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

Looking back: review & evaluation of May - October 2022 ocean outlook

Presented by: Ben Noll, NIWA with thanks to BoM, NOAA, University of Hawaii, SPC, and SPREP

25 October 2022

WORLD METEOROLOGICAL ORGANIZATION
Australian Government
Department of Foreign Affairs and Trade
Bureau of Meteorology
CSIRO
NOAA
APCC
NIWA Taihoro Nukurangi
SPC Secretariat of the Pacific Community
SPREP Secretariat of the Pacific Regional Environment Programme

Outline of Presentation

- Review of PICOF-10 outlook + WMO LRF-MME sea surface temperature outlook
- **Sea surface temperatures**: current & comparison to last 2 La Niña events
- **Marine heatwaves**: active in the western Pacific
- **Sub-surface temperatures**: deep “cool pool” in the central + eastern equatorial Pacific
- **Sea level**: regionally elevated; higher in September 2022 than 2020 & 2021
- **Coral bleaching**: watch to localised warning level in the west
- **Ocean currents**: anomalous easterly currents favouring La Niña
- **Events**: American Samoa south swell in mid-July

A review of April 2022 PICOF-10 predictions

Tenth Pacific Islands Climate Outlook Forum

November 2021 to April 2022 summary and May to October 2022 climate, ocean and tropical cyclone outlook | Issued: 28 April 2022

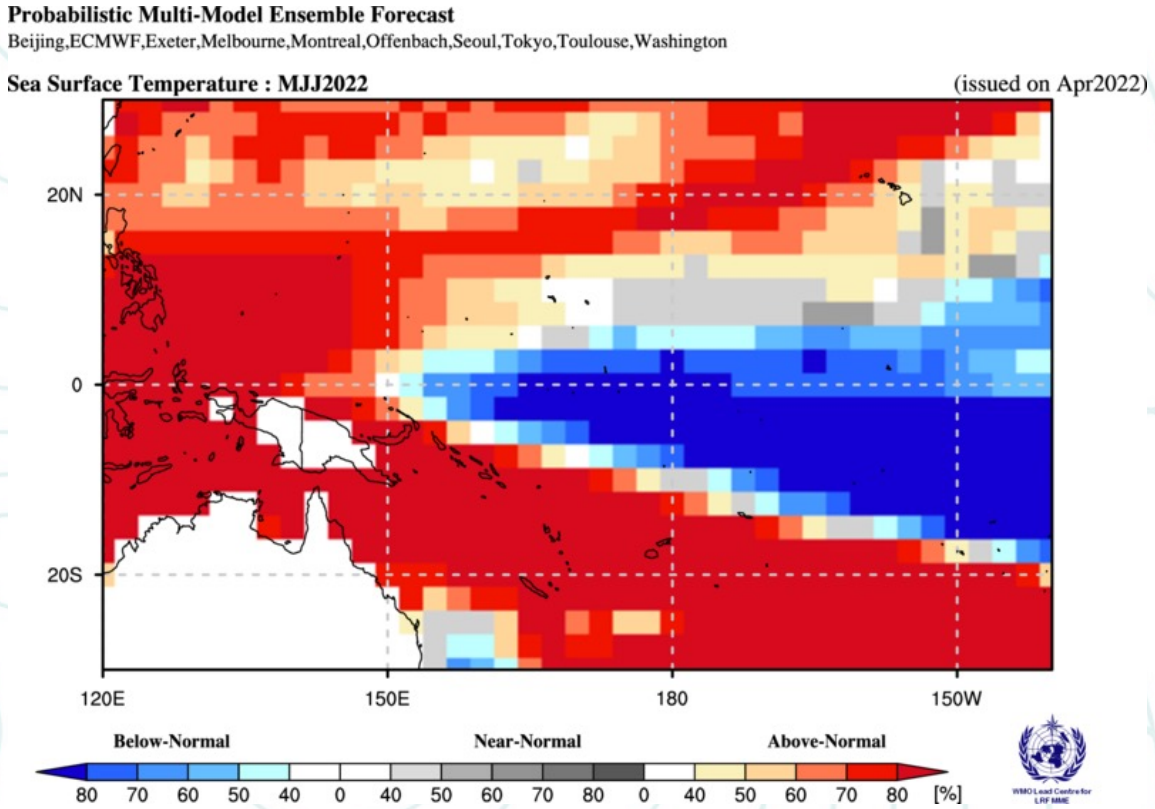
Outlook for May to October 2022

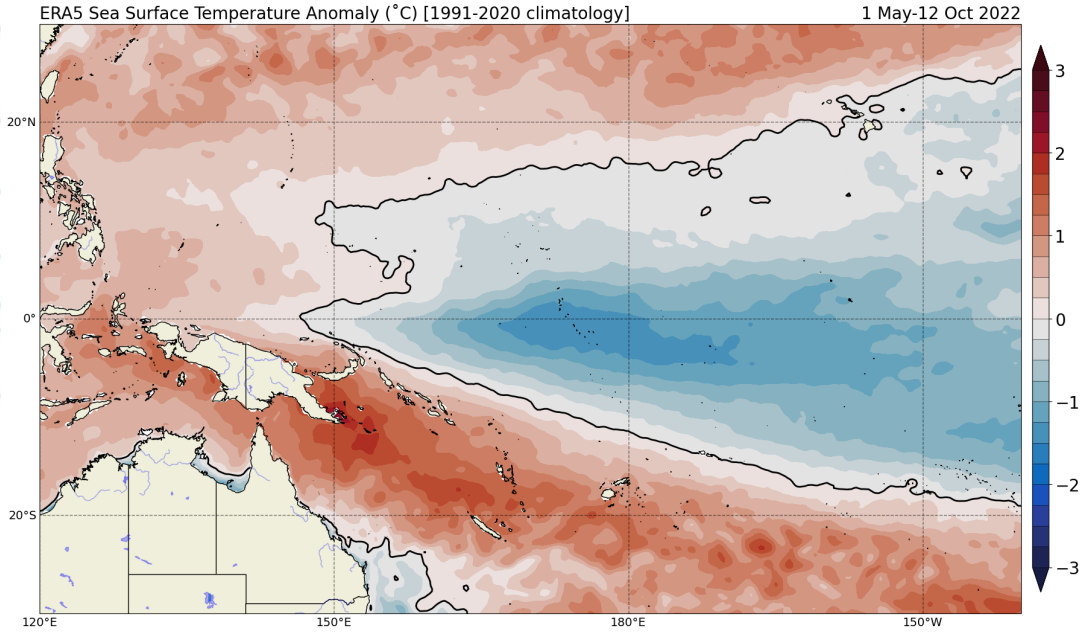
- Climate model outlooks favour ENSO-neutral conditions as the most likely outcome from May to October with a second most likely outcome the continuation of La Niña.
- The continuing influence of La Niña is evident in atmospheric and ocean seasonal forecasts especially for May to July.
- Drier than normal conditions are favoured for the equatorial Pacific. This area of drier than normal conditions extends southeast towards the subtropics of the southern hemisphere. Wetter than normal conditions are favoured for Marshall Islands in the North Pacific and for southern Papua New Guinea (PNG) southeast to the southern Cook Islands in the South Pacific.
- Cooler than normal conditions are predicted along the equator and the off-equatorial South Pacific near and east of the Date Line. Warmer than normal conditions are broadly favoured for region extending northeast and southeast towards the subtropics.
- Models favour the southern Pacific Ocean cooling and ocean heat stress dissipating by May 2022, Coral Bleaching alerts for Papua New Guinea (PNG) persist until July 2022.
- Sea surface temperature (SST) is favoured to below average for May to July across the central equatorial Pacific. Models favour SSTs returning to normal for these island groups around June-July. SSTs remain above average for most of the other PICTs over May-July. For a majority countries these warm conditions prevail but decrease in intensity through August-October.
- Sea level is favoured to be notably higher than normal (>10 cm) over May-July and August-October in the vicinity of PNG, Solomon Islands, northern Vanuatu, northern Fiji and southern Tuvalu.
- A preliminary cyclone outlook for the northwest Pacific is for near-average seasonal activity based on the ongoing, but weakening, La Niña conditions.

