

Ocean temperature, Coral Bleaching and Sea level

[Zulfikar Begg (SPC), John Marra (NOAA) and Grant Smith (BoM)]

Outline of Presentation

- WMO LRFMME SST
- SLA/Tides
- Coral Bleaching
- Fisheries convergence zone
- Key messages

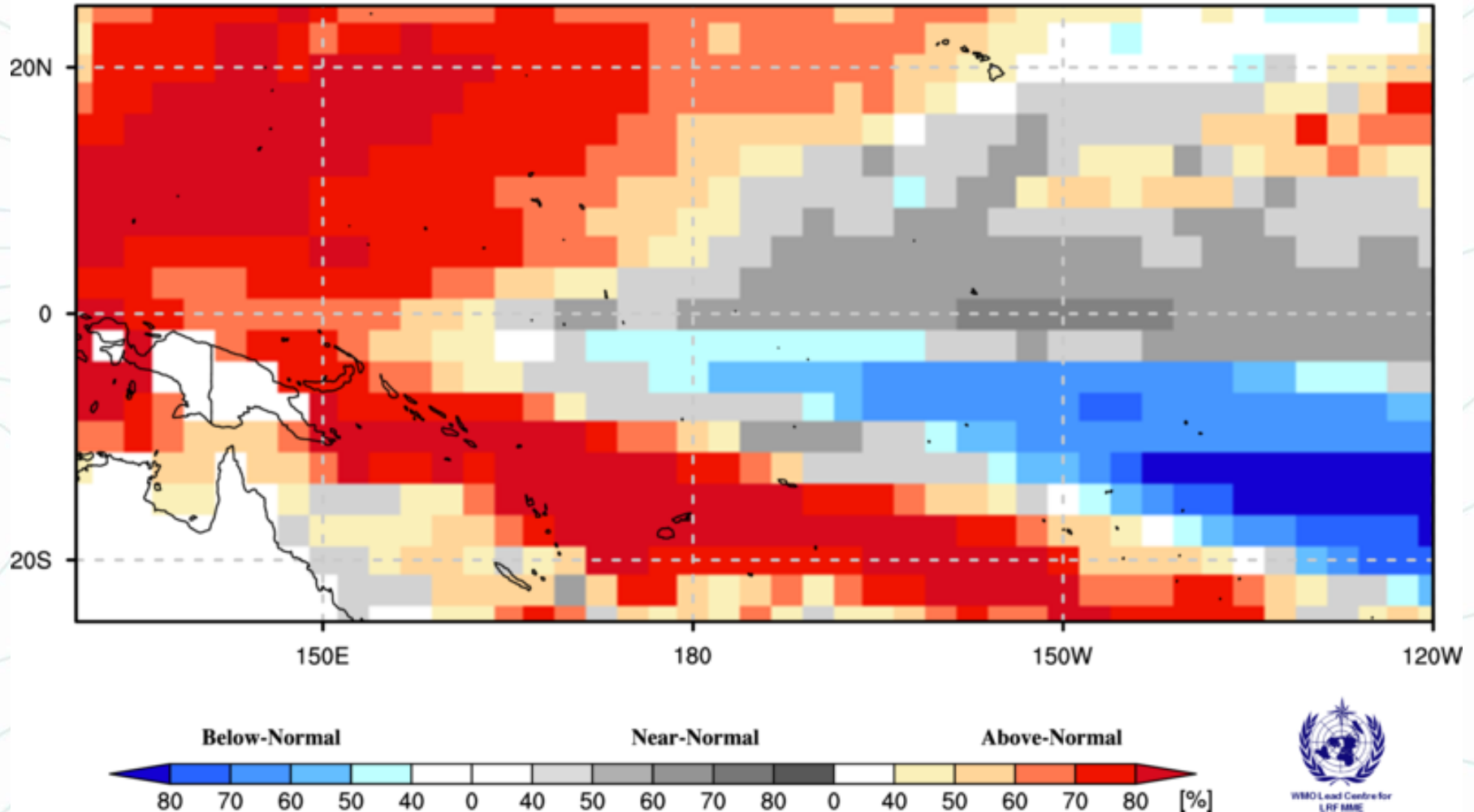
WMO-MME- 3 Month SST

Probabilistic Multi-Model Ensemble Forecast

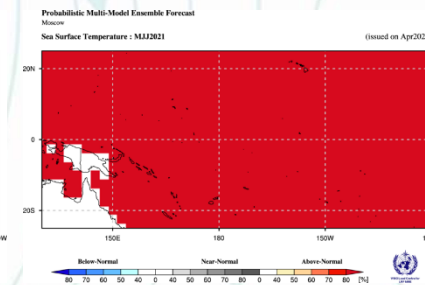
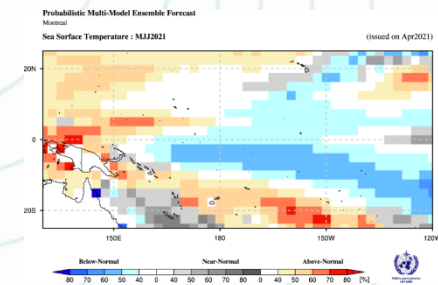
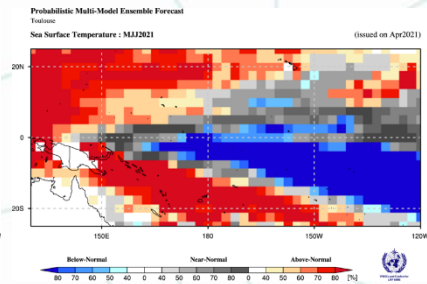
