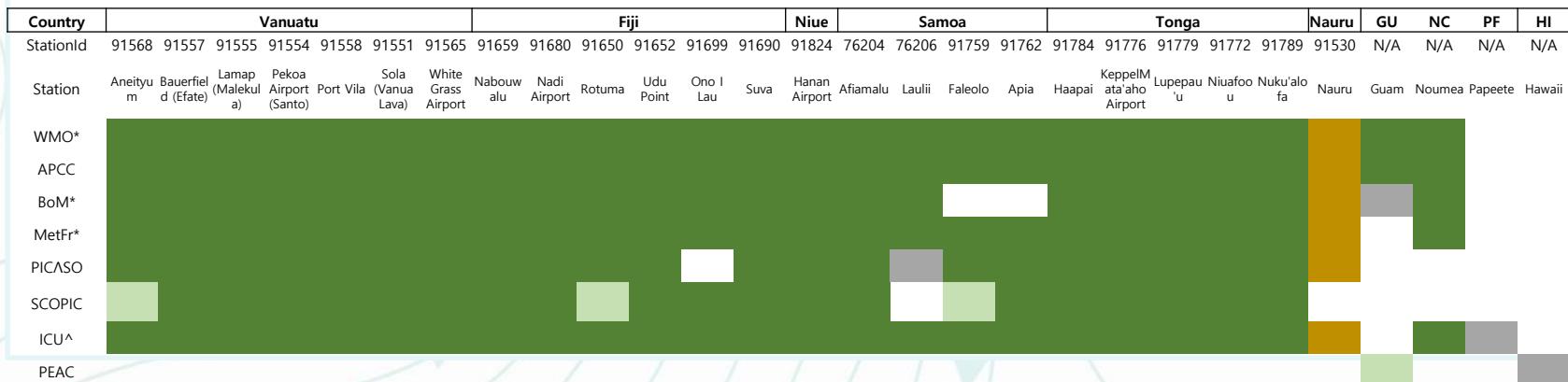
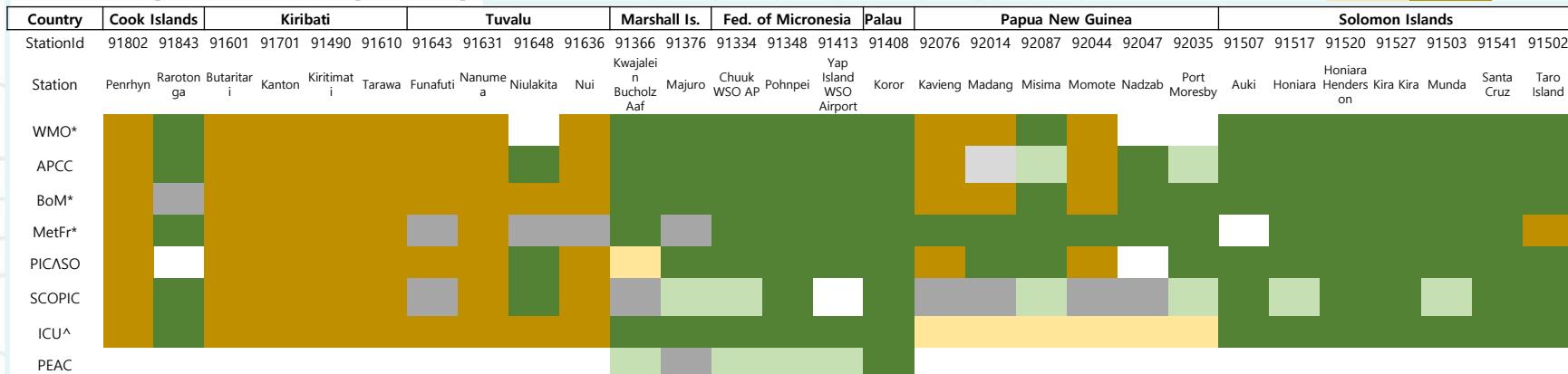
Precipitation: Wet SubTr and Dry EQ-CP

Temperature: Warm WP and Cool EP

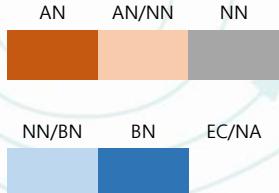
Climate Outlook 2020/21



Precipitation (NDJ)



Climate Outlook 2020/21



Temperature (NDJ)



Note: *WMO/BoM/MetFr are estimated from their corresponding image files, by reading the most dominant tercile category at the longitude and latitude of stations. They have not been double-checked, and it is highly recommended to do so. ^ICU is not station-specific. APCC/CliKp are estimated from their digital output data, by linearly interpolating the gridded forecast onto the longitude and latitude of stations. PICASO and SCOPIC are directly read from their tailored output. PEAC is for OND. The summary are to help NHMSs generating national outlooks, but the accuracy is not guaranteed.

