

# Review of Ocean Conditions November to March 2022

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John Marra (NOAA) & Grant Smith (BOM)

# Ninth Pacific Islands Climate Outlook Forum

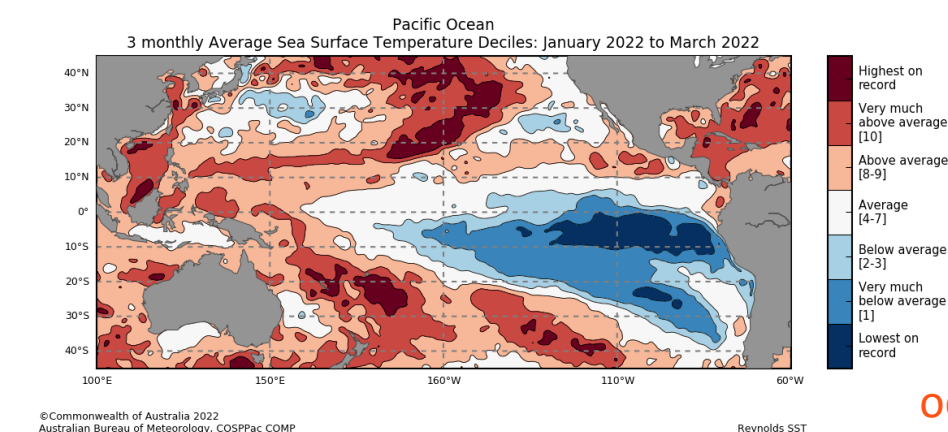
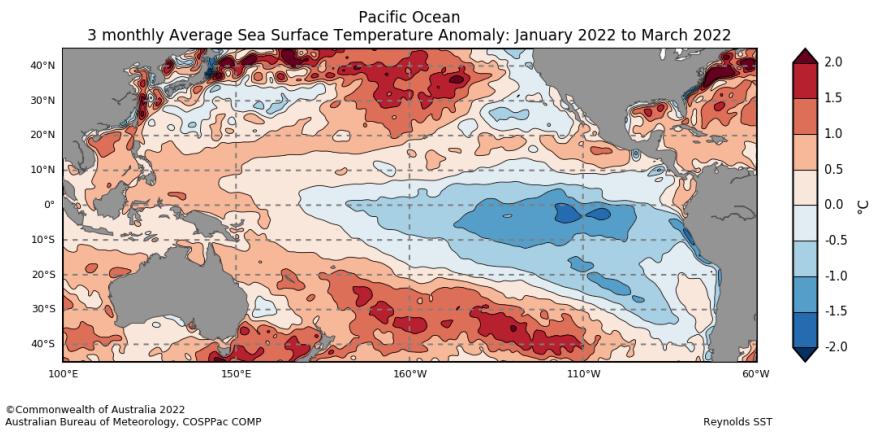
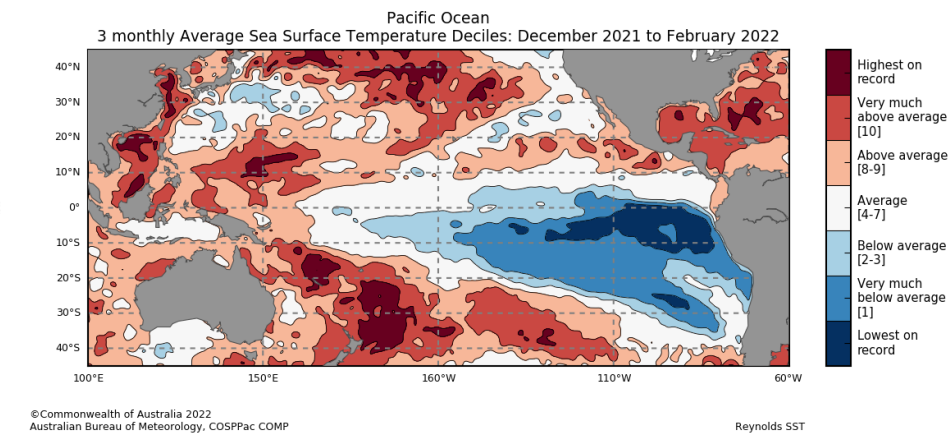
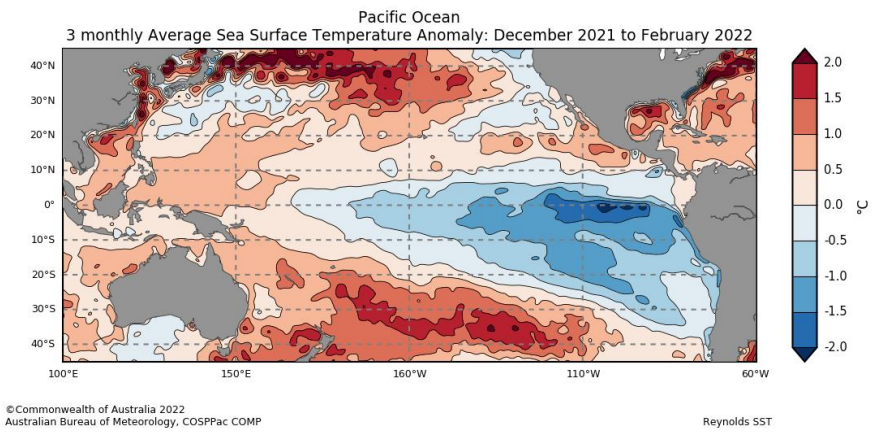
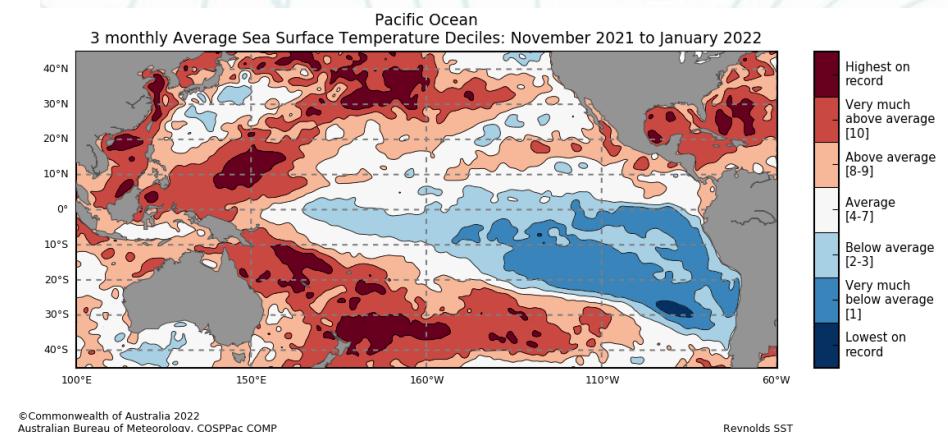
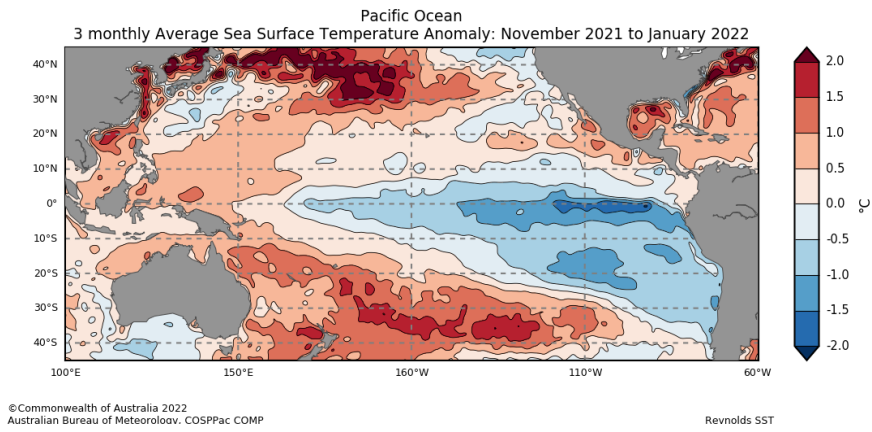
May to October 2021 summary and November 2021 to April 2022 climate, ocean and tropical cyclone outlook | Issued: 29 October 2021