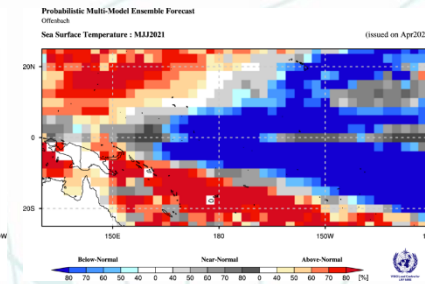
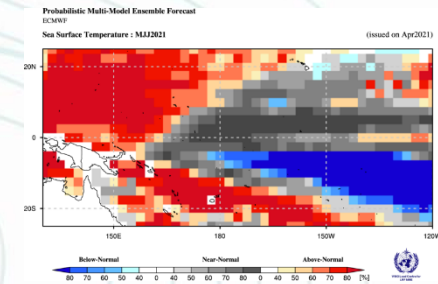
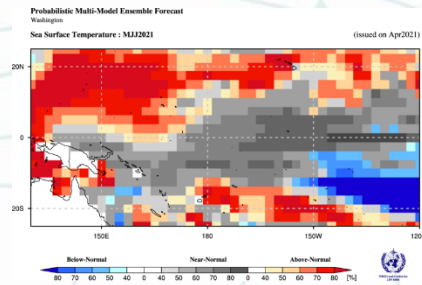
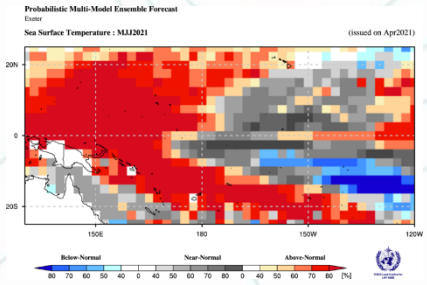
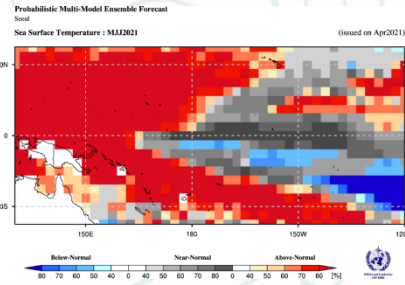
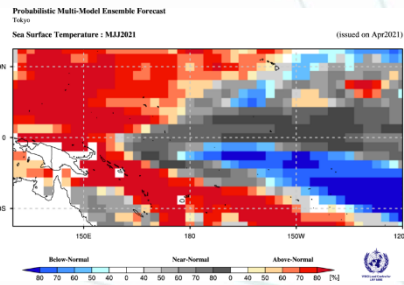
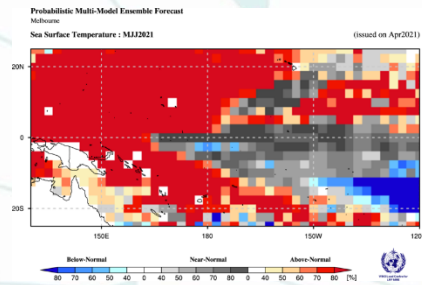
ECMWF,Exeter,Melbourne,Montreal,Moscow,Offenbach,Seoul,Tokyo,Toulouse,Washington

Sea Surface Temperature : MJJ2021

(issued on Apr2021)