- Continued influence of La Niña was well predicted
- Slight easing of event during June-July was well predicted, but re-intensification during August-September was not
- Coral bleaching & sea level outlooks were generally good & consistent with La Niña-like conditions

SST outlook vs observations

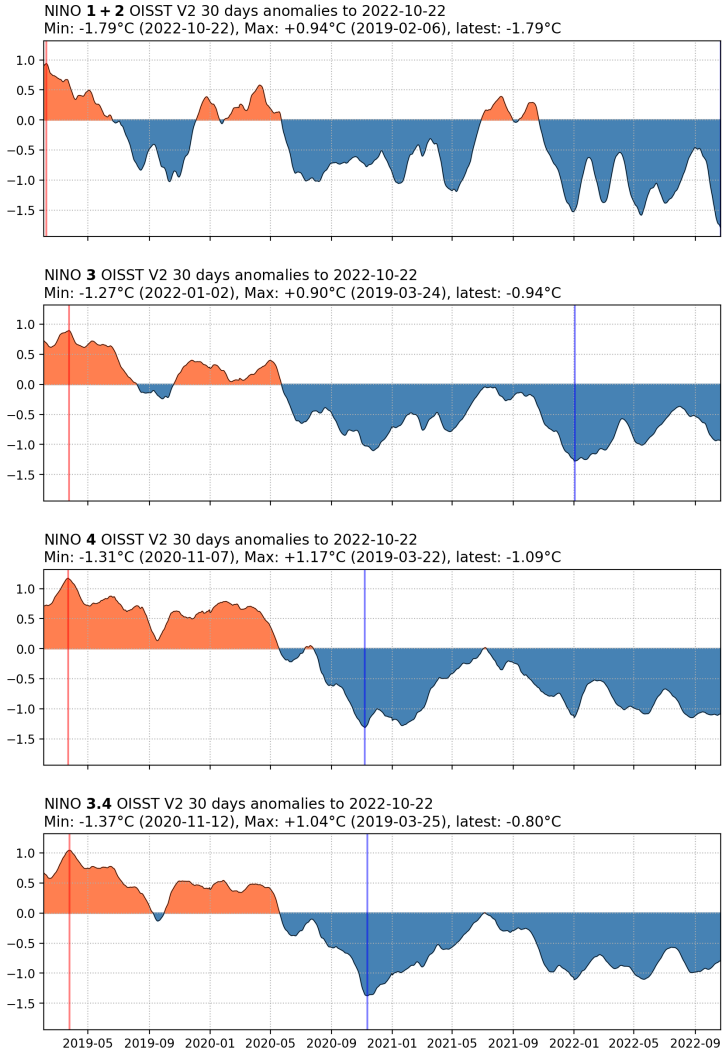
May-Jul forecast (left) vs May-Oct estimate (right)