## Outlook for November 2021 to May 2022

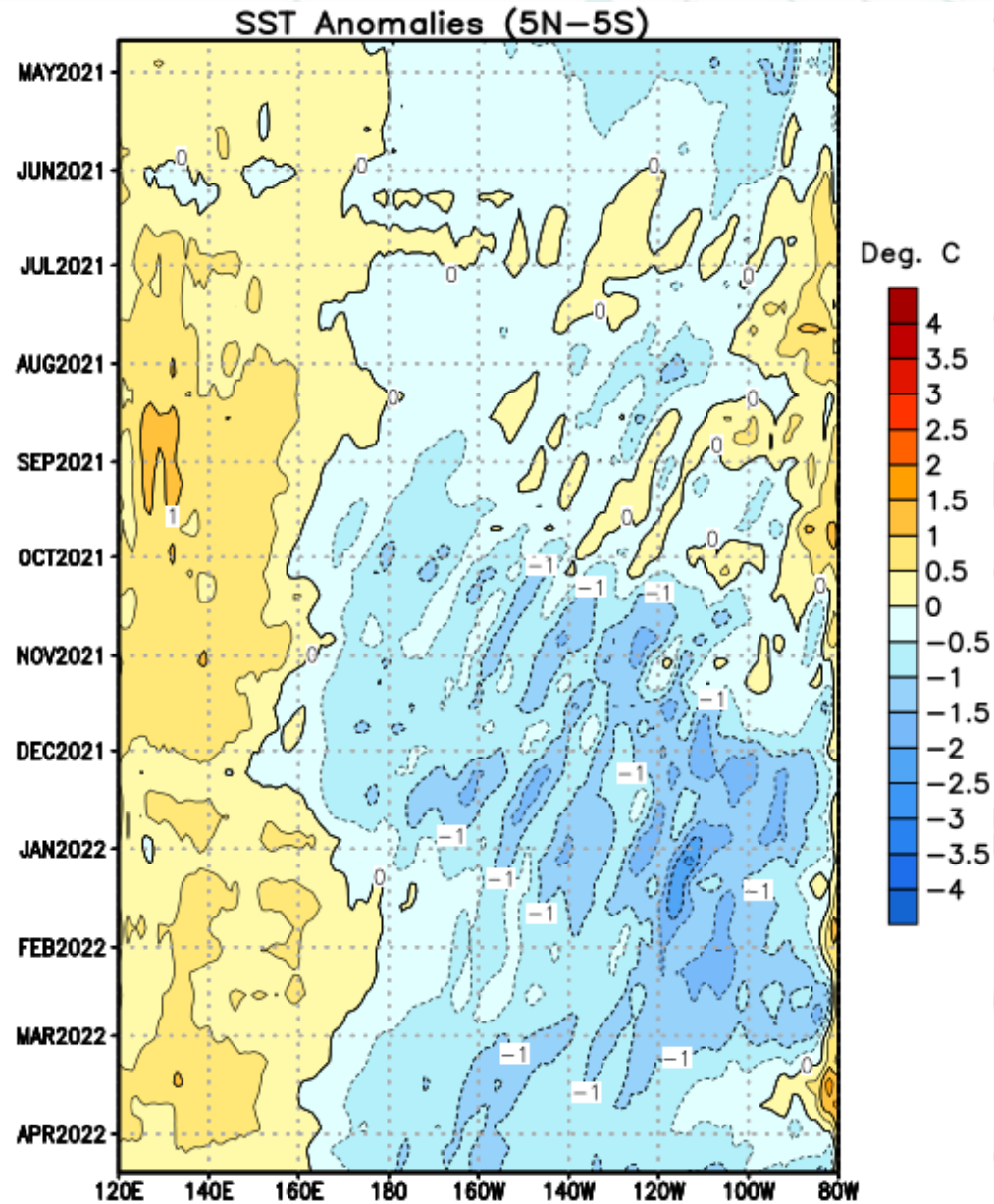
- Climate model outlooks favour weak La Niña conditions in the tropical Pacific Ocean from November to February. It is expected that the La Niña conditions will return to the neutral state in March.
- The transition from neutral to a La Niña-like ENSO state is evident in the following ocean and atmosphere outlooks for November to January and February to April.
- Drier than normal conditions are favoured for island groups near and west of the Date Line that are located close to the equator over November to January. The drier than normal conditions extend northeast and southeast from the Date Line towards the subtropics especially in the southern hemisphere. Wetter than normal conditions are favoured for islands located between Palau and the central Marshall Islands in the north Pacific and from southeast PNG to the southernmost French Polynesian islands in the South Pacific. The February to April rainfall outlook pattern is similar to the earlier November to January outlook with minor differences.
- Sea surface temperature is favoured to remain warmer than normal in the western Pacific and regions close to the Coral Sea over November to January. Boomerang shaped warm anomalies are predicted to remain in the western Pacific. The central and eastern regions show cooling conditions, a typical of La Niña. The coral bleaching outlook favours coral bleaching in the tropical north-west Pacific off the equator.
- Sea level is favoured to be notably higher than normal for most of the countries in the region. Patches of below normal sea level are favoured in a few regions such as Kiritmati atoll in Kiribati. Communities are encouraged to note periods of higher-than-normal tides especially when a tropical cyclone is in the vicinity.
- There is an enhanced risk for tropical cyclone activity in the western part of the basin over November to April. In the central part of the region, cyclone risks are generally near normal, with reduced chances farther east.
- It's important to remember that it does not take a severe cyclone to produce severe impacts. Coastal and river flooding rainfall can occur with a distant, weak or former cyclone. Communities should remain vigilant, and follow forecast information provided by their National Meteorological and Hydrological Service (NMHS).