Individual Model –SST: 3 months



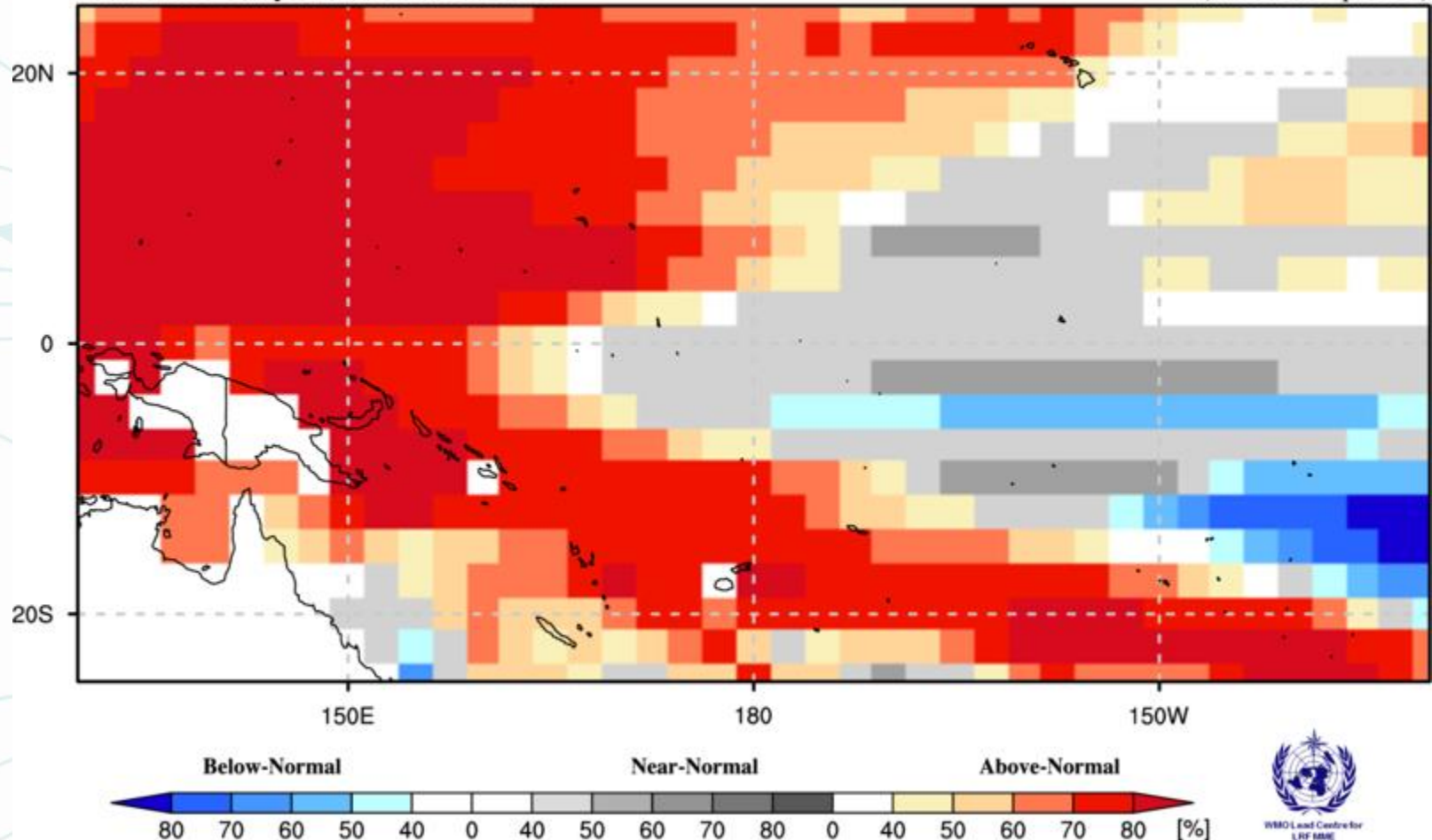
WMO-MME- 6 Month SST

Probabilistic Multi-Model Ensemble Forecast

Beijing, Montreal, Seoul, Washington

Sea Surface Temperature : MJJASO2021

(issued on Apr2021)



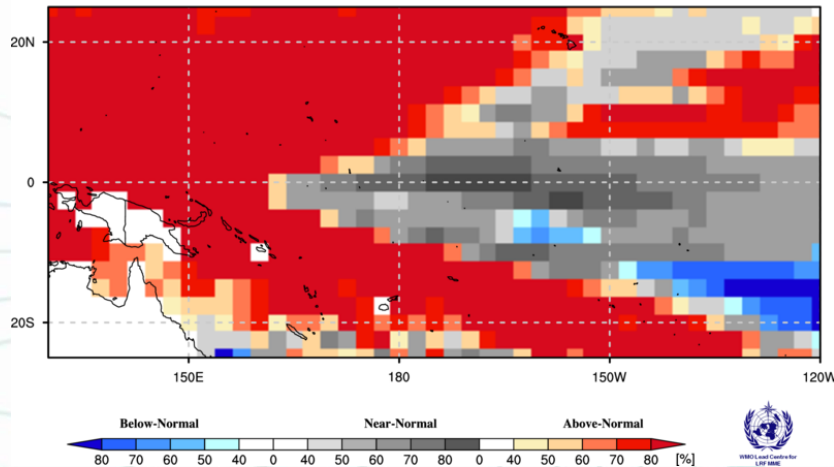
Individual Model –SST: 6 months

Probabilistic Multi-Model Ensemble Forecast

Seoul

Sea Surface Temperature : MJJASO2021

(issued on Apr2021)

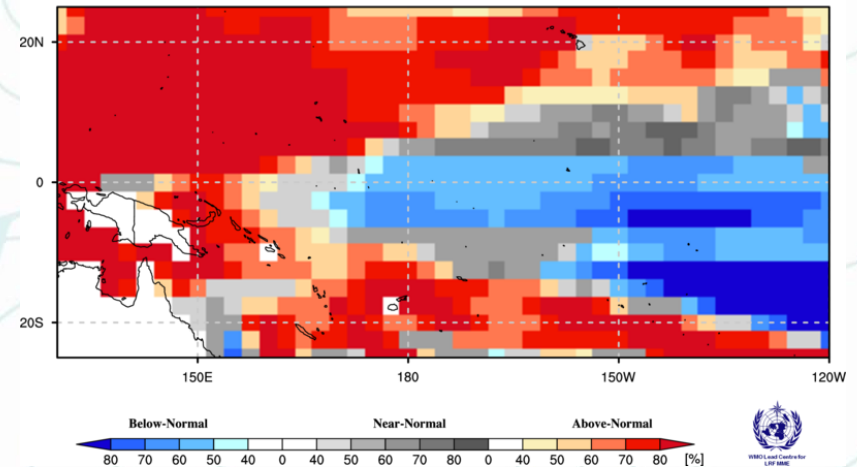


Probabilistic Multi-Model Ensemble Forecast

Washington

Sea Surface Temperature : MJJASO2021

(issued on Apr2021)