- WonMoo Kim

Climate Outlook 2020/21

- Precipitation

NDJ: Most of Micronesia, off-equatorial Melanesia and off-equatorial Polynesia are expected to be wetter than normal; while northern PNG, Nauru, Tuvalu, Kiribati, and northern Cook Islands may expect drier conditions.

FMA: Similar pattern persists, but the dry band may penetrate further to the west.

- Temperature

NDJ: Most of Micronesia, Melanesia, and off-equatorial Polynesia are expected to be warmer than normal; while some equatorial islands, e.g., northern Cook Islands, Kiribati, northern Tuvalu, and Nauru may expect cooler conditions.

FMA: Similar pattern persists, but with less certainty.

- There is a strong consensus between the prediction systems, and the prediction skills are generally high for NDJ prediction, both for precipitation and temperature.

Agenda 5. Looking Forward:

Seasonal IntraSeasonal Guidance for 2020/21

APEC Climate Center (APCC)

by WonMoo Kim

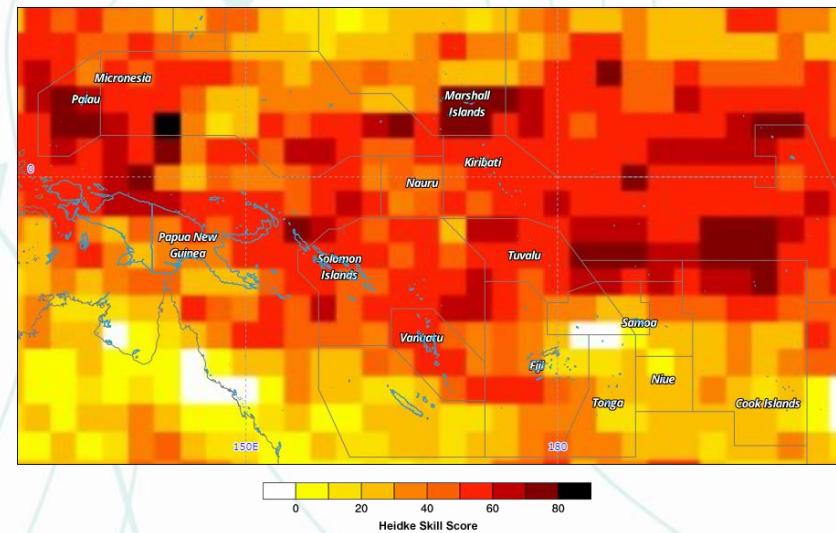
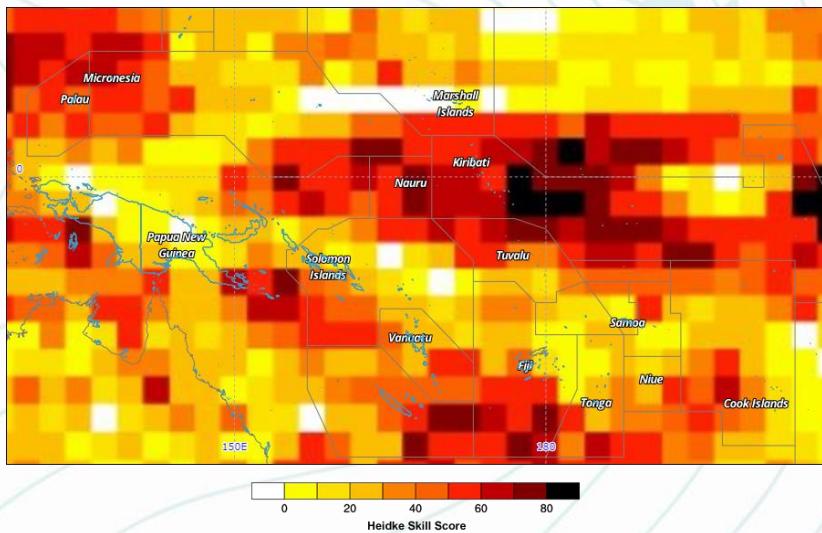
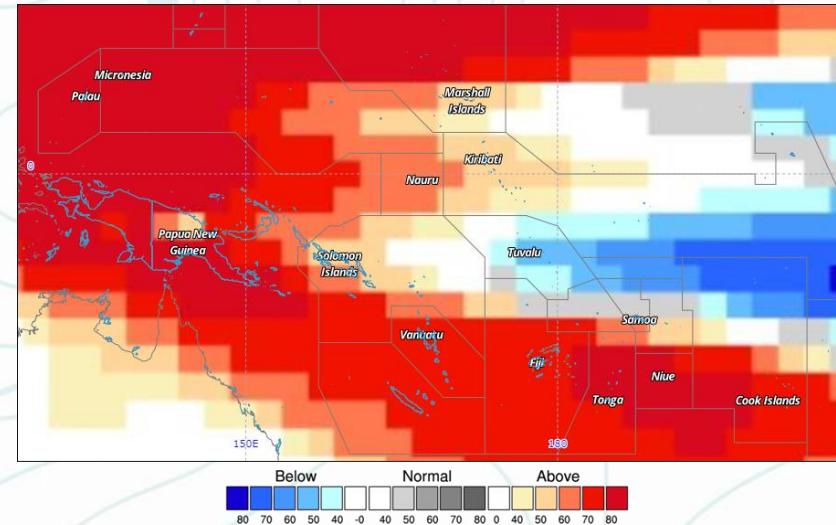
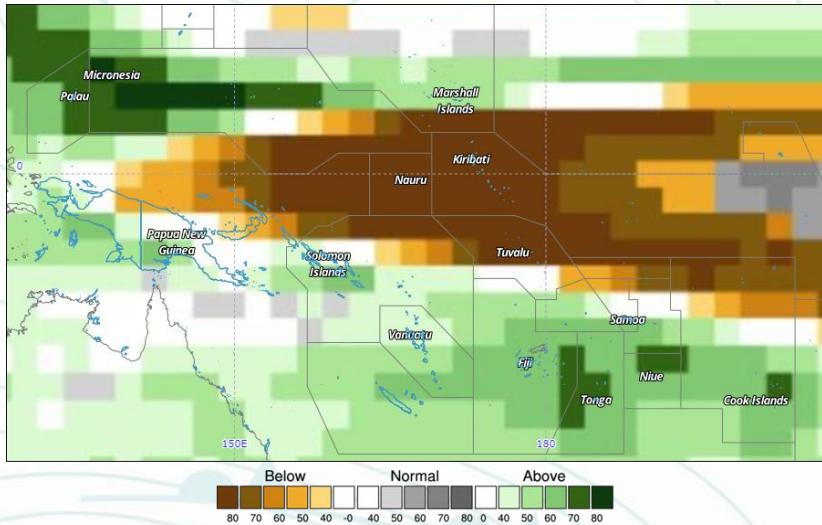
NIWA/NOAA/BoM/APCC/SPREP