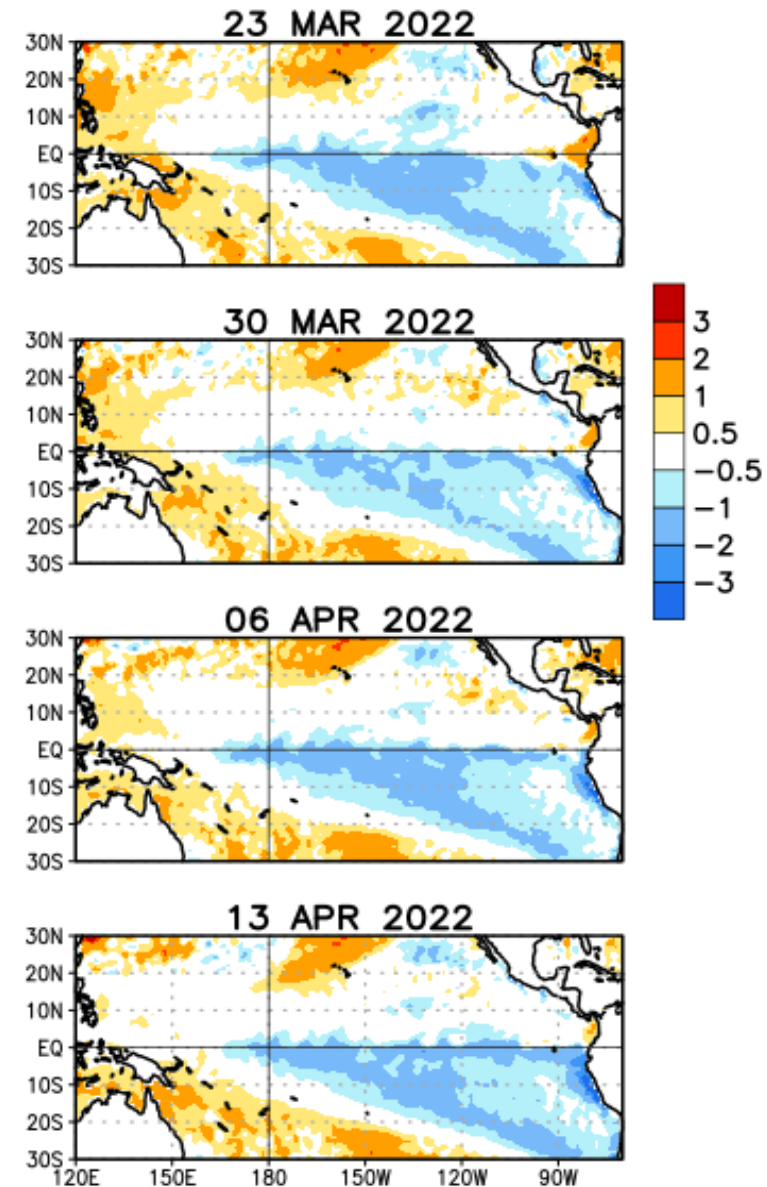
# Sea Surface Temperature



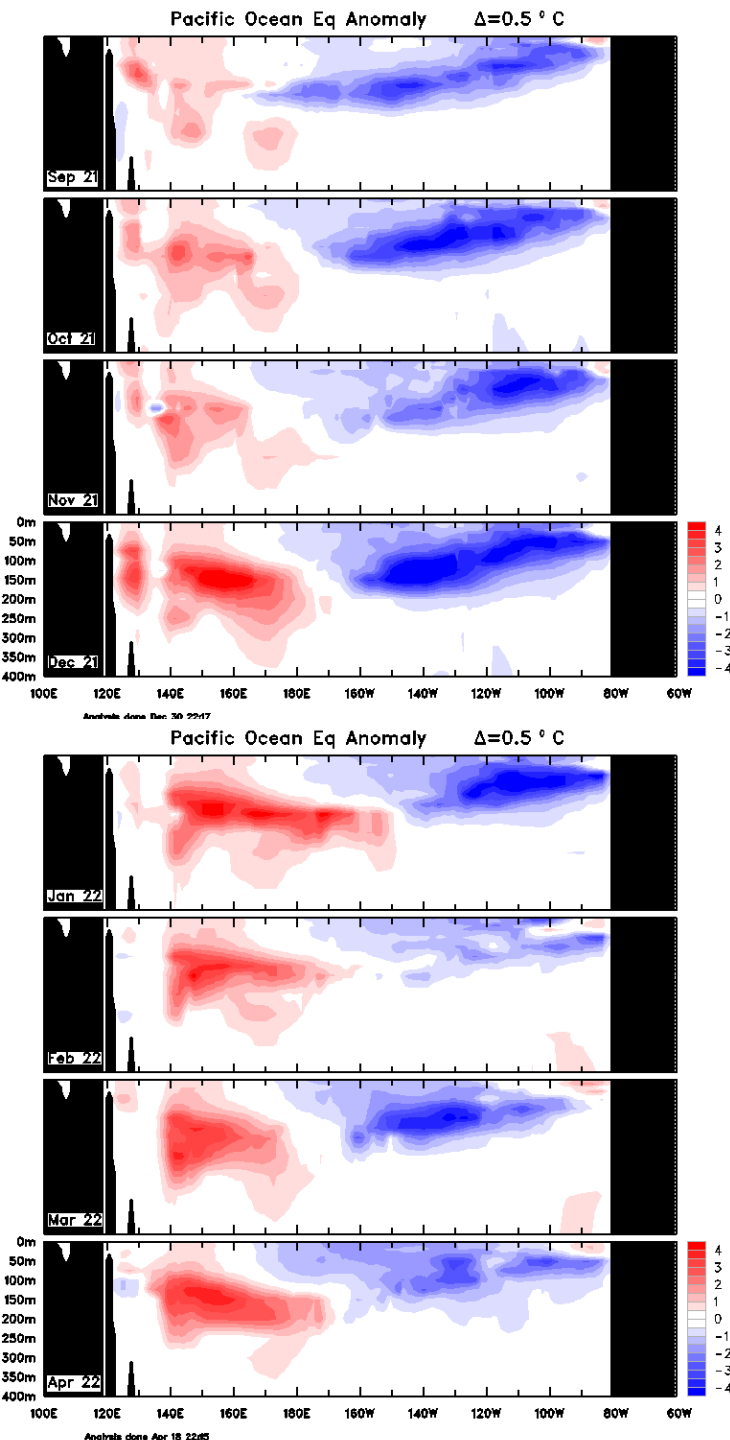
# Sea Surface Temperature



## Weekly SST Anomalies (DEG C)

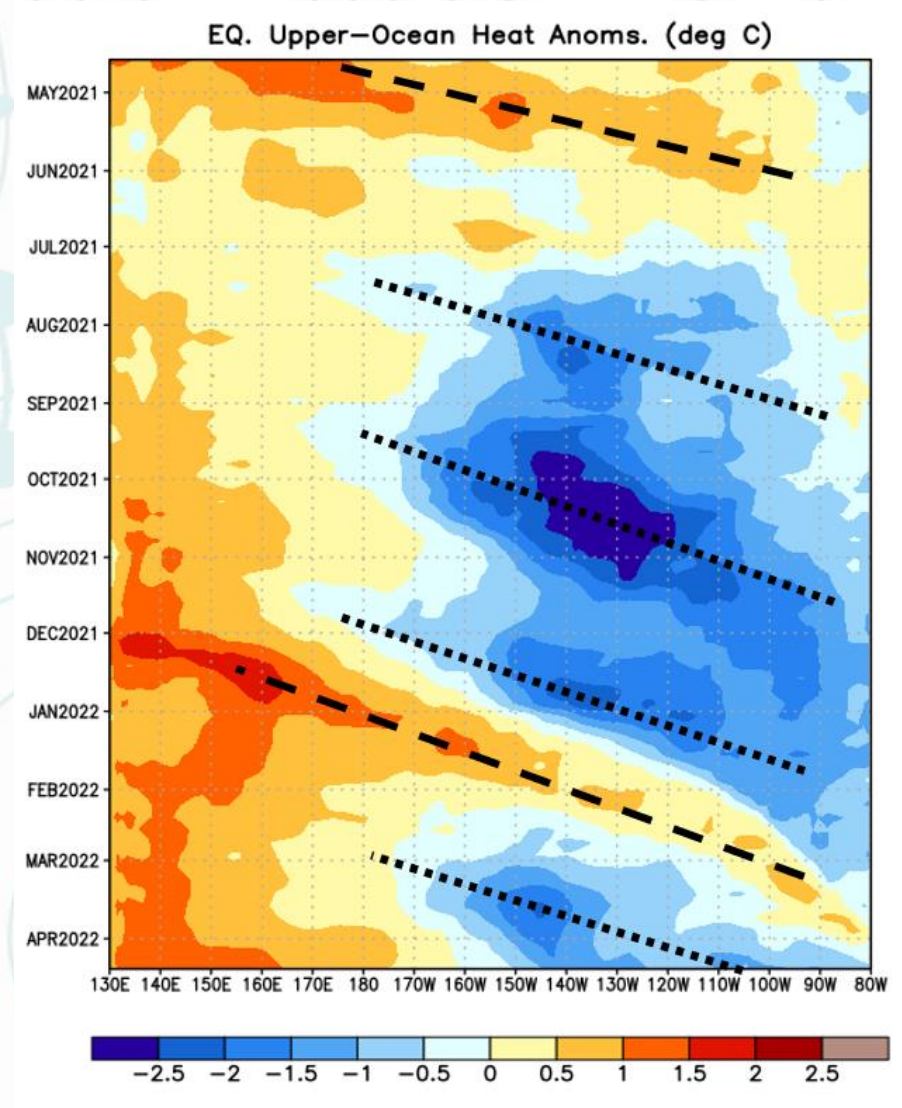