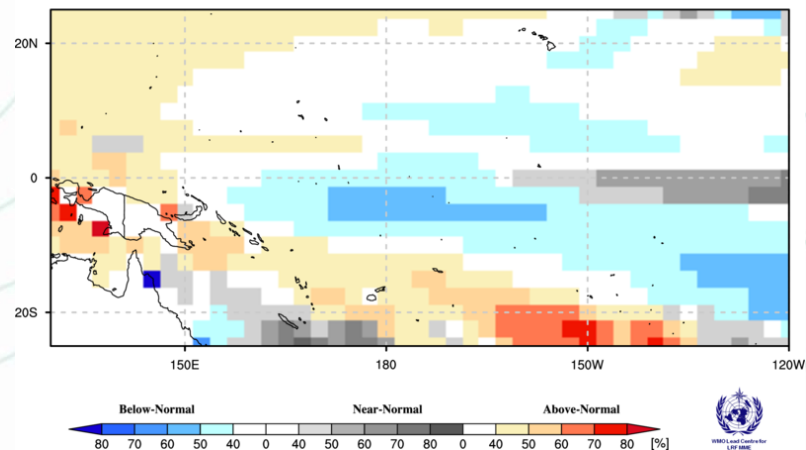


Probabilistic Multi-Model Ensemble Forecast

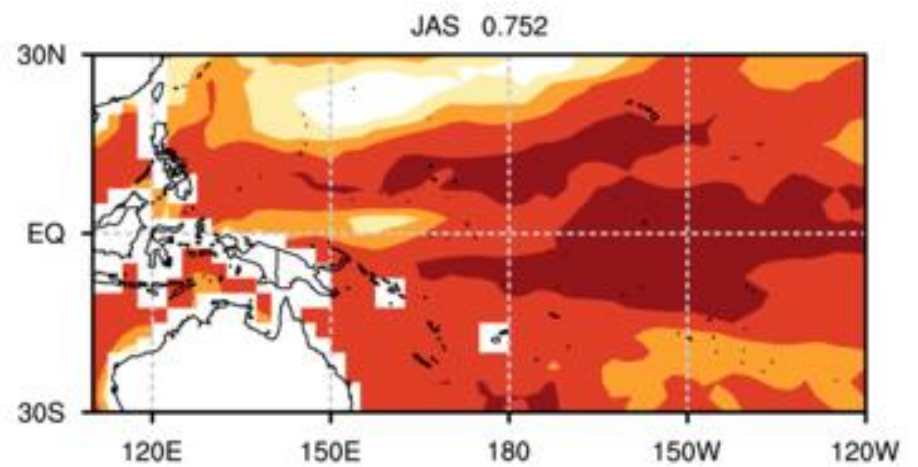
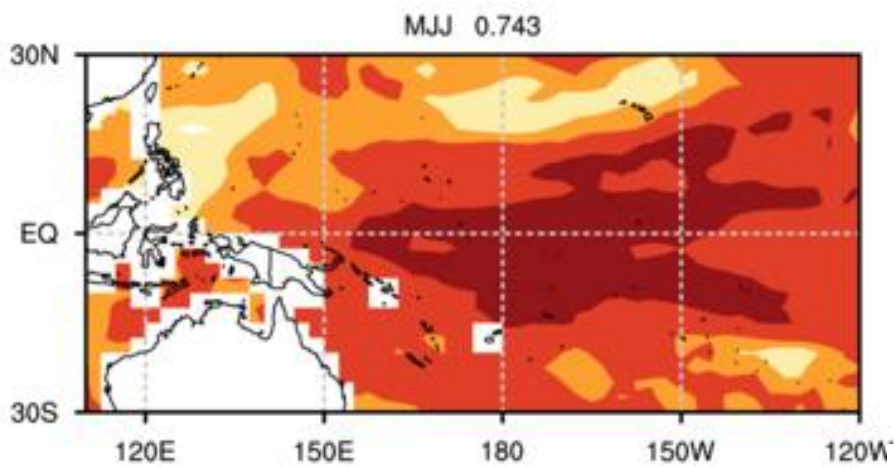
Montreal

Sea Surface Temperature : MJJASO2021

(issued on Apr2021)