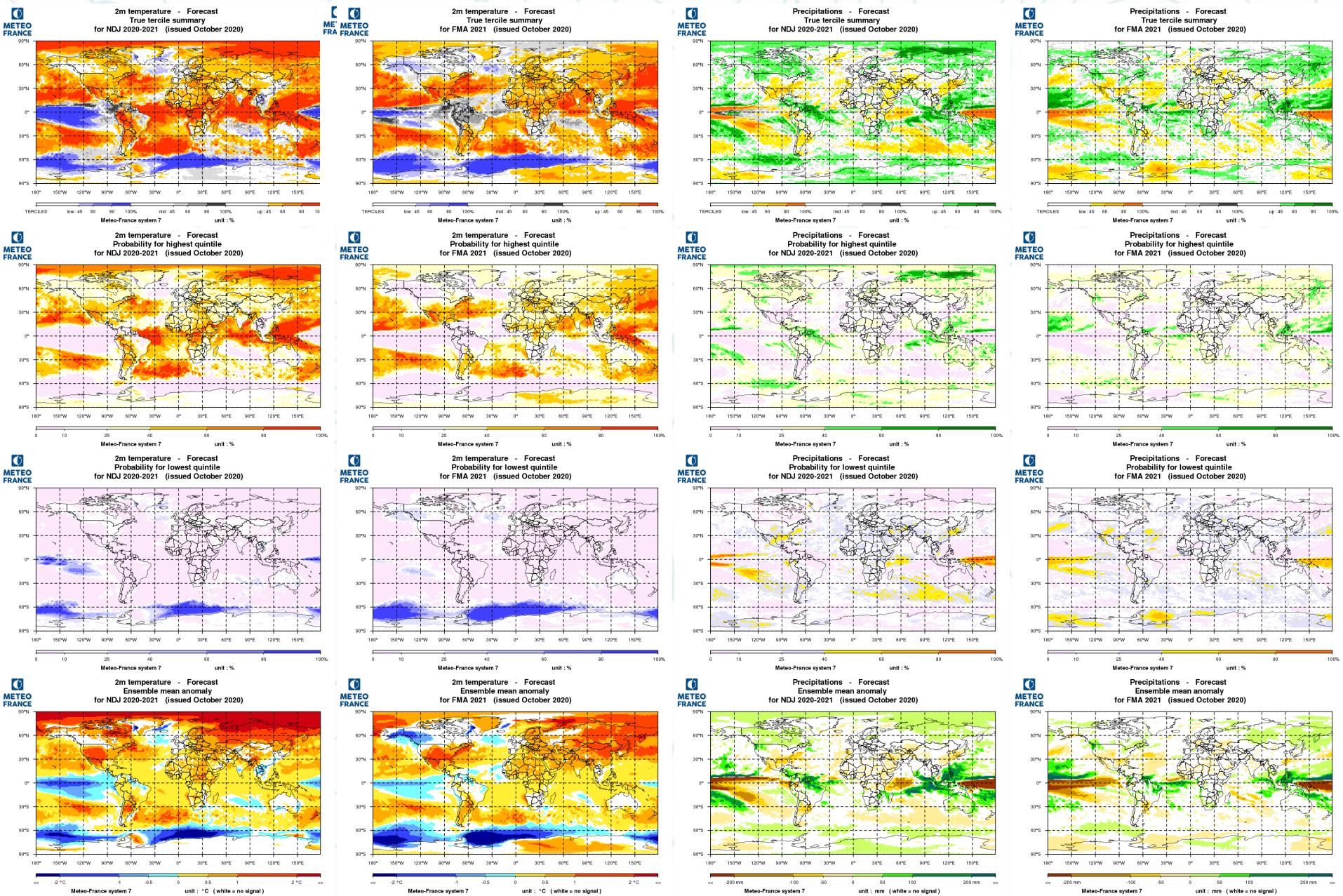
Further information

- WMO (MME)
https://wmolc.org/seasonPmmeUI/plot_PMME
- APCC (MME)
<https://apcc21.org>
<https://apcc21.org/ser/global/outlookSummary.do?lang=en>
- BoM (ACCESS-S)
<http://access-s.clide.cloud/regional/pacific/>
- CliKp and PICASO
<http://clikp.sprep.org>

SPREP (CliKp)