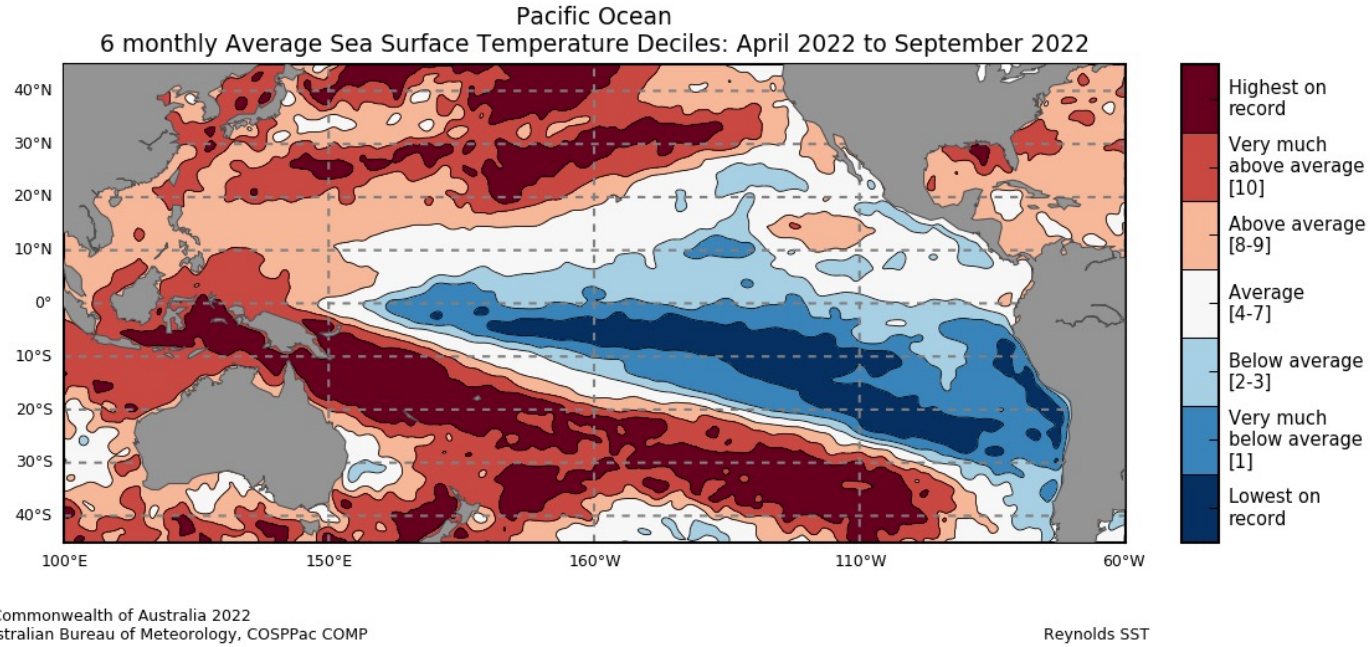




*SST forecast were generally **very good***

Sea surface temperatures: a healthy La Niña event



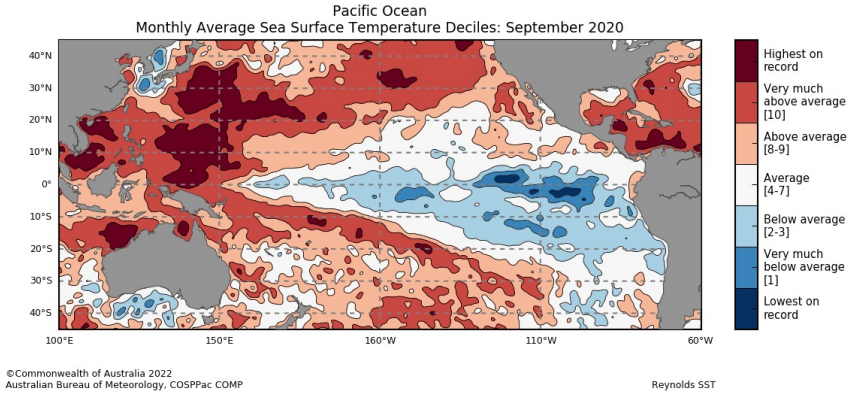


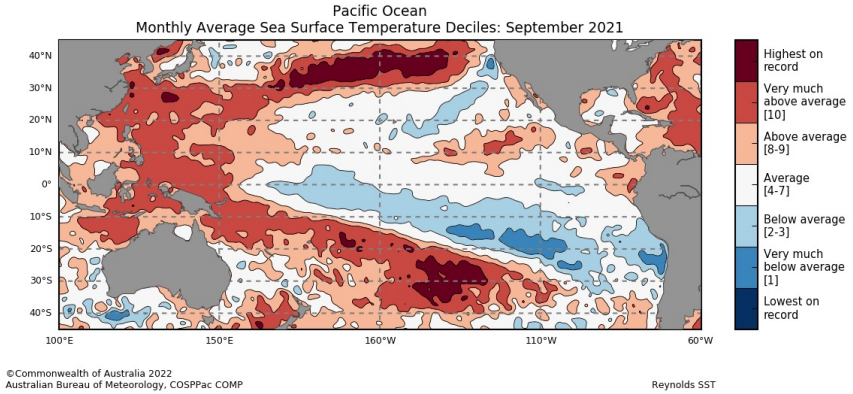
©Commonwealth of Australia 2022
Australian Bureau of Meteorology, COSPPac COMP