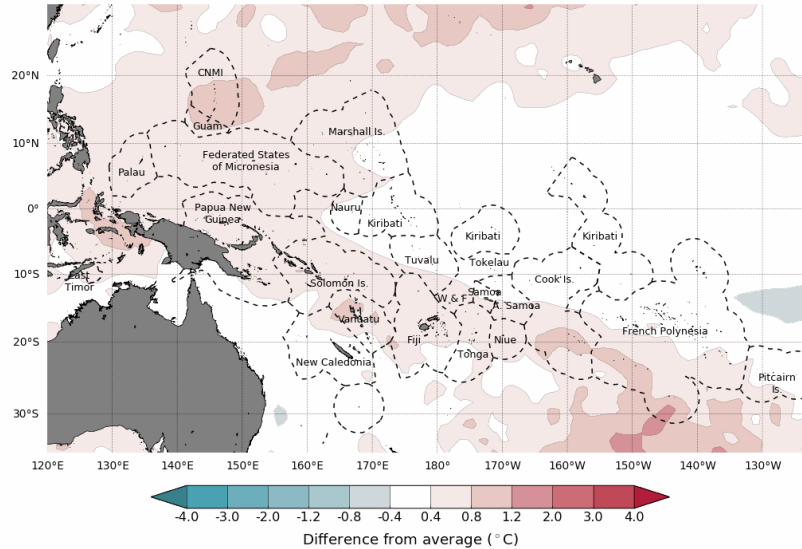


Skill



ACCESS-S: SST Anomalies

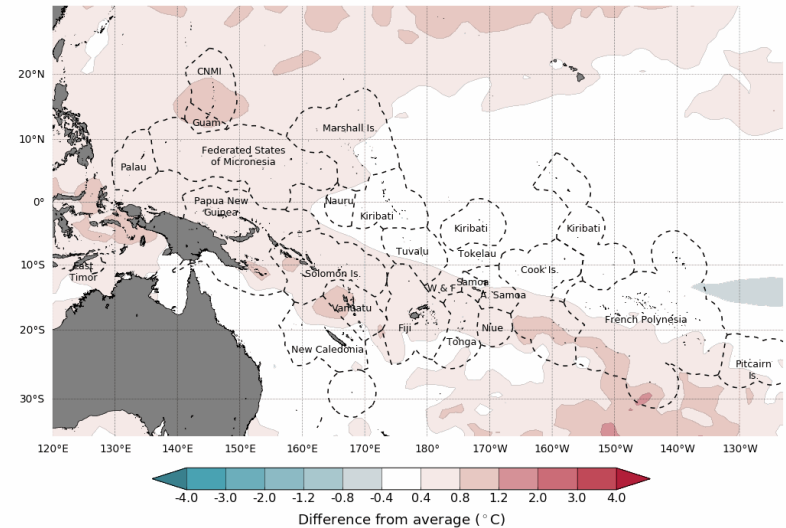
Difference from average sea surface temperature forecast for
May to July 2021



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

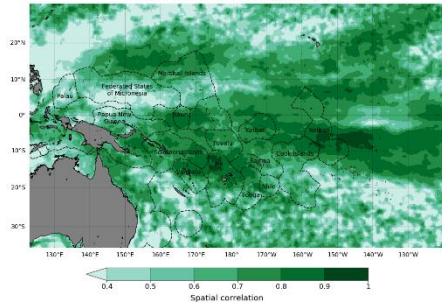
Difference from average sea surface temperature forecast for
June to August 2021



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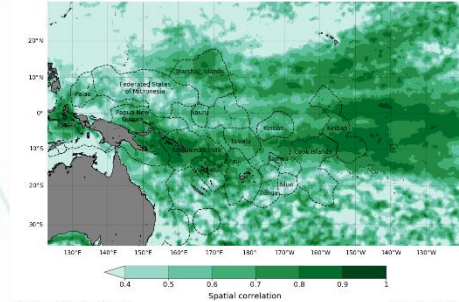
Shapfile data extracted from Flanders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 11. Available online at <http://www.marinegovernance.org/>

MJ sea surface temperature anomaly spatial correlation.
Period: Seasonal. Initialisation date: 9th April



Model run: 12/04/2021
Created: 1/12/2020

JJA sea surface temperature anomaly spatial correlation.
Period: Seasonal. Initialisation date: 9th April



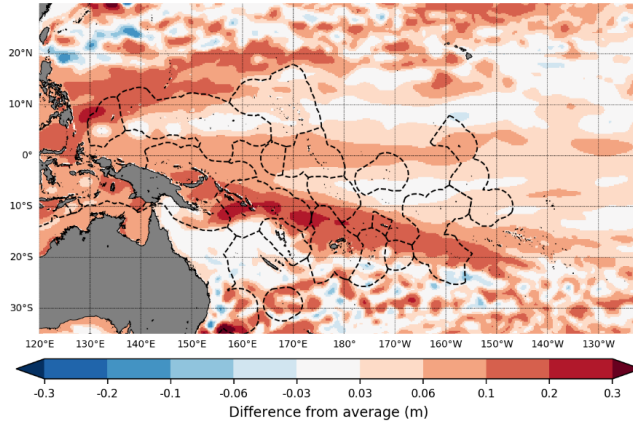
Model run: 12/04/2021
Created: 1/12/2020

Skill

Sea Level Anomaly

ACCESS-S1

Difference from average sea surface height forecast for
April 2021 to June 2021

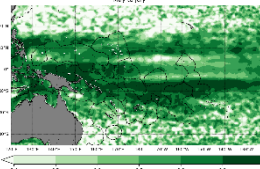


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Model: ACCESS-S1
Base Period: 1990-2012