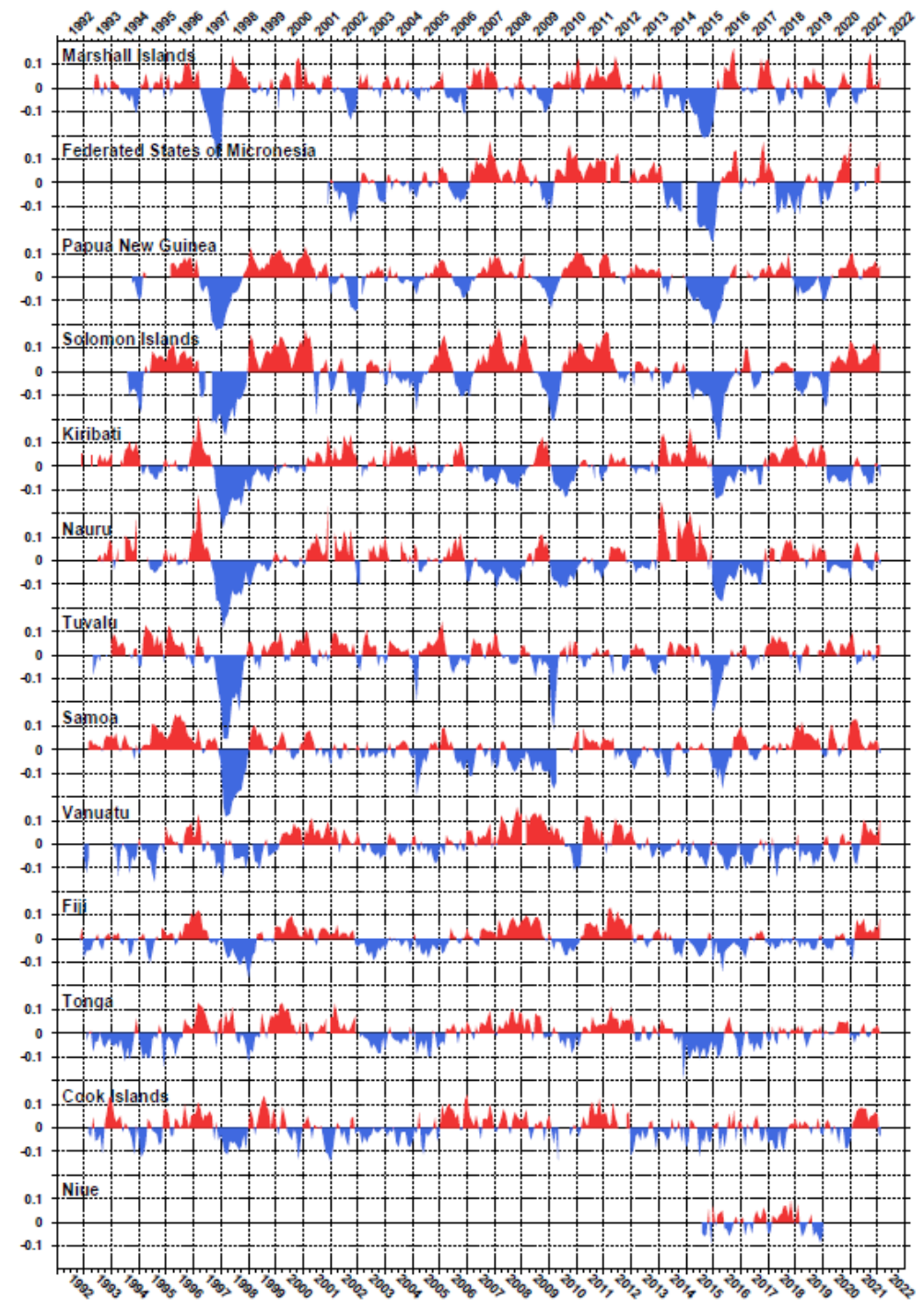
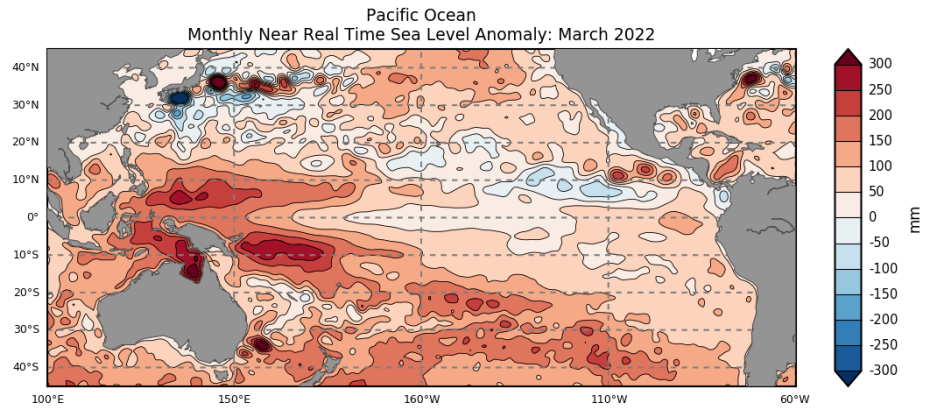
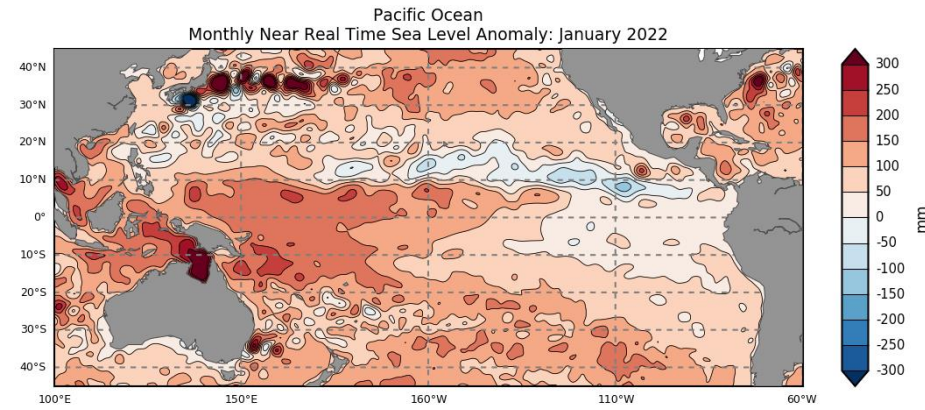
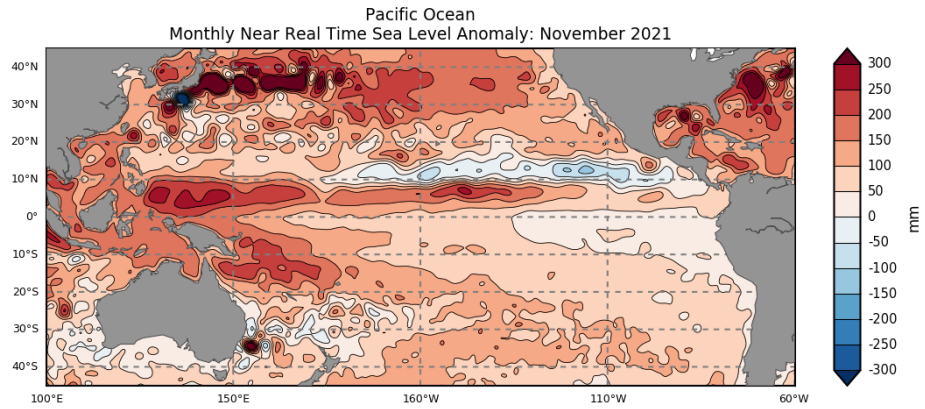
# Sub-surface temperature