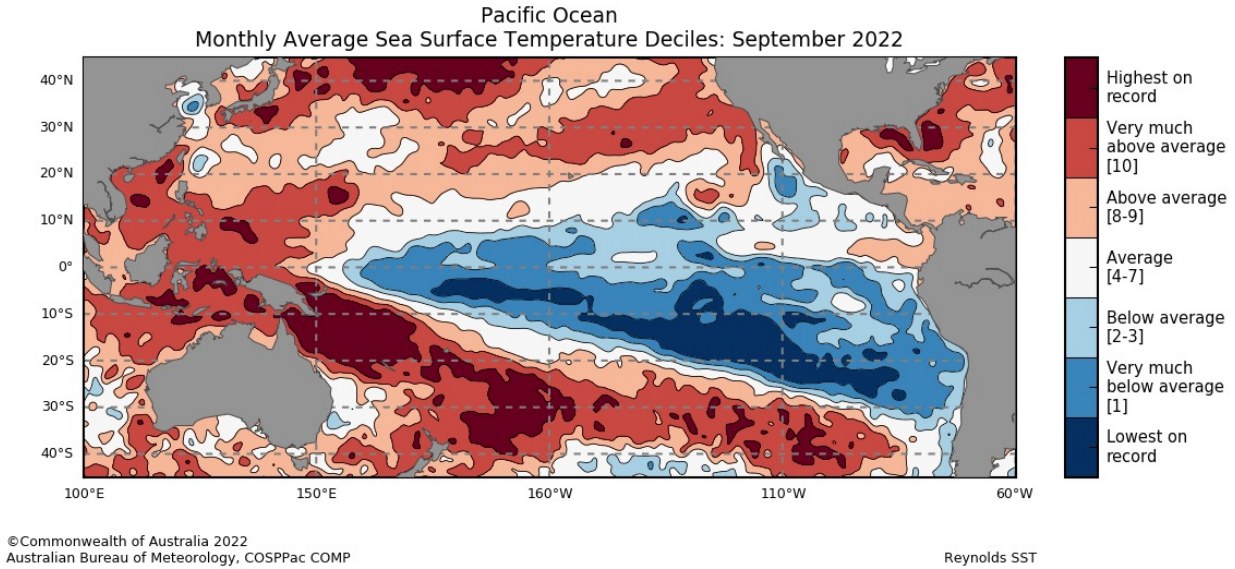
Reynolds SST

http://oceanportal.spc.int/portal/ocean.html

Sea surface temperatures: Sep 2020-2022



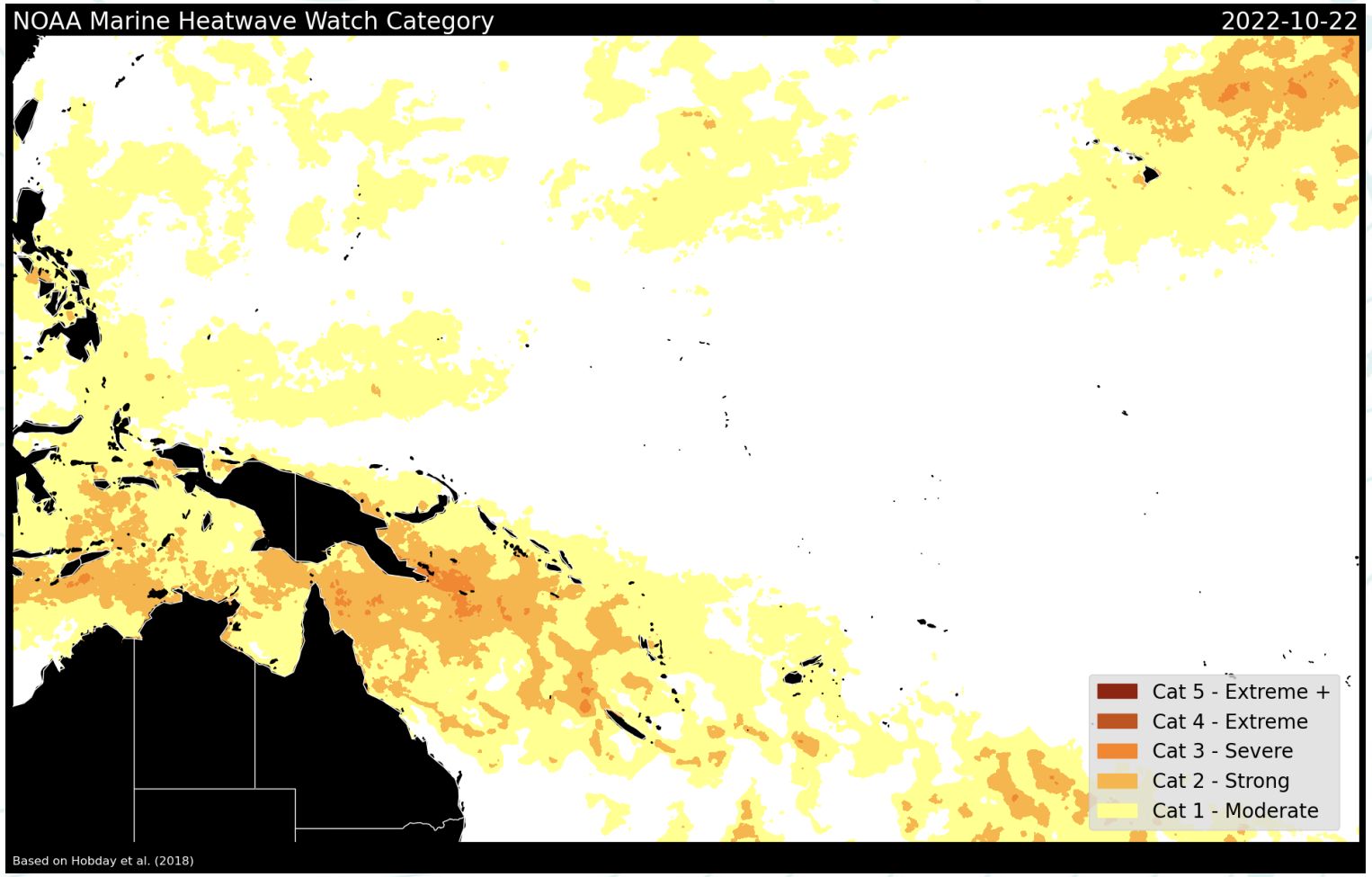




- La Niña's oceanic imprint is stronger in 2022 than 2021 & 2020

http://oceanportal.spc.int/portal/ocean.html

Marine heatwaves: active in the western Pacific



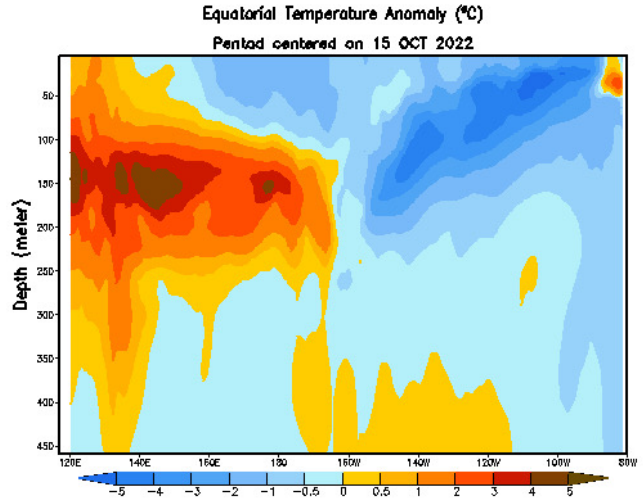
- Shows us where the sea surface temperature is above the 90th percentile for the time of year & for how long
- Can be associated with impacts such as coral bleaching, unusual fish behaviour
- Fuel for tropical cyclones

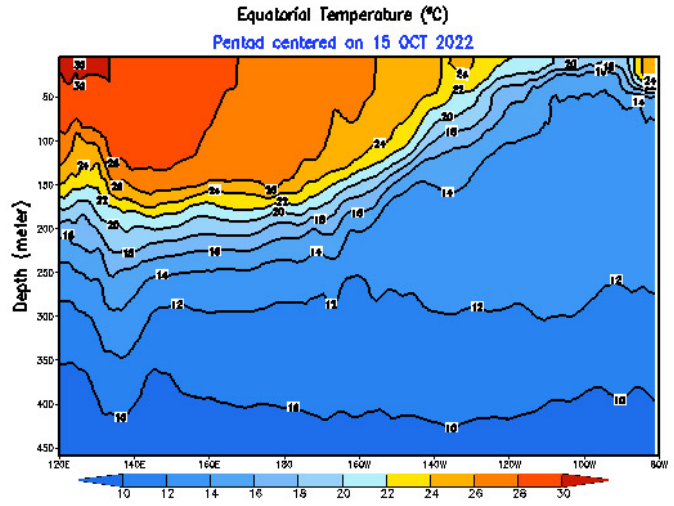
https://coralreefwatch.noaa.gov/product/marine_heatwave/

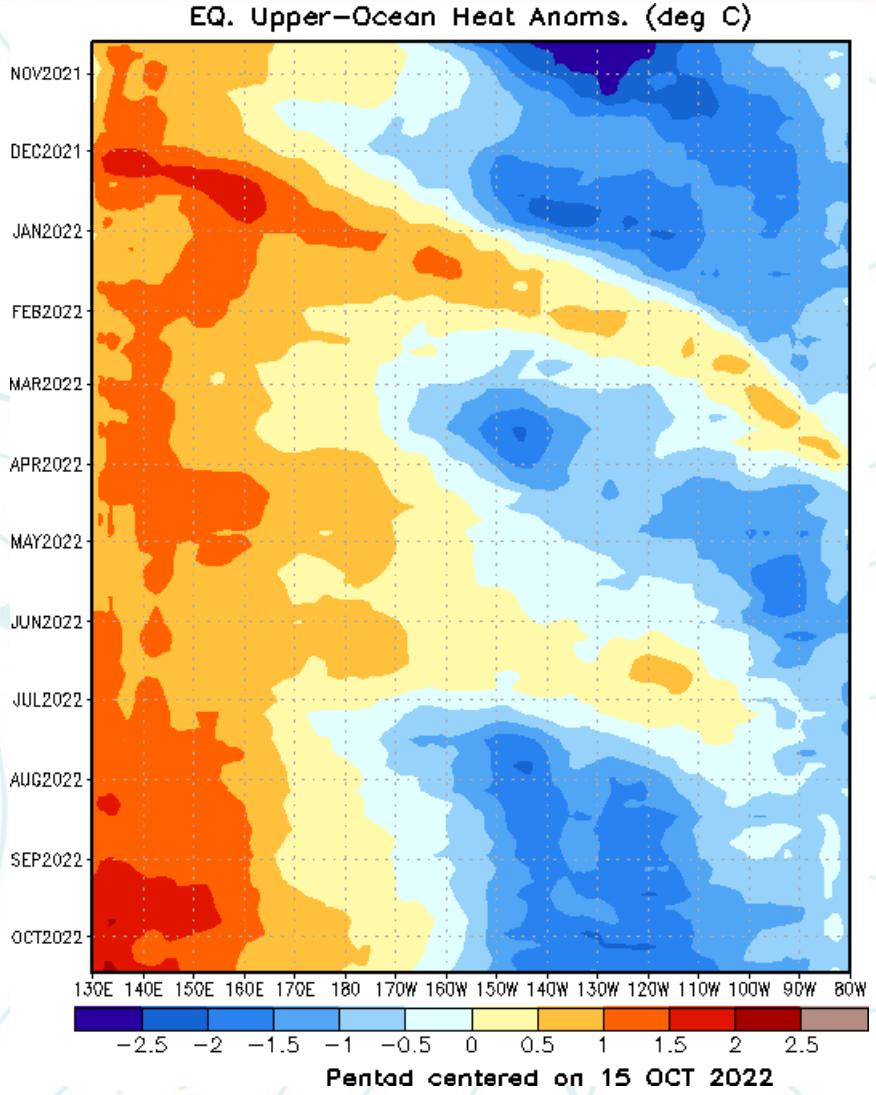
PACIFIC METEOROLOGICAL COUNCIL
SINCE 2011 Celebrating 10 years of service to the region

Sub-surface temperatures: deep “cool pool”