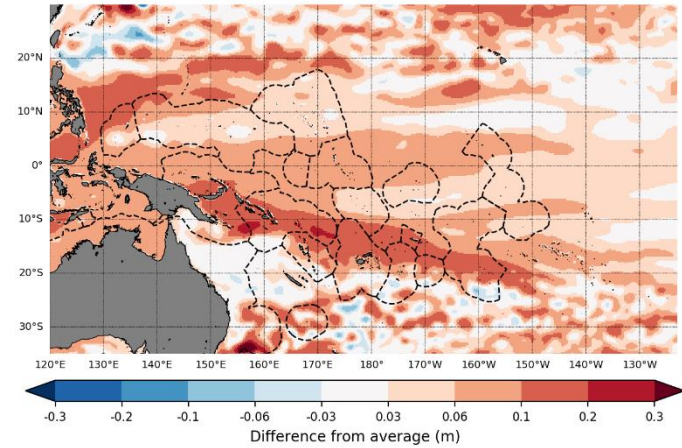
Model Run: 27/03/2021
Issued: Map not issued

Difference from average sea surface height spatial correlation
July to July



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Difference from average sea surface height forecast for
May 2021 to July 2021

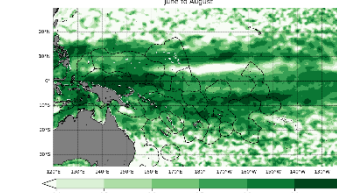


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Model: ACCESS-S1
Base Period: 1990-2012

Model Run: 27/03/2021
Issued: Map not issued

Difference from average sea surface height spatial correlation
June to August

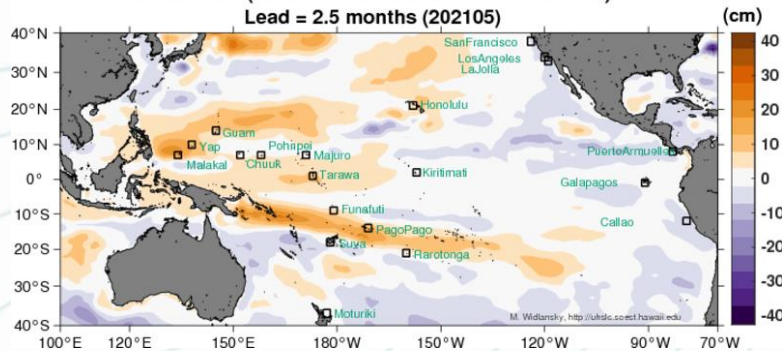


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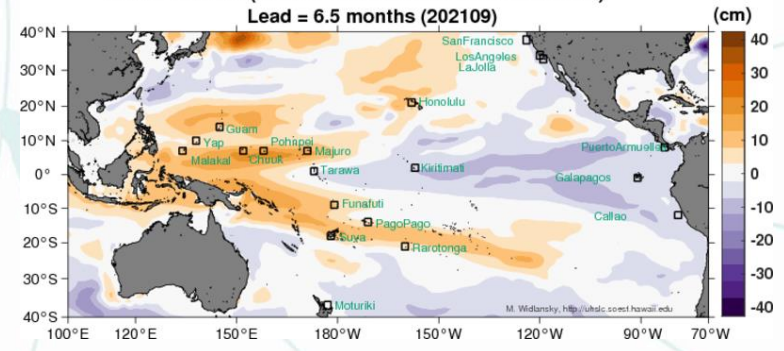
Skill

NOAA

Model forecast (CFSv2: initialized 20210302-20210331)
Lead = 2.5 months (202105)



Model forecast (CFSv2: initialized 20210302-20210331)
Lead = 6.5 months (202109)



Highest Tides

Port Moresby

10 highest tides for 2021

Date	Time	Height (m)
28-Mar	8:46	2.77
23-Jul	21:21	2.77
2-Oct	8:48	2.76
13-Jan	9:40	2.76
24-Jun	21:30	2.76
12-Jan	8:58	2.75
25-Jun	22:20	2.75

Honiara

10 highest tides for 2021

Date	Time	Height (m)
1-May	5:12	1.00
2-May	5:29	0.99
6-Dec	16:00	0.99
7-Dec	16:25	0.99
29-May	4:15	0.98
30-Apr	4:58	0.98

Neiafu

10 highest tides for 2021

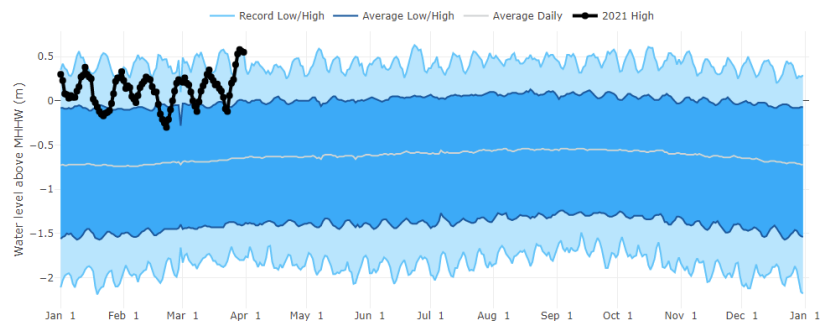
Date	Time	Height (m)
5-Dec	19:42	1.51
29-April	8:33	1.51
27-May	7:17	1.50
28-Apr	7:40	1.50
28-May	8:13	1.50
6-Dec	20:38	1.49
4-Dec	18:46	1.49