- From Aug 2021 to Jan 2022, negative subsurface temperature anomalies persisted in the eastern half of the Pacific Ocean
- From mid-December 2021 through February 2022, a downwelling Kelvin wave shifted eastward.
- Since February 2022, an upwelling Kelvin wave has shifted eastward into the eastern Pacific Ocean, and below-average subsurface temperatures have persisted in the east-central Pacific.

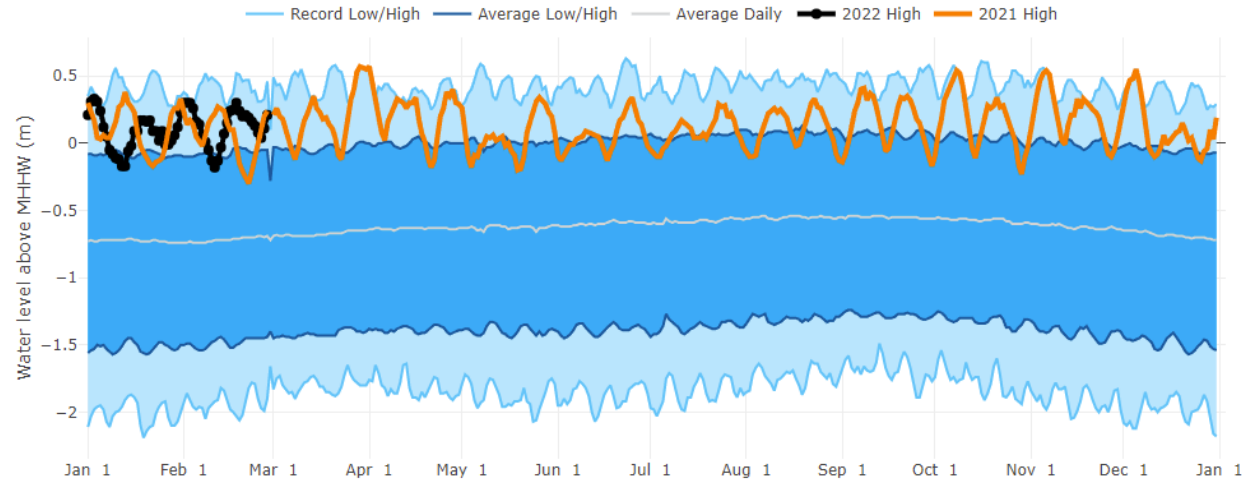




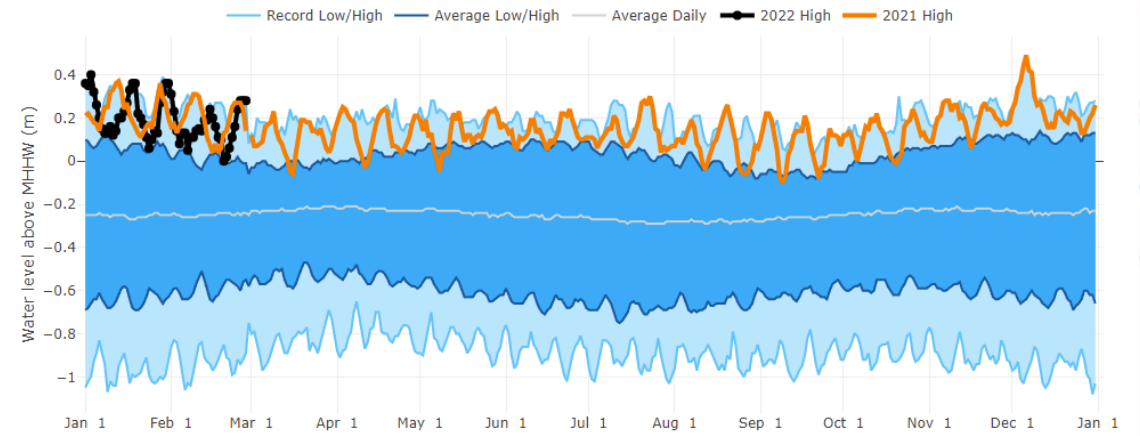
# Sea level



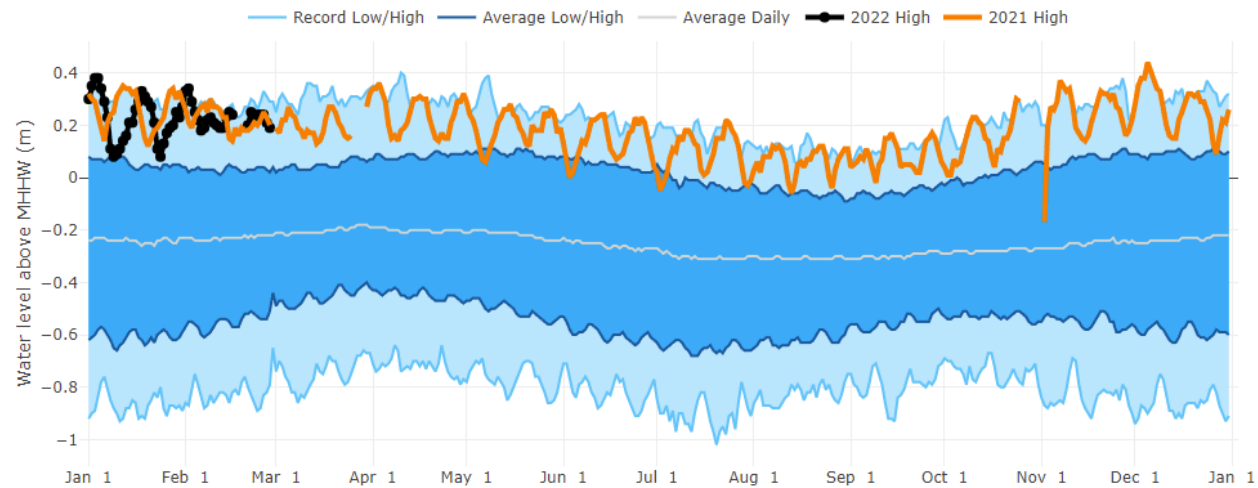
# UoH – Sea level



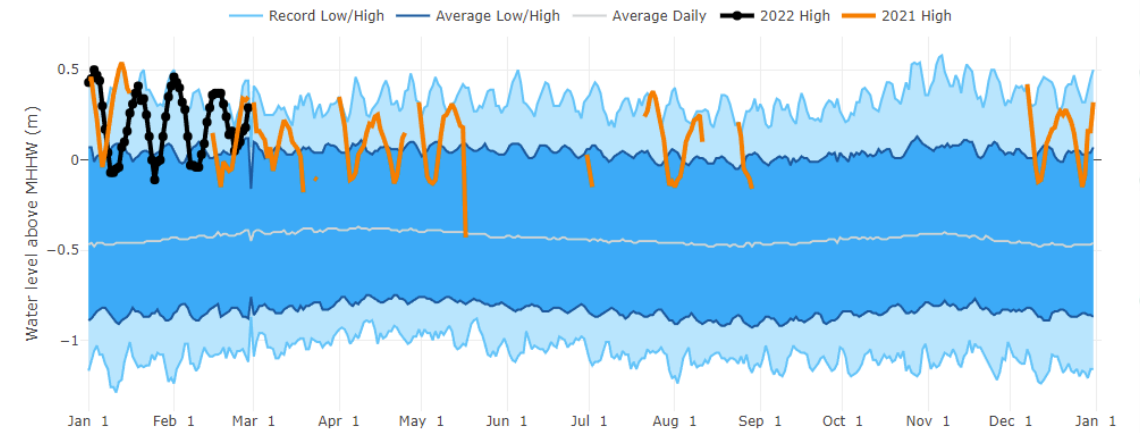
Palau



Lombrum-PNG



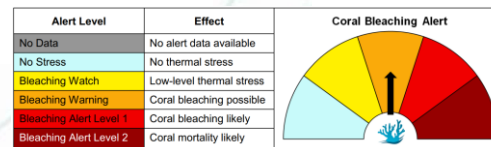
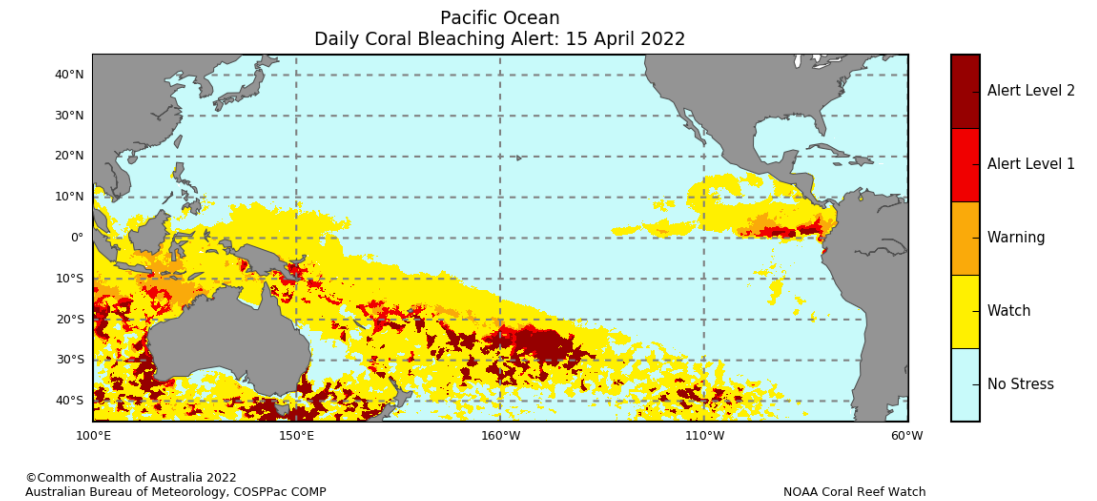
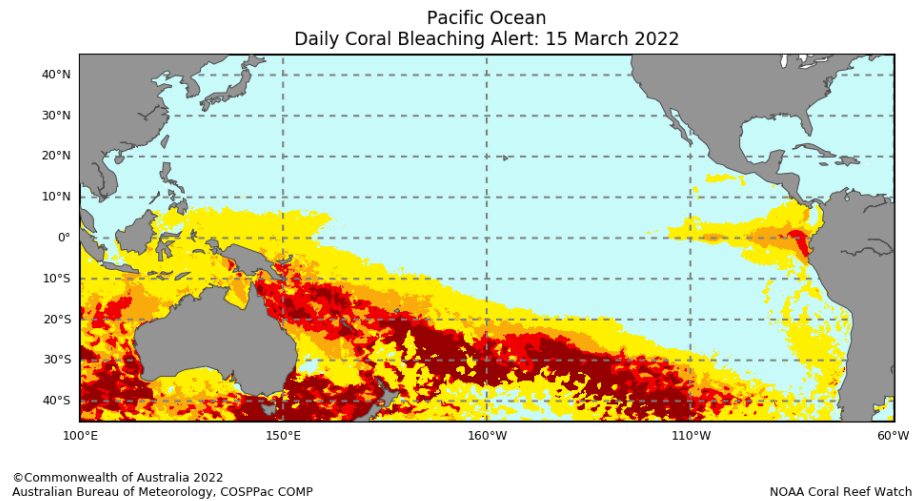
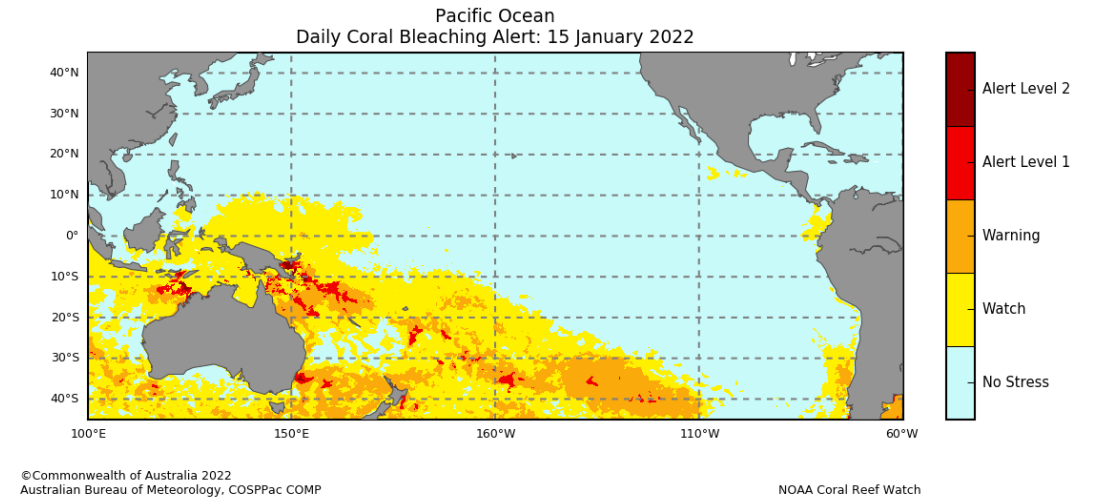
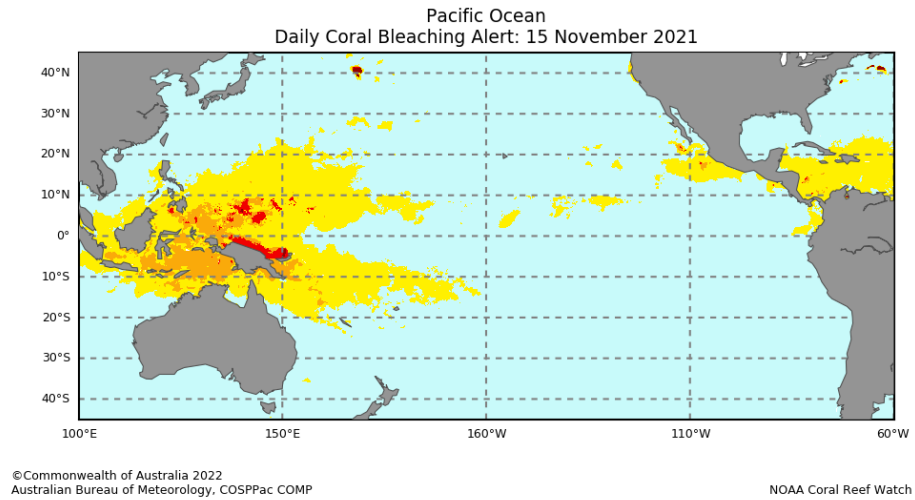
Honiara-Solomon Is