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_update/wkxzteq.shtml





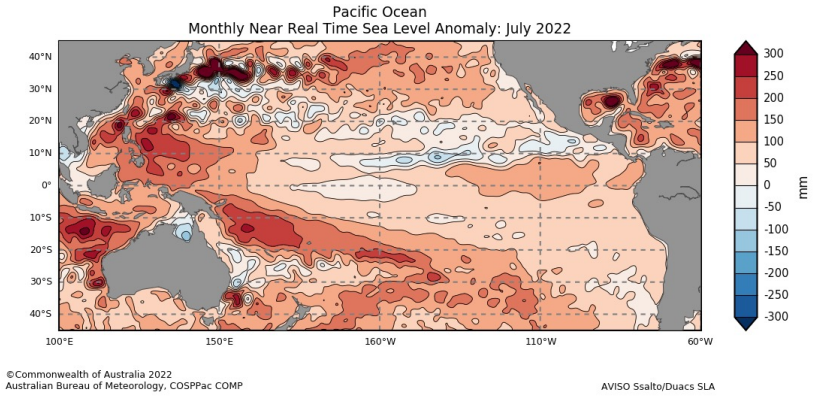


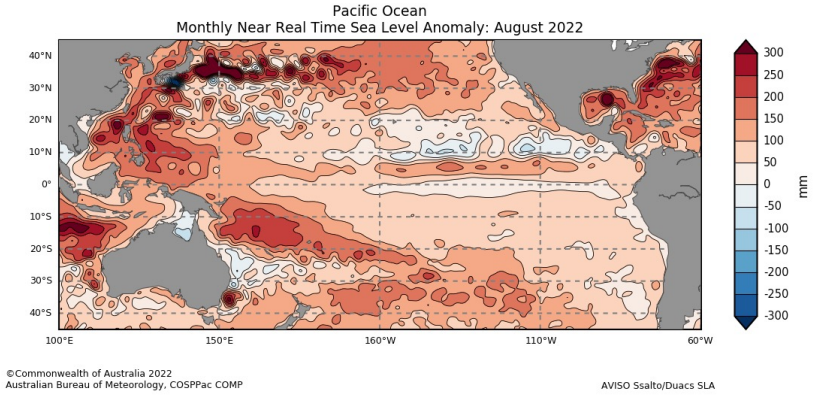
https://www.cpc.ncep.noaa.gov/products/intraseasonal/heat_tlon.shtml

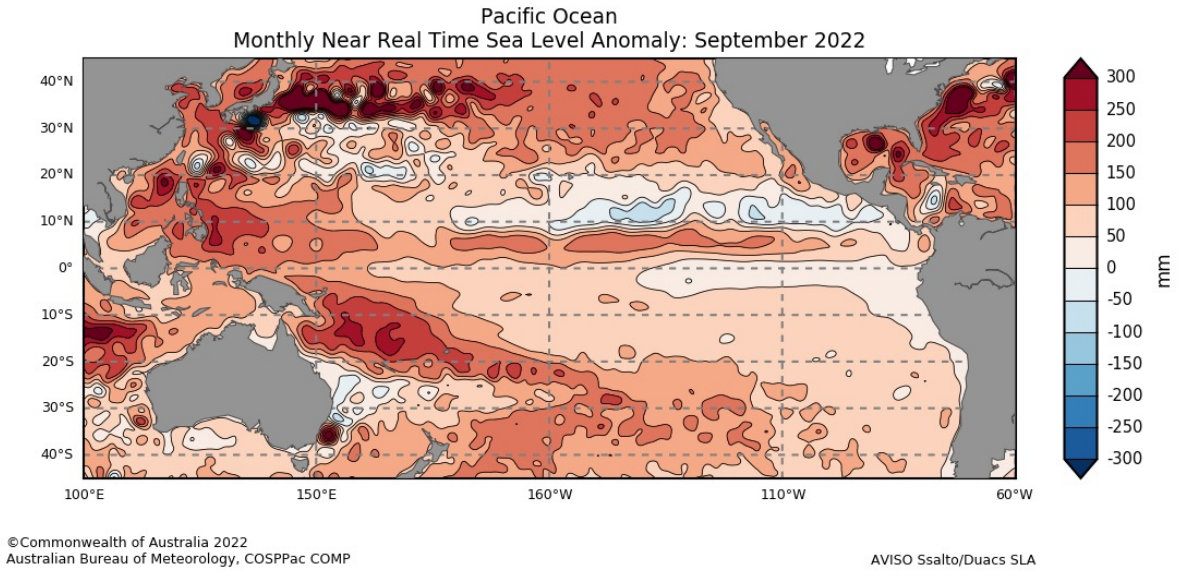
- Sub-surface conditions are cool at depth in the east, but quite warm in the west
- The thermocline (area where warm near-surface water meets cool, deeper water) in the eastern Pacific resides near the surface

WORLD METEOROLOGICAL ORGANIZATION
Australian Government Department of Foreign Affairs and Trade Bureau of Meteorology
CSIRO
NOAA
APCC
NIWA Taihoro Nukurangi
SPC Secretariat of the Pacific Community
SPREP Secretariat of the Pacific Regional Environment Programme

Sea level: elevated across most of the region, notably 10-30 cm north of 20 deg south