Météo-France



SCOPIC

November 2020 to January 2021

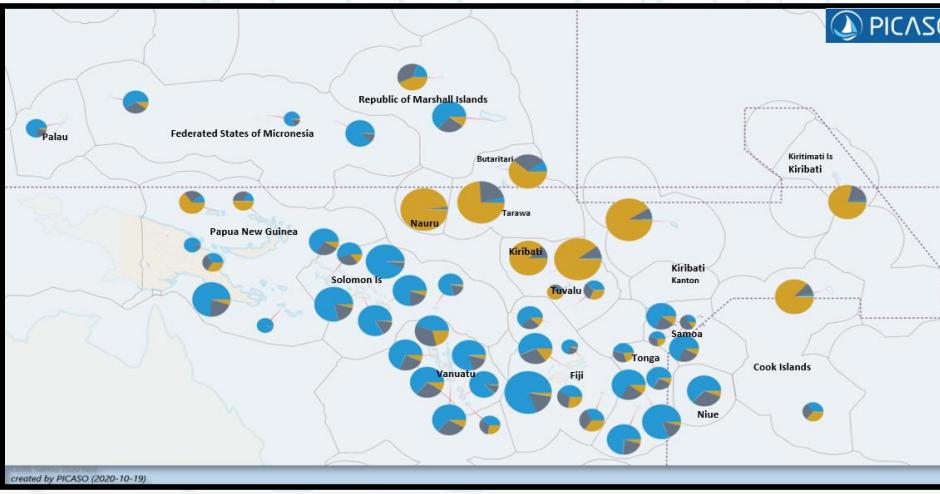
System	Outlook	Skill
Cook Islands (Rainfall mm)	Below Normal: Penrhyn	
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Normal: Aitutaki Above Normal: Rarotonga	Range: very low - high Average: good
Federated States of Micronesia (Rainfall mm)	Normal to Above Normal: Chuuk & Yap	Range: very low - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Kosrae & Pohnpei_QC	Average: good
Fiji (Rainfall mm)	Normal to Above Normal: Navua & Rotuma	Range: low - very high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Labasa Airfield, Lakeba, Lautoka, Nabouwalu, Nadi Airport, Nausori Airport, Ono-i-Lau, Penang, Savusavu, Suva, Udu Point, Viwa & Funisea	Average: high
Kiribati (Rainfall mm)	Below Normal: Beru, Butaritari, Kanton, Kirimati & Tarawa	Range: very high - exceptional!! Average: exceptional!!
Marshall Islands (Rainfall mm)	Normal to Above Normal: Majuro	Range: low - moderate
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Climatology: Kwajalein	Average: low
Niue (Rainfall mm)		Range: moderate
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Alofi	Average: moderate
Palau (Rainfall mm)		Range: very high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Koror	Average: very high
Papua New Guinea (Rainfall mm)	Normal to Above Normal: Misima & Port Moresby	Range: very low - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Wewak	Average: low
Climatology: Goroka W O, Kavieng, Madang, Momote, Nadzab & Vanimo W O		
Samoa (Rainfall mm)	Normal to Above Normal: Faleolo & Nafanua	Range: low - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Afiamalu & Apia	Average: moderate
Solomon Islands (Rainfall mm)	Normal to Above Normal: Honiara & Munda	Range: low - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Auki, Henderson, Kirakira, Lata & Taro	Average: good
Tonga (Rainfall mm)	Above Normal: Fu'a'amotu, Ha'apai, Niuafo'ou, Niutoputapu, Nuku'alofa & Vava'u	Range: low - very high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)		Average: high
Tuvalu (Rainfall mm)	Below Normal: Nanumea & Nui	Range: low - very high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Niulakita	Average: good
Climatology: Funafuti		
Vanuatu (Rainfall mm)	Normal to Above Normal: Aneityum	Range: very low - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Bauerfield, Lamap, Peko, Port Vila, Saratamata, Sola & Whitegrass	Average: good

LEPS SCALE	very low LEPS<0%	low 0%<=LEPS<5%	moderate 5%<=LEPS<10%	good 10%<=LEPS<15%	high 15%<=LEPS<25%	very high 25%<=LEPS<35%	exceptional LEPS>=35%
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November 2020 to April 2021