Pohnpei-FSM



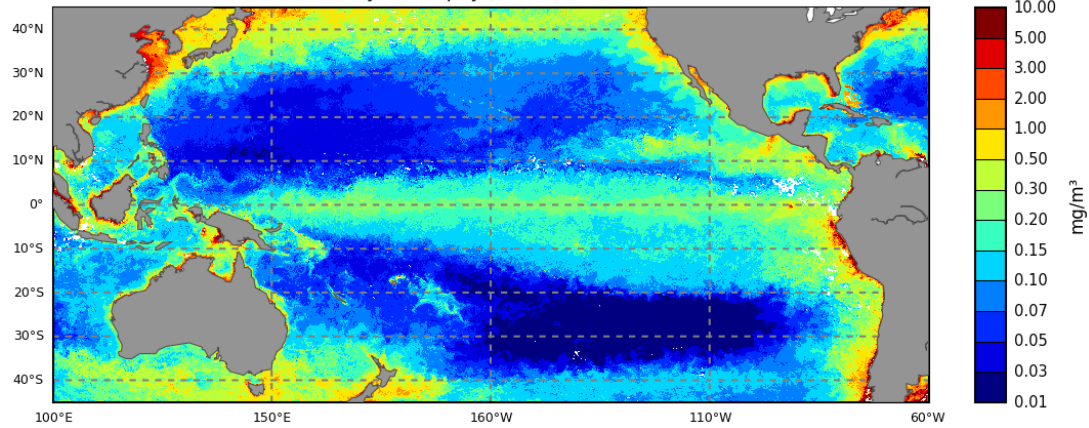
# Coral bleaching





# Chlorophyll

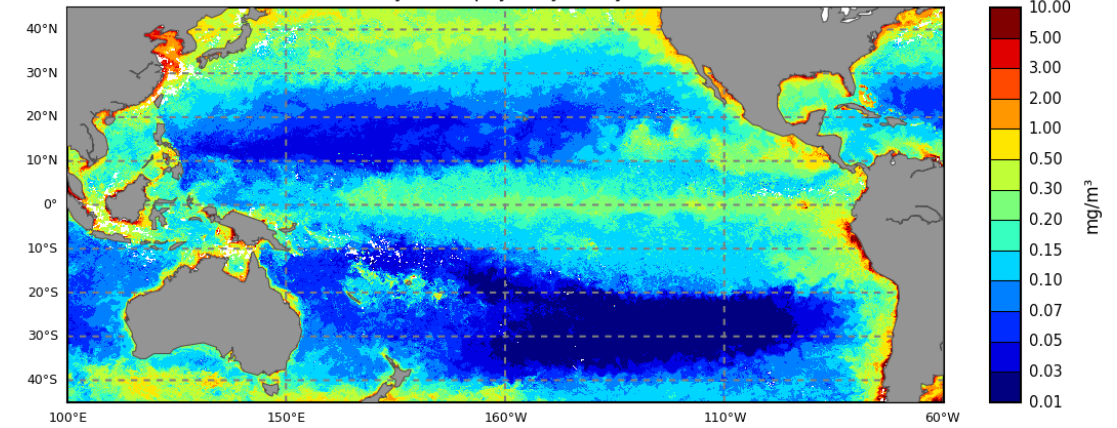
Pacific Ocean  
Monthly Chlorophyll-A: November 2021



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Chlorophyll-A

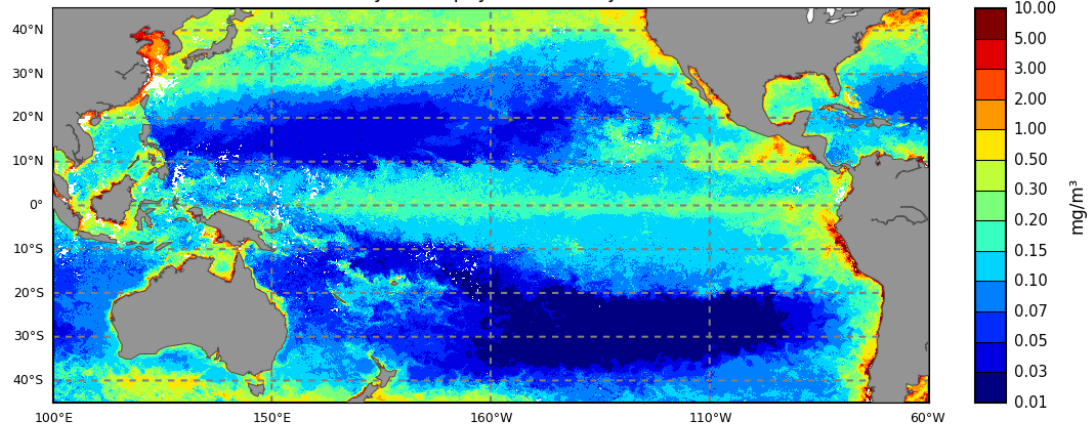
Pacific Ocean  
Monthly Chlorophyll-A: January 2022



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Chlorophyll-A

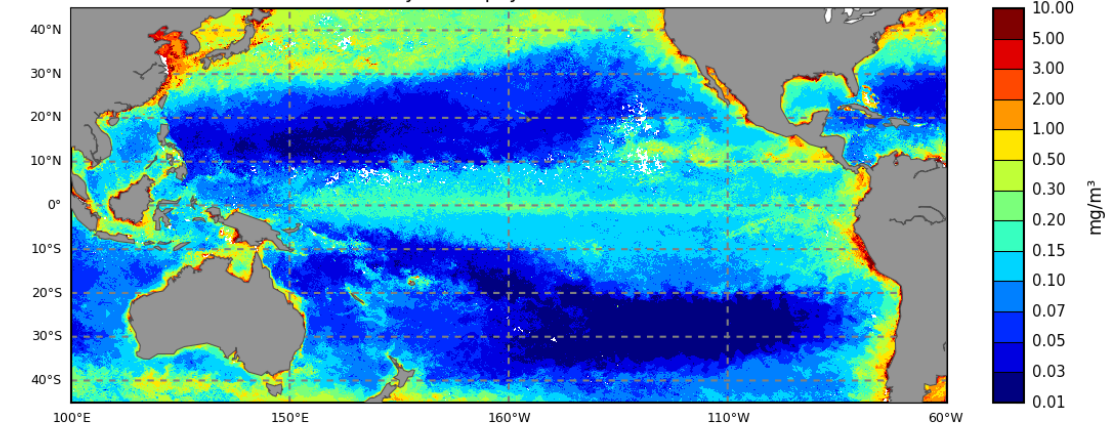
Pacific Ocean  
Monthly Chlorophyll-A: February 2022



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Chlorophyll-A

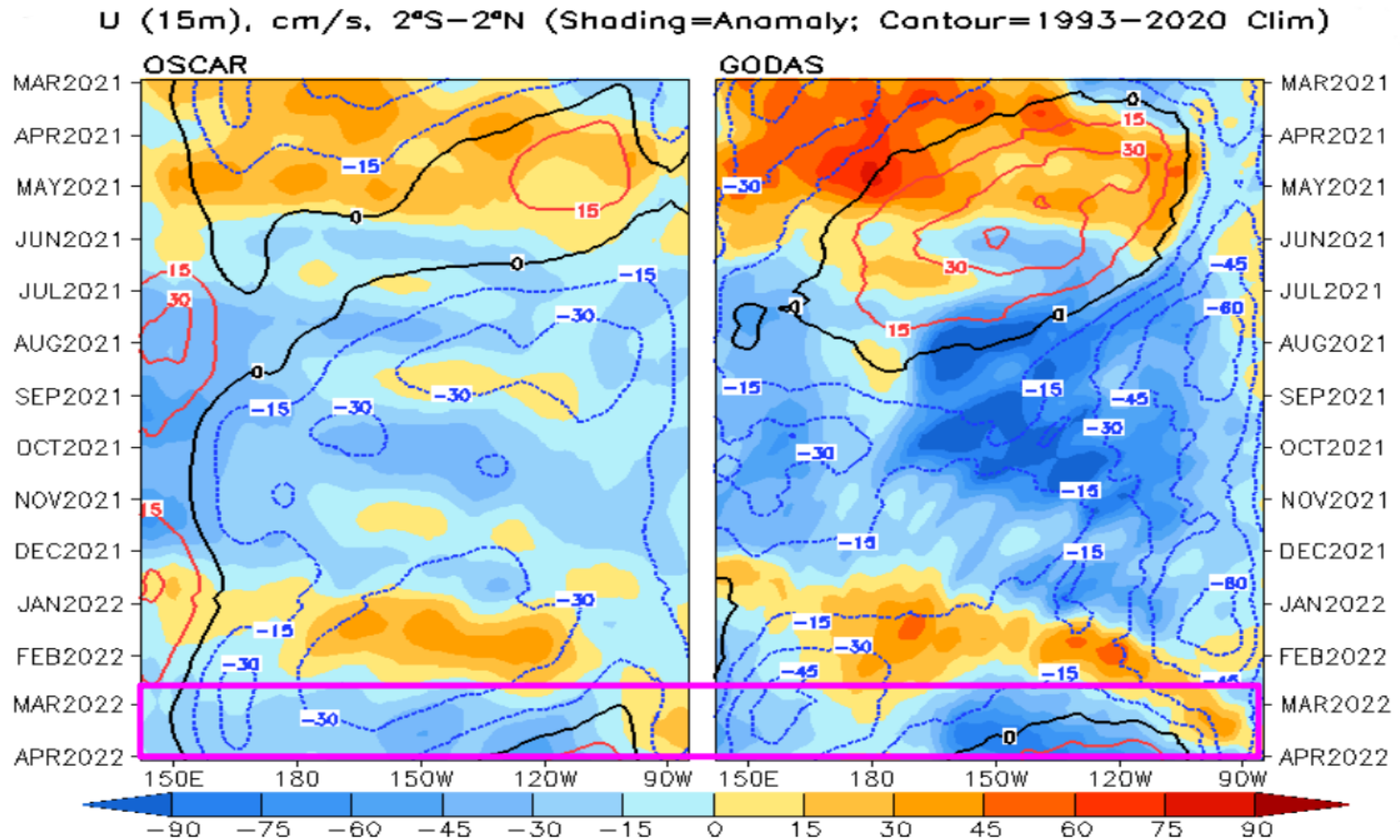
Pacific Ocean  
Monthly Chlorophyll-A: March 2022



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Chlorophyll-A

# Current Anomaly (cm/s)





# Case Study – PNG coastal flooding



## Media Release National Weather Service

For Immediate Release

### Coastal Flooding to continue this season in PNG

Coastal communities should be on alert for higher-than-normal tides over the next few months. High tides that would not cause concern under normal conditions may trigger coastal flooding this season, due to a combination of factors.