Funafuti

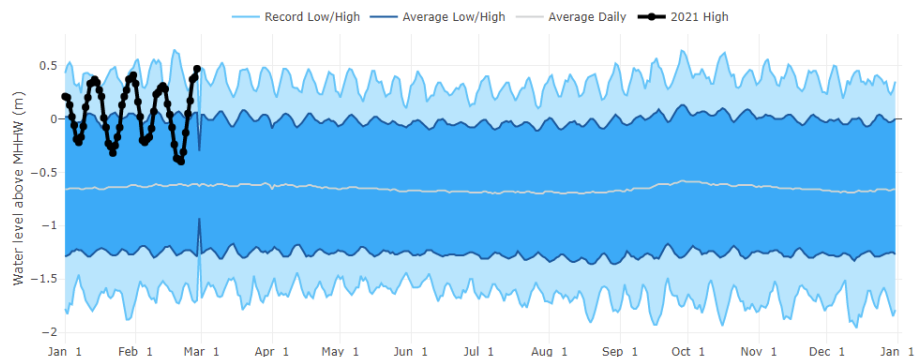
10 highest tides for 2021

Date	Time	Height (m)
28-Apr	5:30	3.21
29-Mar	17:31	3.2
27-Apr	4:49	3.19
28-May	16:52	3.19
28-Feb	17:53	3.19
30-Mar	5:53	3.18

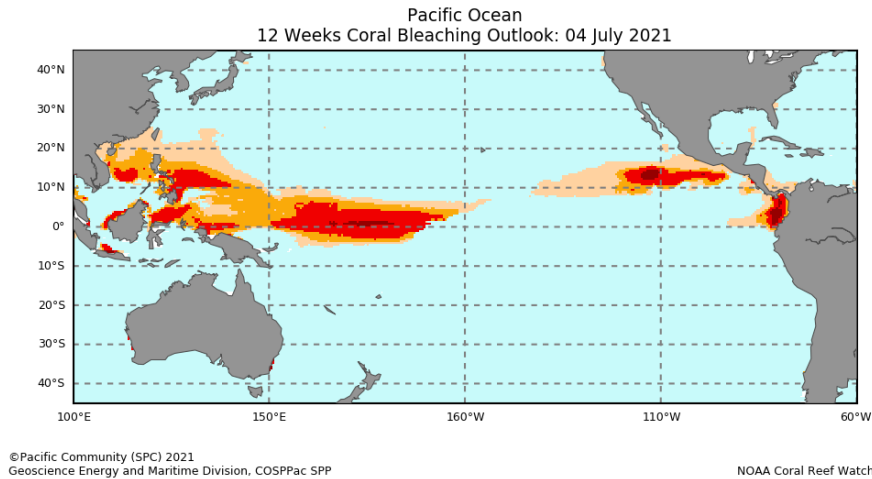
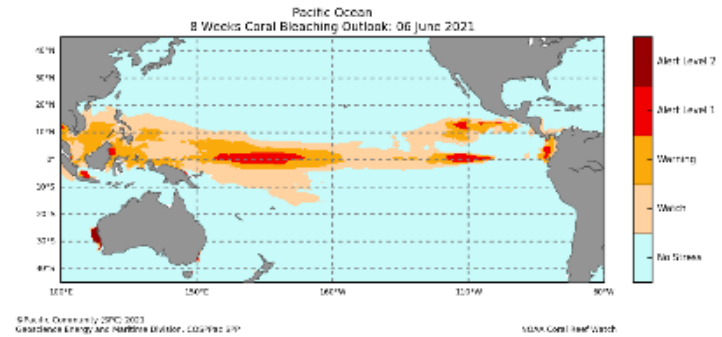
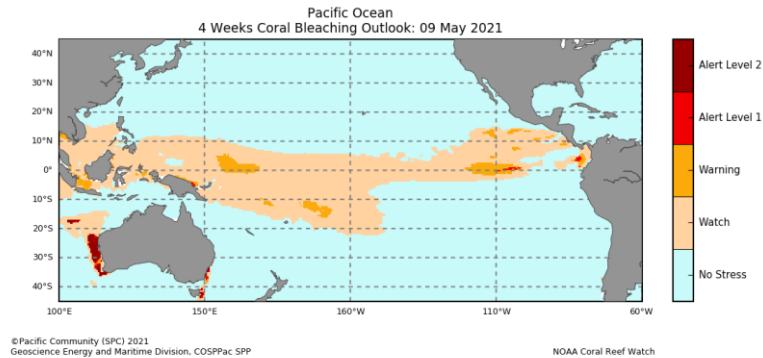
The epoch year range for averaging is: 1983 - 2001
The data year range for determining records is: 1969 - 2021



The epoch year range for averaging is: 2002 - 2020
The data year range for determining records is: 1993 - 2021



Coral Bleaching (NOAA)



Alert Level	Effect	Coral Bleaching Alert
No Data	No alert data available	
No Stress	No thermal stress	
Bleaching Watch	Low-level thermal stress	
Bleaching Warning	Coral bleaching possible	
Bleaching Alert Level 1	Coral bleaching likely	
Bleaching Alert Level 2	Coral mortality likely	