System	Outlook	Skill
Cook Islands (Rainfall mm)	Below Normal: Penrhyn	
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Normal to Above Normal: Aitutaki	Range: low - very high
Above Normal: Rarotonga	Average: good	
Federated States of Micronesia (Rainfall mm)	Normal to Above Normal: Kosrae	Range: high - exceptional!!
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Chuuk, Pohnpei_QC & Yap	Average: very high
Fiji (Rainfall mm)	Normal: Nausori Airport	
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Normal to Above Normal: Nadi Airport, Rotuma, Suva & Funisea	Range: low - exceptional!!
Above Normal: Labasa Airfield, Lakeba, Lautoka, Nabouwalu, Ono-i-Lau, Penang, Savusavu, Udu Point & Viwa	Climatology: Navua	Average: high
Kiribati (Rainfall mm)	Below Normal: Kirimati & Tarawa	Range: high - exceptional!!
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Below Normal to Normal: Beru, Butaritari & Kanton	Average: very high
Marshall Islands (Rainfall mm)	Normal to Above Normal: Kwajalein & Majuro	Range: moderate - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)		Average: good
Niue (Rainfall mm)	Above Normal: Alofi	Range: high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)		Average: high
Palau (Rainfall mm)	Above Normal: Koror	Range: exceptional!!
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)		Average: exceptional!!
Papua New Guinea (Rainfall mm)	Below Normal: Goroka W O, Kavieng & Nadzab	Range: very low - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Normal to Above Normal: Misima & Wewak	Average: low
Above Normal: Port Moresby	Climatology: Madang, Momote & Vanimo W O	
Samoa (Rainfall mm)	Normal: Nafanua	Range: very low - moderate
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Normal to Above Normal: Apia & Faleolo	Average: moderate
Above Normal: Afiamalu		
Solomon Islands (Rainfall mm)	Normal to Above Normal: Auki	Range: very low - very high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Henderson, Honiara, Kirakira, Lata & Taro	Average: good
Climatology: Munda		
Tonga (Rainfall mm)	Normal to Above Normal: Niuafo'ou	Range: low - high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Fu'a'amotu, Ha'apai, Niutoputapu, Nuku'alofa & Vava'u	Average: high
Tuvalu (Rainfall mm)	Below Normal: Funafuti, Nanumea & Nui	Range: low - exceptional!!
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Normal to Above Normal: Niulakita	Average: good
Vanuatu (Rainfall mm)	Normal to Above Normal: Peko, Port Vila & Sola	Range: high