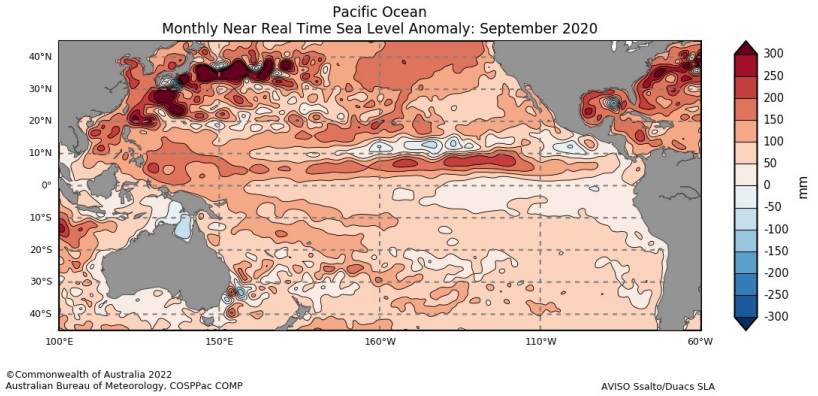


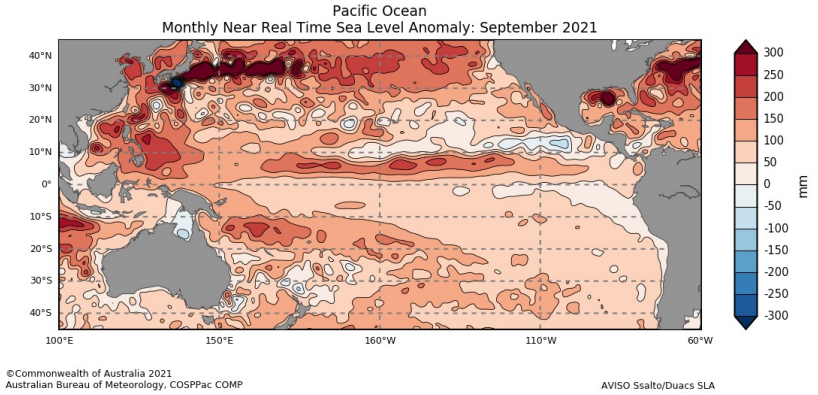


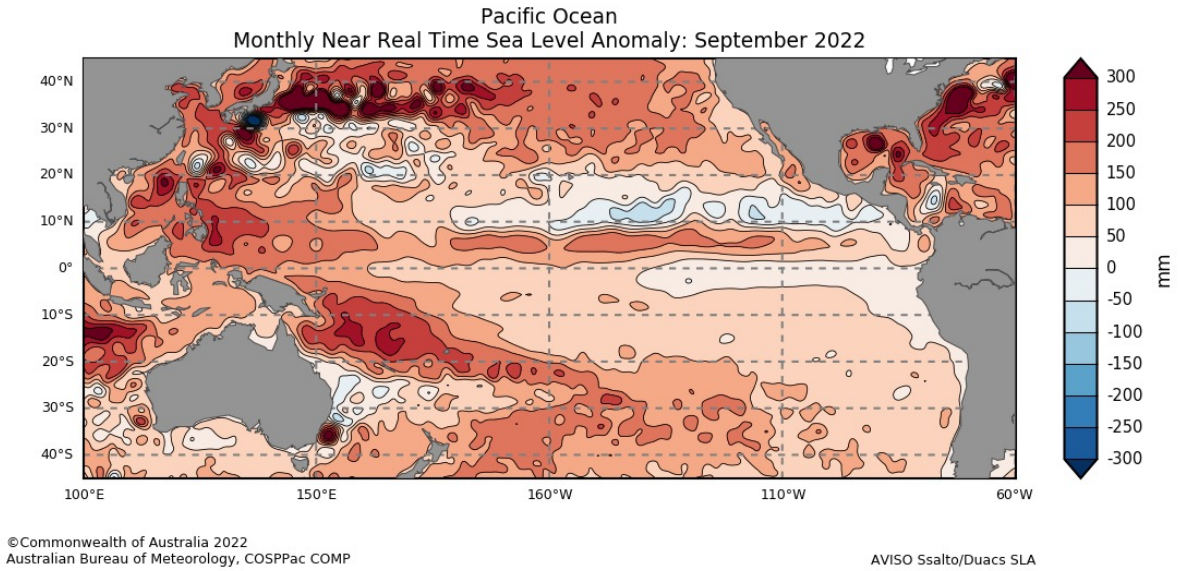


http://oceanportal.spc.int/portal/ocean.html

Sea level: generally higher than 2020 & 2021





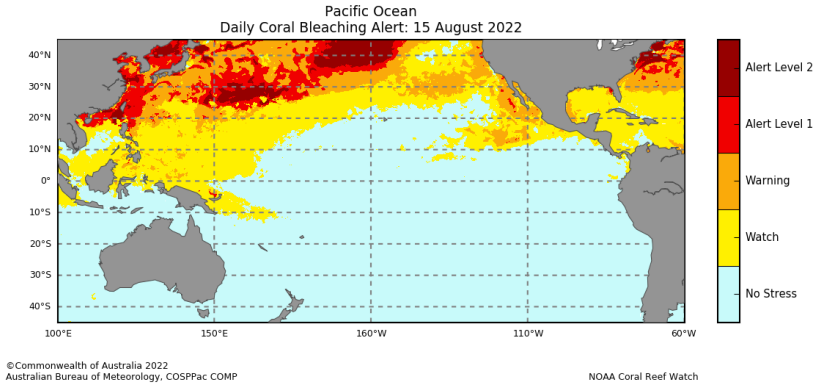


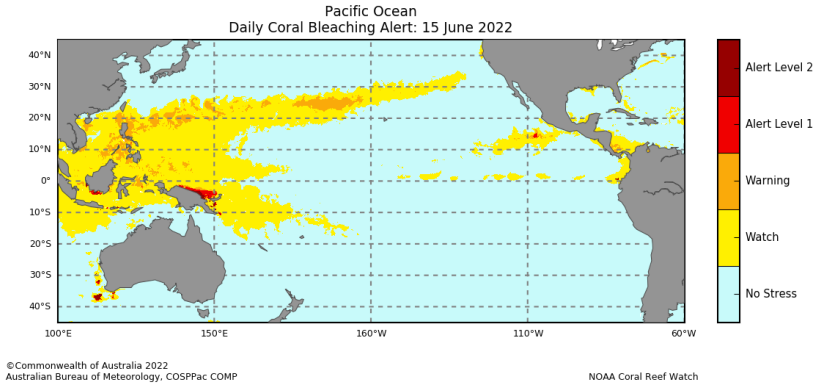
- Sea levels are somewhat higher across the region than this time in 2021 & 2020

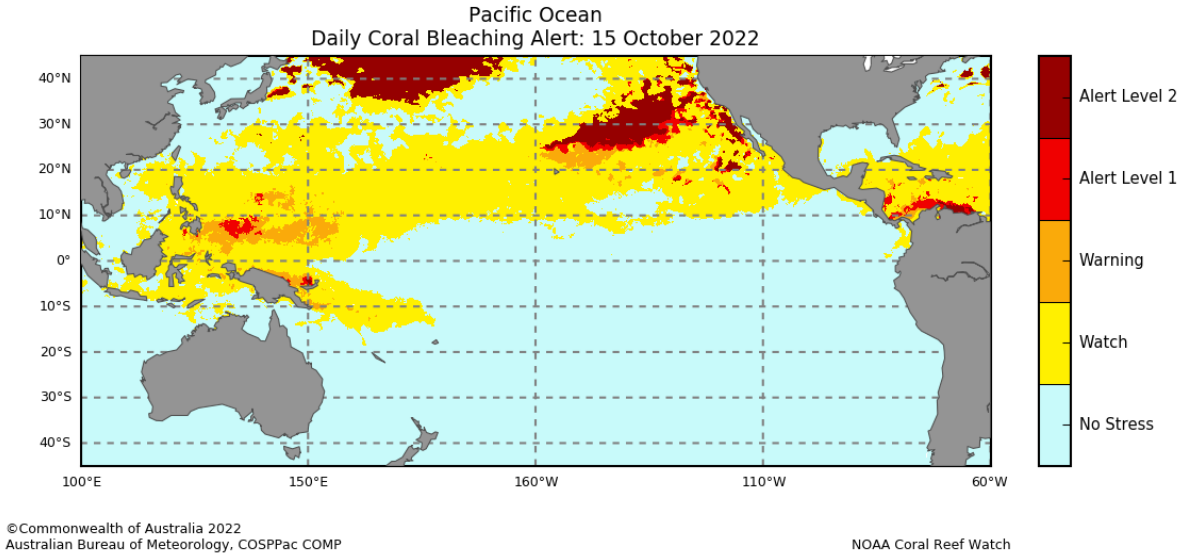
http://oceanportal.spc.int/portal/ocean.html