Coral Bleaching

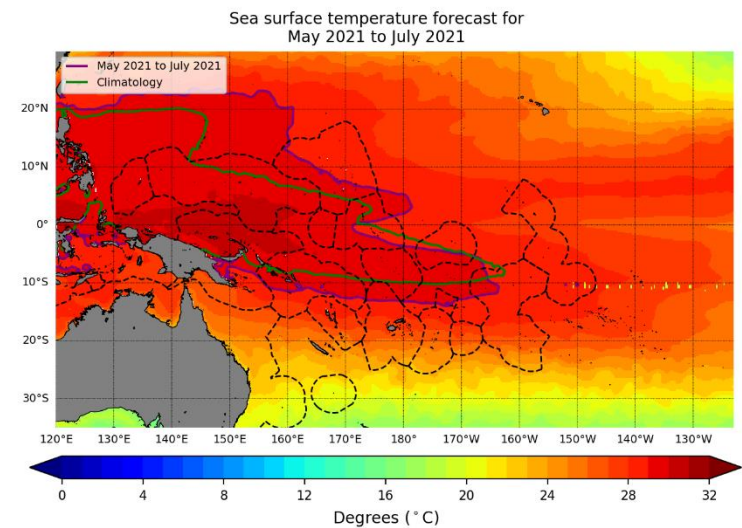
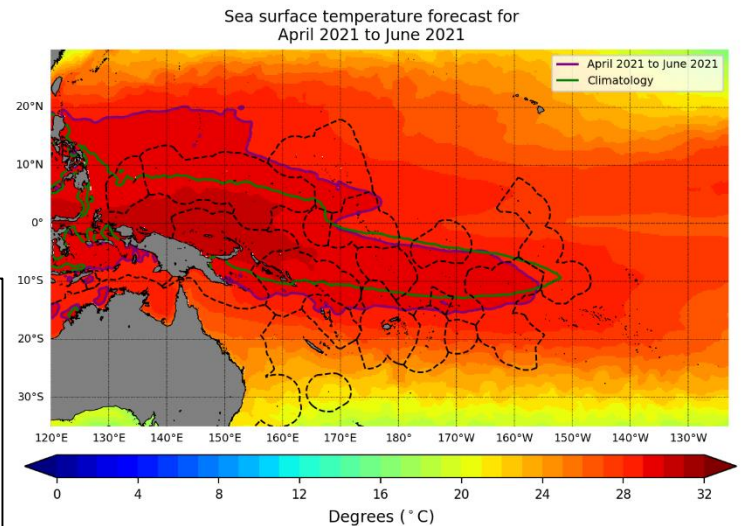
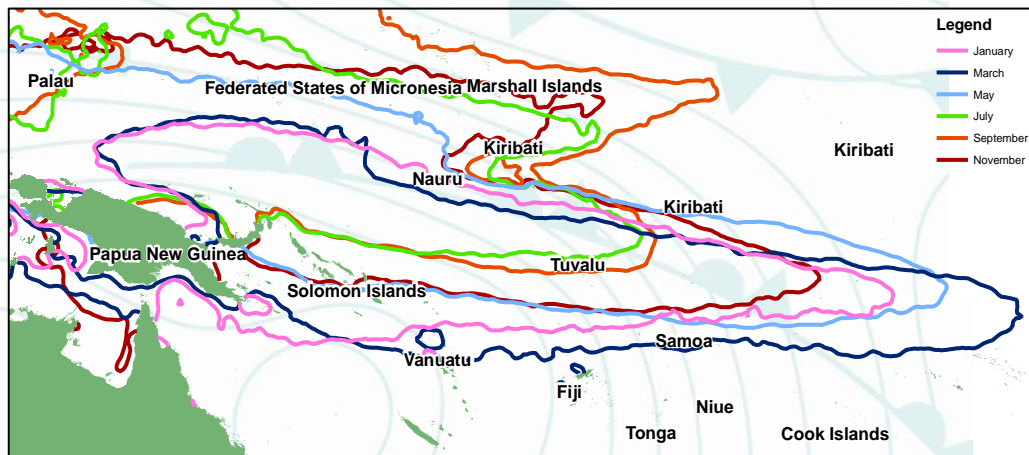
- Bleaching can also be caused by:
 - freshwater inflows
 - salinity changes
 - nutrient pollution
 - intense light



Airport Reef, Tutuila, American Samoa

https://coralreefwatch.noaa.gov/satellite/analyses_guidance/global_coral_bleaching_2014-17_status.php

ACCESS-S: Fisheries Convergence zone



Key Messages:

- Warmer than normal for most countries in the west, including COSPPac partner countries in the south. Cooler along the equator towards the east.
- Sea Level favoured to be higher than normal for most countries. Solomon Is, northern Fiji and northern Tonga expect increase of >20cm
- Countries to be aware of higher tides
- Coral Beaching on alert levels for northern PNG, Nauru and western Kiribati
- Fisheries convergence zone slightly contracts westward and shifts north

The background features a complex pattern of thin, teal-colored wavy lines that resemble topographical contour lines or fluid flow paths. These lines are interspersed with small, solid teal circles and triangles, some of which are arranged along the lines, suggesting a vector field or a sequence of points. The overall aesthetic is clean and modern, with a light teal color palette.

Thank you/Vinaka