One of these factors is the current La Niña state, declared earlier this season. La Niña typically results in 30cm to 40cm of increased sea level in the Western Pacific. This is evident in Figure 2 for PNG which shows most parts of PNG experiencing higher than normal sea level by more than 30cm. This is also evident in the real time data display (Figure 3) which shows the last 4 days of water level from the tide gauge in Lombrum, the water level recorded extra 40cm (maximum recorded) than predicted.

Secondly, a seasonal phenomenon often referred to as 'westerly wind burst' is also contributing to the current coastal flooding situation on the northern coast of PNG. A westerly wind burst is a phenomenon, whereby the typical east-to-west trade winds across the equatorial Pacific shift to west-to-east and has a sustained wind of 25 km/h (16 mph) over a period of 5–20 days. As depicted in Figure 4, there is a 3m swell surrounding the New Guinea Islands.

Finally, many parts of PNG were expecting the highest tides of the year this month. The 2021 Tide Calendar for Lombrum in Manus province shows that four of the highest tides of the year are expected in the month of December (Figure 1). These monthly and annual tidal cycles are predictable and are a result of the combined gravitational forces of the sun and moon.

In summary, the combination of these spring tides, the westerly wind burst, and La Niña increased sea level are producing extreme high tides around PNG this season.

How long will this situation last?

As La Niña is anticipated to influence higher sea levels until April 2022, the chances of coastal flooding during extreme high tides will persist over the next few months, as shown in the seasonal sea level outlook in Figure 6. In addition, the 2022 tide calendars for Lombrum and Port Moresby illustrate that a number of the highest expected tides of the year will occur between January- March (Figure 5). If there are swells or [low pressure](#) systems around PNG, coastal flooding can be severe.

Coastal communities and the general public should be on high alert throughout the season as these flooding events are not over yet. Stay tuned for warnings from the National Weather Service.



Loop PNG • Following

9 Dec 2021 •

Following reports of the effects of King Tides throughout New Ireland Province, the Provincial Government has warned coastal residents and those from the islands to be cautious when commuting by boat and remain vigilant.

[#kingtides](#) [#NewIreland](#) [#PapuaNewGuinea](#)  
[#climatechange](#) [#risingsealevels](#) [#PNG](#)  
[#PNGNews](#) [#LoopPNG](#)



### Tides Continue In NIP

[looppng.com](http://looppng.com)

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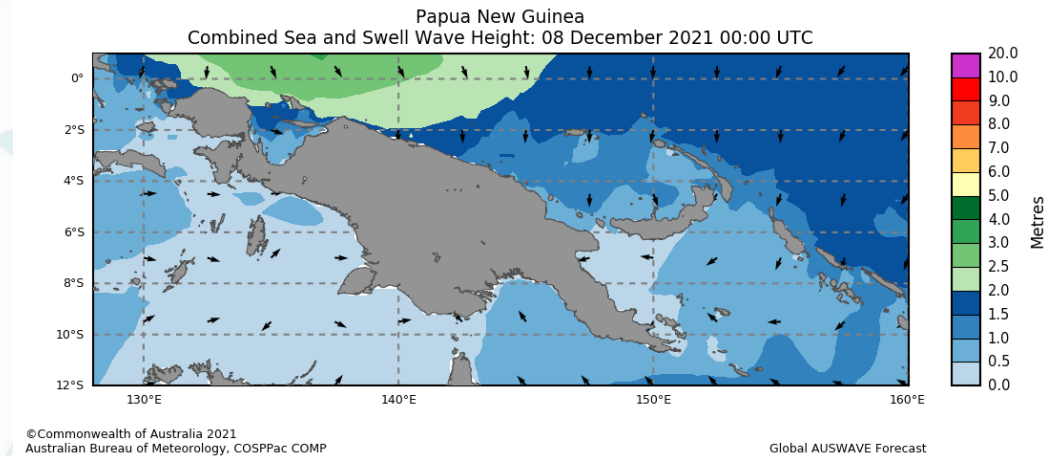
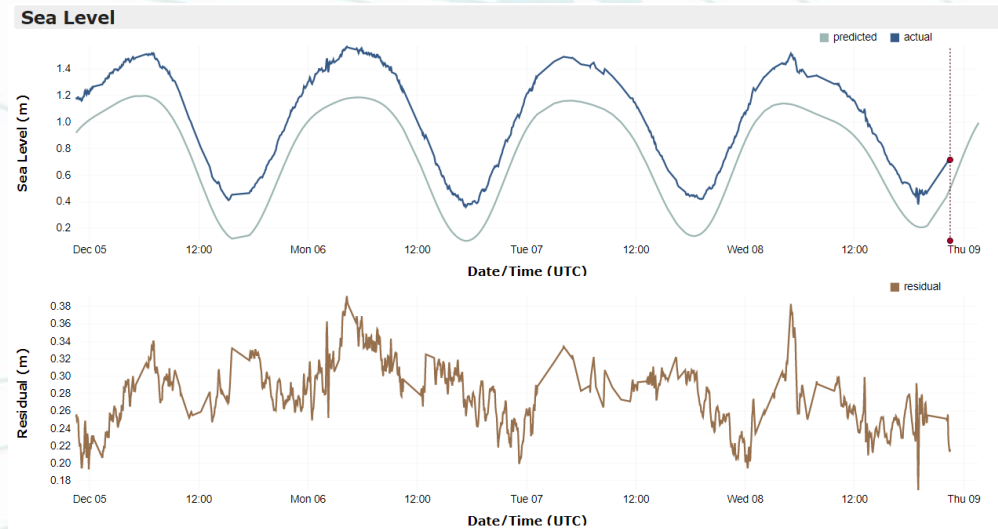
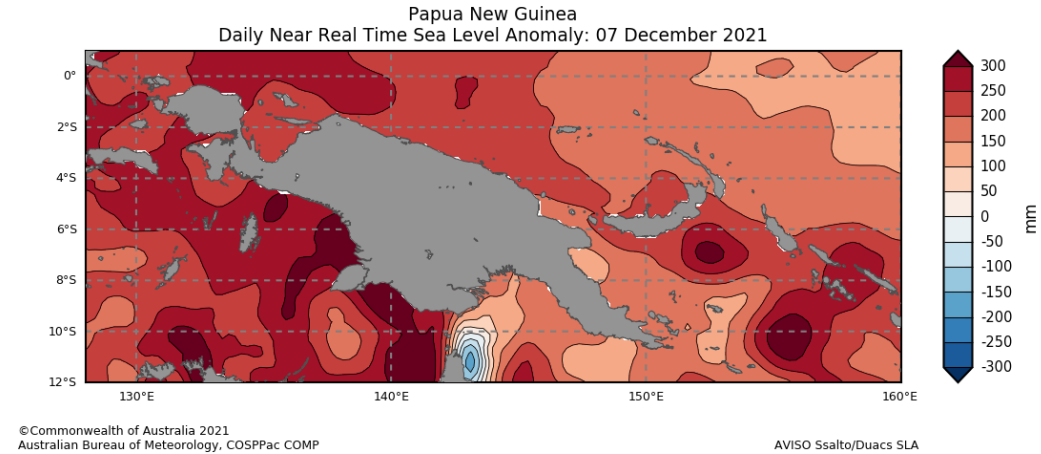
Dianna Leotohian · 7 Dec 2021 ·

Manus Province is undergoing natural disasters especially the sea level rise in all coastline and all the outlying islands. The king tide have swept homes and villages to ruin.