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

Coral bleaching: watch in the west



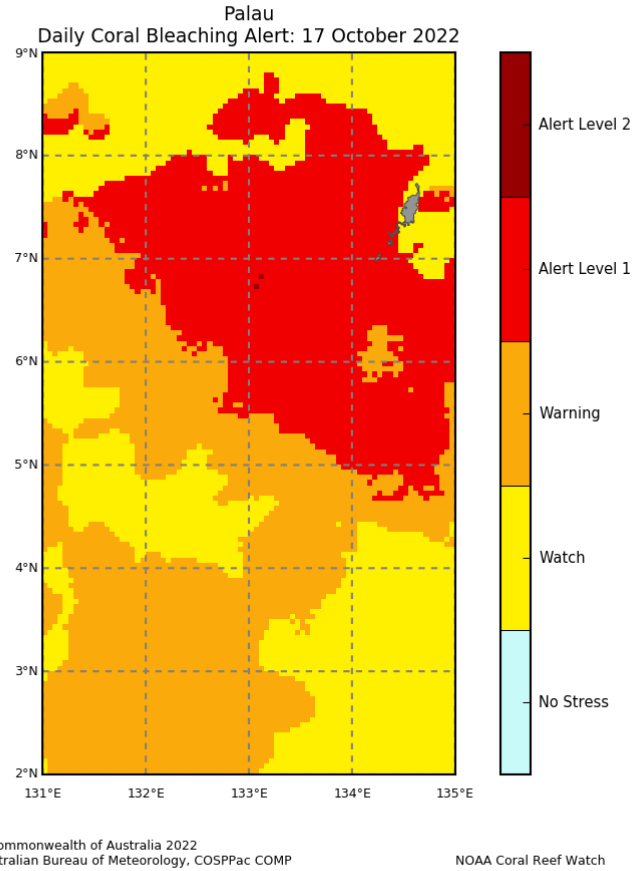


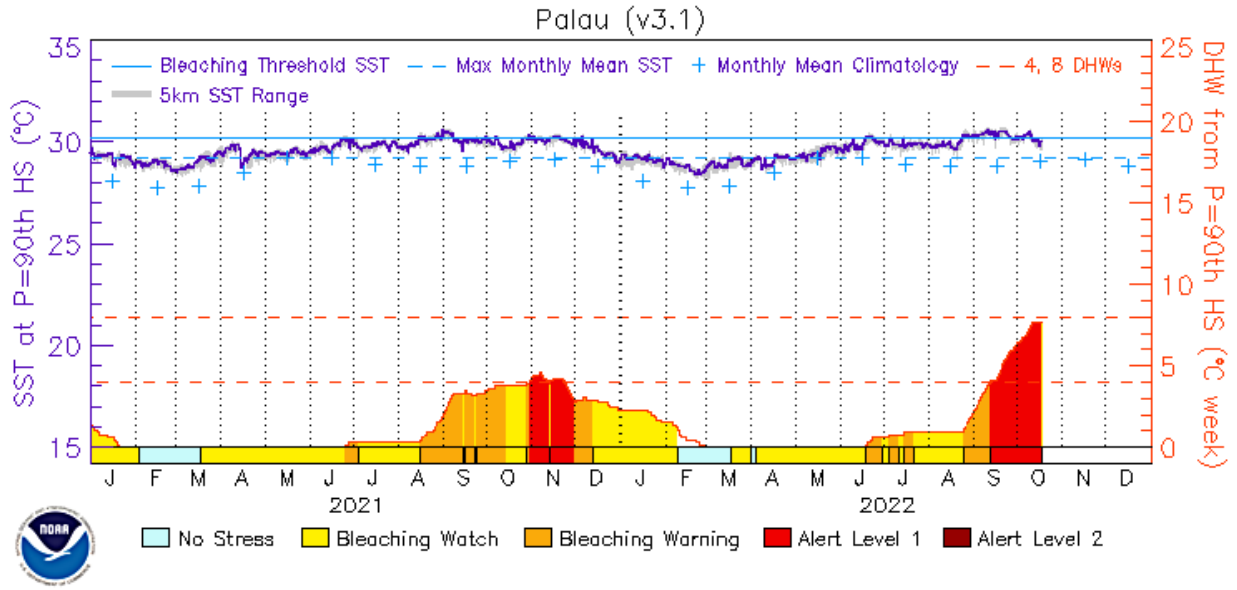


http://oceanportal.spc.int/portal/ocean.html

WORLD METEOROLOGICAL ORGANIZATION
Australian Government
Department of Foreign Affairs and Trade
Bureau of Meteorology
CSIRO
NOAA
APCC
NIWA Taihoro Nukurangi
SPC Secretariat of the Pacific Community
SPREP Secretariat of the Pacific Regional Environment Programme