2mth NINO3.4 SST Anomalies (Aug - Sep 2020)	Above Normal: Aneityum, Bauerfield, Lamap, Saratamata & Whitegrass	Average: very low

PICASO



Station	Tercile Probability	Verification Score (LEPS)	Verification Score (ISS)	Hit/NearMiss/Miss	Station	Tercile Probability	Verification Score (LEPS)	Verification Score (ISS)	Hit/NearMiss/Miss
Cook Islands					Lamot	8%	24%	68%	12.4
Ponape	87% 31% 11%	31	Very high 46.4	9 3 2	Aitutaki	8% 24%	68%	3.6	5 7 2
Rarotonga	35% 31% 34%	0.8	Low 3.6	5 4 5	Lau	15% 58%	27%	-39.3	1 11 2
Tuvalu	12% 25% 63%	6.3	Moderate -1.1	3 10 1	Faleolo	24% 31%	45%	14.3	5 1 8
Udu Point	5% 25% 70%	-4.3	Very Low 11.4	4 2 5	Apa	10% 22%	68%	35.7	8 3 3
Nabouwala	15% 28% 57%	16.5	High 79.5	8 2 1	Tar Island	8% 26%	66%	14.3	6 6 2
Nadi Airport	9 16% 81%	39.9	Excellent 46.4	9 5 0	Munua	15% 29%	56%	14.3	6 4 4
Savu	27% 31% 42%	7.1	Moderate 57.1	10 1 3	Aasi	5% 94%	31.9	25	7 6 1
Ovo Iau	35% 33% 32%	7.2	Moderate 53.8	9 1 3	Hemara	49% 17%	79%	46.4	9 1 4
Kaituna	79% 19% 19%	27.9	Very High 3.6	5 8 1	Kia Kila	5% 19%	83%	40.4	9 2 3
Rotariki	61% 29% 10%	29	Very High 25	7 6 1	Santa Cruz	3 18%	79%	14.3	6 6 4
Taveuni	74% 22% 41	39.7	Excellent 51.8	8 4 2	Niuafoou	20% 33%	47%	-7.1	4 5 5
Kanton	91% 8% 8%	44.4	Excellent 50	8 2 2	Kopehikaihu Airport	8% 25%	67%	3.8	4 6 3
Marshall Islands					Luganville	10% 23%	67%	62.5	10 1 3
Kwajalein Atoll	43% 38% 19%	10.9	Good 14.3	6 7 1	Honipai	48% 15%	81%	57.1	10 2 2
Majuro	10% 26% 64%	22.2	High 41.1	8 5 1	Nukutavake	5% 21%	74%	35.7	8 3 3
Nicaragua					Iota				7 6 1
Chosk WSO AP	2 18% 79%	-4.5	Very Low -7.1	4 4 6	Nanumea	89%	10%	25	9 5 0
Pohnpei	10% 89% 10.8	14.3	Good 41.1	6 6 2	Nui	90%	9%	46.4	3 6 5
Yap Island WSO Airport	10% 31% 59%	5.3	Moderate 25	7 2 5	Fonuafo'ou	64%	29%	-1.8	5 5 4
Nuru					Nukuhiva	31%	31%	8.9	3 7 1
Naen	98%	56.9	Excellent 57.1	5 2 0	Sata (Vava'u Lava)	21% 35%	44%	46.4	9 2 3
Hanu Airport	6% 31% 63%	23.9	High 51.8	8 5 1	Peleliu Airport (Savu)	7% 24%	69%	51.8	9 3 2
Nuku					Lempi (Mataelau)	49% 17%	79%	25	7 5 2
Koro	4% 19% 77%	2.1	Low 8.9	5 7 2	Bauerfield (Cete)	9% 27%	6%	21.4	7 6 1
Depa New Guinea					Port Vila	8% 29%	63%	25	5 7 2
Madang	10% 89% 18.4	-26.9	Very Low 53.8	2 7 4	White Grass Airport	10% 88%	14.5	3.6	5 5 4
Port Moresby	9% 21% 74%	31.1	Very High 53.8	9 3 1	Anaehou	20% 31%	41%	8.9	5 5 4
Mosese	65% 24% 11%	7	Moderate 19.2	6 3 4					
Nadab	33% 33% 34%	1.0	Low -3.0	4 6 3					
Kewang	50% 32% 18%	1.2	Low 1.9	3 8 2					
Misima	3 96% 13.3	-21.2	Very Low 51.8	1 10 2					