# Case Study – PNG coastal flooding

10 highest tides for 2021			10 lowest tides for 2021		
Date	Time	Height (m)	Date	Time	Height (m)
5-Dec	15:44	1.24	23-Jul	12:30	0.11
4-Dec	15:34	1.23	25-Jun	13:41	0.11
31-Dec	14:36	1.23	22-Jul	11:44	0.12
6-Dec	15:26	1.22	26-Jun	14:35	0.13
11-Jan	15:00	1.22	24-Jul	13:20	0.14
12-Jan	15:21	1.22	24-Jun	12:50	0.14
10-Jan	14:40	1.21	7-Dec	3:23	0.14
13-Jan	15:38	1.20	6-Dec	2:24	0.14
24-Jun	3:19	1.20	19-Aug	10:31	0.15
3-Dec	15:22	1.20	20-Aug	11:16	0.16





# Case Study - PNG coastal flooding outlook

## 10 highest tides for 2022 - Port Moresby:

10 highest tides for 2022			10 lowest tides for 2022		
Date	Time	Height (m)	Date	Time	Height (m)
1-Feb	9:36	2.91	11-Aug	14:23	0.12
31-Jan	8:55	2.89	12-Aug	15:05	0.13
1-Mar	8:37	2.88	1-Feb	2:44	0.15
11-Aug	21:12	2.86	3-Jan	2:51	0.15
2-Mar	9:10	2.85	2-Jan	2:07	0.16
3-Jan	9:51	2.84	14-Jul	15:20	0.16
2-Feb	10:16	2.83	13-Jul	14:33	0.16
14-Jul	22:17	2.83	31-Jan	2:03	0.18
12-Aug	21:52	2.83	9-Sep	14:07	0.19
13-Jul	21:30	2.82	2-Feb	3:25	0.2

## 10 highest tides for 2022 - Lombrum:

10 highest tides for 2022			10 lowest tides for 2022		
Date	Time	Height (m)	Date	Time	Height (m)
23-Dec	15:17	1.27	13-Jul	12:43	0.08
2-Jan	15:27	1.27	14-Jul	13:33	0.09
24-Dec	15:47	1.27	10-Aug	11:28	0.11
3-Jan	15:56	1.26	3-Jan	1:07	0.11
1-Jan	15:00	1.26	16-Jun	14:51	0.12
30-Jan	14:53	1.25	12-Jul	11:55	0.12
31-Jan	15:28	1.25	4-Jan	1:59	0.12
22-Dec	14:51	1.25	15-Jun	13:54	0.12
25-Dec	16:11	1.24	25-Dec	2:14	0.12
29-Jan	14:20	1.23	9-Aug	10:42	0.12

# Coral Bleaching-Fiji



tom vierus  
@TomVierus

Water temperatures have been too warm here in #Fiji, and last weekend we encountered some #coralbleaching at Combe reef.

Besides some white bleached corals we also found a number of corals that underwent a process termed “colorful bleaching” causing the corals to..

[thread] ▼

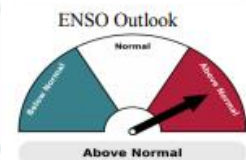


8:01 AM · Apr 6, 2022 · Twitter for iPhone

Source: Twitter



⇒ La Niña continues in the tropical Pacific. The majority of surveyed climate models suggest this La Niña event has past its peak, with chances of a return to neutral ENSO state during April to June.



⇒ Above normal sea surface temperatures (SSTs) are likely to be observed within the Fiji Waters during the April to June 2022 period.



⇒ The average position of the 29°C convergence zone is likely to lie over the Fiji Group during the April to June 2022 period.



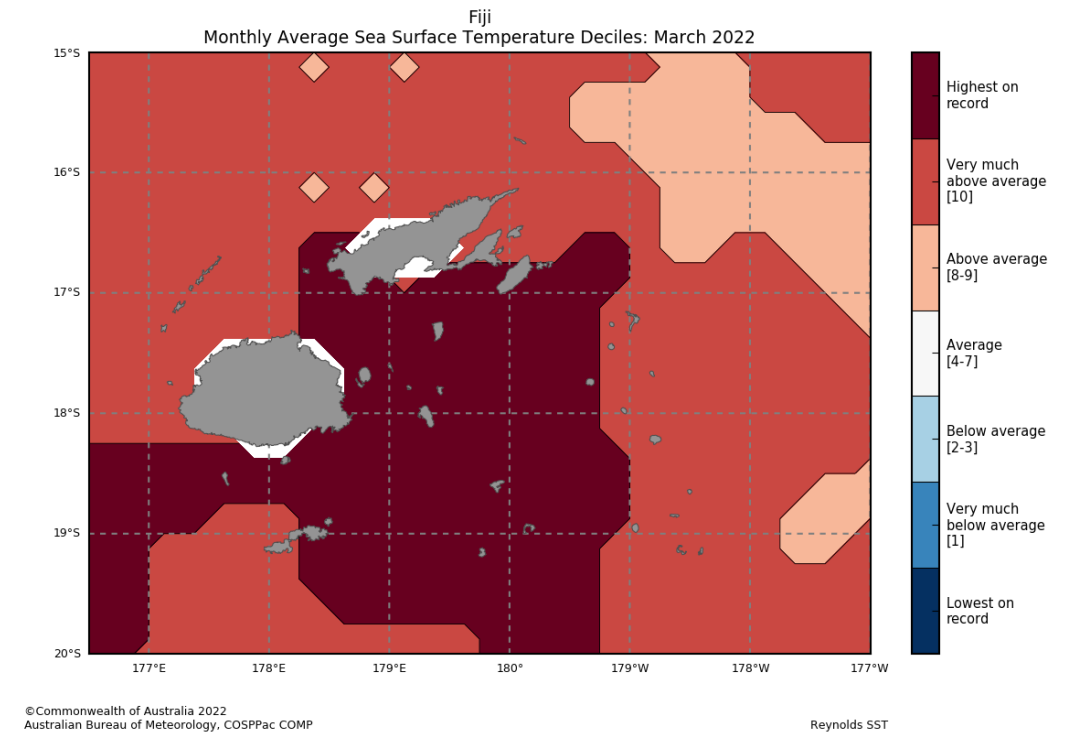
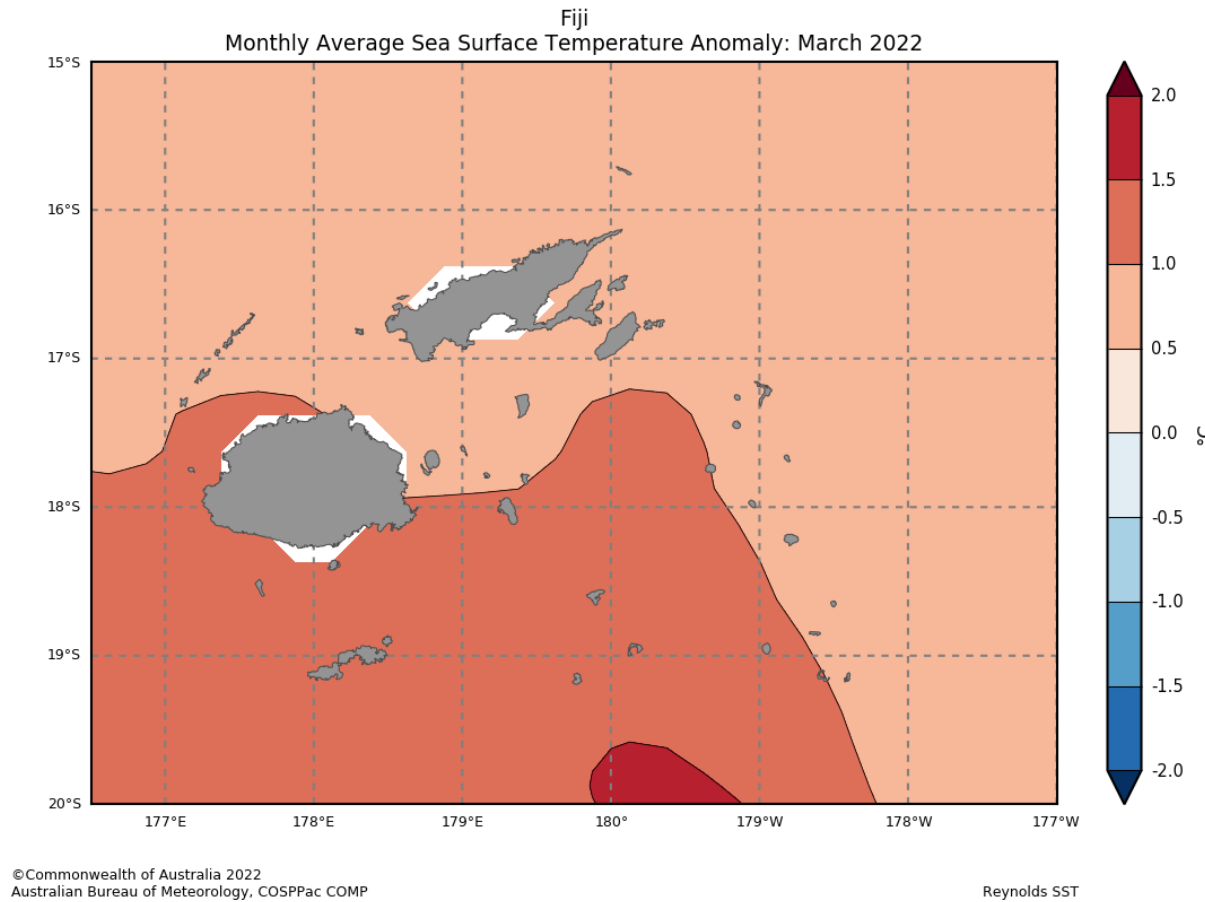
⇒ The 8 weeks coral bleaching outlook is at 'Alert 2' for waters south of Viti Levu and Vanua Levu, Taveuni, Kadavu and across the Lomaiviti and Lau Group, while 'Alert 1' is in place for the rest of the Fiji Waters.



⇒ Sea level is likely to be near normal or above normal across most of Fiji's EEZ during the April to June 2022 period.



# Coral Bleaching-Fiji



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 arrowheads, some pointing in the direction of the flow and others pointing against it, creating a sense of movement and depth. The overall color palette is a soft, muted teal against a light cream or off-white background.

Thank you/Vinaka