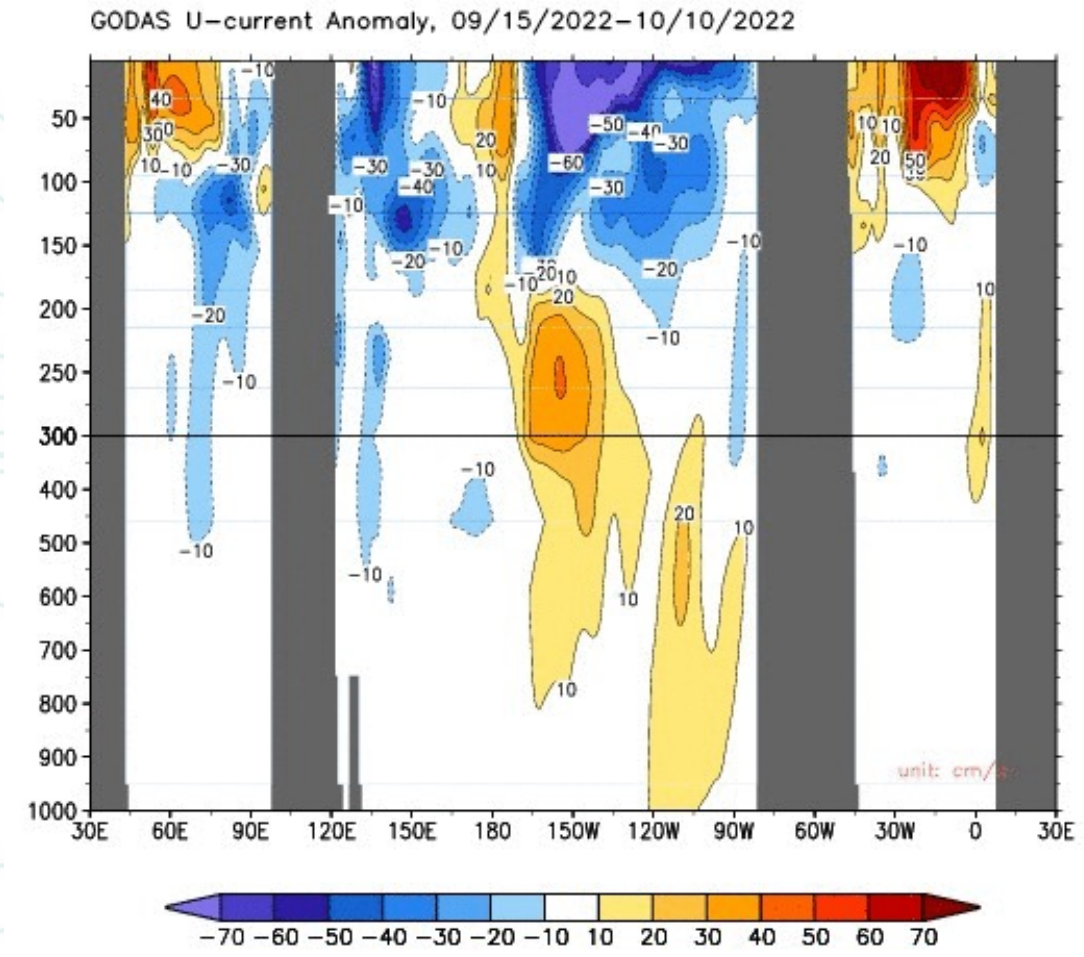
Event: bleaching in Palau

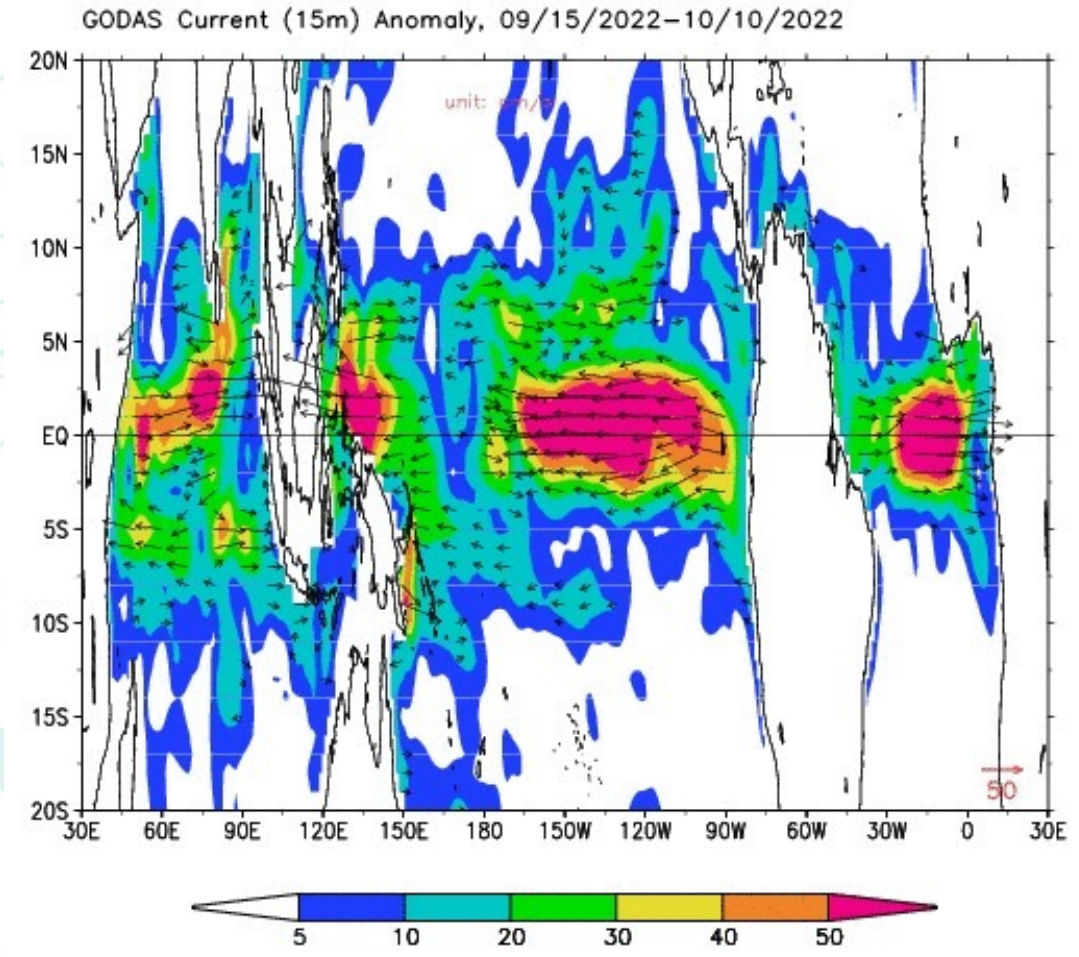




- Alert level 1 (significant coral bleaching) at present; approaching alert level 2 (widespread bleaching)
- Maria Ngemaes (via Grant Smith) reports coral bleaching

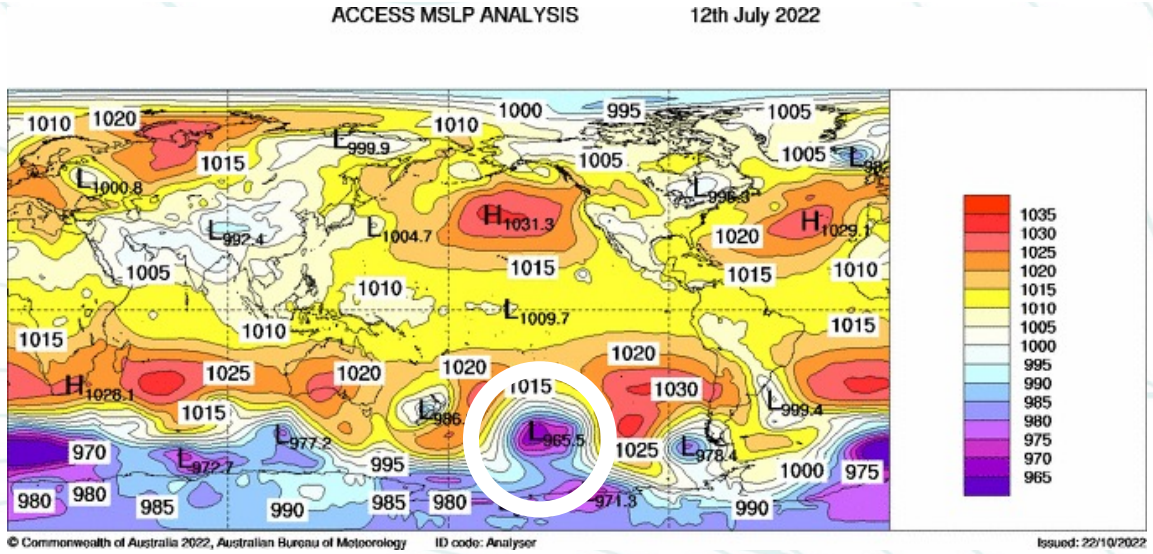
Ocean currents: anomalous easterly currents favouring La Niña





https://www.cpc.ncep.noaa.gov/products/GODAS/

Event: South Pacific swell, July 2022



Cook Islands

- Large low-pressure system generated strong swell
- Occurred a few days before the highest spring tide of the month
- Inundation was heavily reported at Cook Islands, but also Samoa, American Samoa, Niue, and waves even reached as far north as Hawaii.
- In American Samoa, the historic south swell in mid-July caused considerable damage along the coastlines of Tutuila, Aunu'u, and the Manu'a Islands, with the Governor Mauga declaring a state of emergency in response.
- Airport operations were disrupted with the Pago Pago Airport temporarily closed due to surf reaching the runway as well as on Ofu Island where debris covered portions of the runway.