created by PICASO (2020-10-19)

PEAC (OND)

Model:	UKMO	ECMWF	NCEP CA	NASA GMAO	NCEP Coupled	IRI	APCC	PEAC CCA	Final Outlook	Final Probabilities
Republic of Palau										
Airai L 7° 22' N, λ 134° 32' E	Above	Above	Avg-Above	Avg.	Above	Above	Above	-	Above	20:30:50
Federated States of Micronesia										
Yap L 9° 29' N, λ 138° 05' E	Above	Above	Avg-Above	Avg-Above	Above	Above	Above	-	Avg-Above	30:35:35
Chuuk L 7° 28' N, λ 151° 51' E	Avg-Above	Above	Avg-Above	Avg-Above	Avg-Above	Clim.	Avg-Above	-	Avg-Above	30:35:35
Pohnpei L 6° 59' N, λ 158° 12' E	Avg.	Above	Avg-Above	Above	Avg-Above	Clim.	Avg-Above	-	Avg-Above	30:35:35
Kosrae L 5° 21' N, λ 162° 57' E	Avg-Below	Clim.	Above	Avg.	Avg.	Clim.	Avg-Below	-	Avg.	30:40:30
Republic of the Marshall Islands										
Kwajalein L 8° 43' N, λ 167° 44' E	Above	Avg-Below	Avg-Above	Above	Avg.	Clim.	Avg.	-	Avg-Above	30:35:35
Majuro L 7° 04' N, λ 171° 17' E	Avg-Below	Avg-Above	Above	Avg-Above	Avg-Above	Clim.	Avg-Below	-	Avg.	30:40:30
Guam and CNMI										
Guam L 13° 29' N, λ 144° 48' E	Above	Avg.	Avg-Above	Avg.	Avg-Above	Above	Avg-Above	-	Avg-Above	30:35:35
Saipan L 15° 06' N, λ 145° 48' E	Above	Avg.	Avg-Above	Avg-Above	Avg.	Above	Avg-Above	-	Avg-Above	30:35:35
American Samoa										
Pago Pago L 14° 20' S, λ 170° 43' E	Above	Above	Avg-Above	Avg-Above	Avg-Above	Clim.	Avg-Above	-	Avg-Above	30:35:35
State of Hawaii										
Lihue L 21° 59' N, λ 159° 20' E	Avg-Below	Avg.	Avg.	Avg-Above	Avg.	Avg-Below	Avg.	-	Avg.	30:40:30
Honolulu L 21° 19' N, λ 157° 56' W	Avg-Below	Avg.	Avg.	Avg.	Avg.	Avg-Below	Avg.	-	Avg.	30:40:30
Kahului L 20° 54' N, λ 156° 26' E	Avg-Below	Avg.	Avg.	Avg.	Avg.	Avg-Below	Avg.	-	Avg.	30:40:30
Hilo L 19° 43' N, λ 155° 03' E	Avg-Below	Avg.	Avg.	Avg-Above	Avg.	Below	Avg.	-	Avg.	30:40:30