

Pacific Islands - Ocean and Climate Outlook Forum (OCOF) No. 179

Country: Tonga

Part 1: Recent climate

TABLE 1: Monthly Rainfall

Station (include data period)	May-2022	Jun-2022	Jul-2022				
			Total (mm)	33%tile	67%tile	Median	Rank
	Total (mm)	Total (mm)	Rainfall (mm)				
Northern Division							
Niuafo'ou (1971-2022)	102.7	74.5	83.0	59.0	143.6	111.0	20/50
Niuaatoputapu (1947-2022)	120.0	62.5	92.0	60.3	131.6	92.5	37/76
Central Division							
Vava'u (1947-2022)	79.1	59.9	74.7	64.3	121.1	82.3	33/76
Ha'apai (1947-2022)	72.8	69.2	21.0	55.7	100.5	70.2	7/76
Southern Division							
Fua'amotu (1979-2022)	22.3	32.2	22.5	71.2	144.3	108.8	3/43
Nuku'alofa (1944-2022)	29.0	36.5	20.5	64.0	117.3	83.0	4/78

TABLE 2: Three-month Total Rainfall for May to July 2022

Station	Three-month Total		33%tile	67%tile	Median	Rank
	Rainfall (mm)					
Northern Division						
Niuafo'ou (1971-2022)	260.2	Below normal	367.8	478.1	432.0	10/48
Niuaatoputapu (1947-2022)	274.5	Below normal	322.3	423.0	366.6	15/72
Central Division						
Vava'u (1947-2022)	213.7	Below normal	305.0	409.4	370.5	10/76
Ha'apai (1947-2022)	163.0	Below normal	216.3	320.5	248.0	11/75
Southern Division						
Fua'amotu (1979-2022)	77.0	Below normal	271.3	441.7	368.6	1/43
Nuku'alofa (1944-2022)	86.0	Below normal	244.0	343.2	299.0	1/78

NB: The X LEPS % score has been categorised as follows:

Very Low: $X < 0.0$

Low: $0 \leq X < 5$

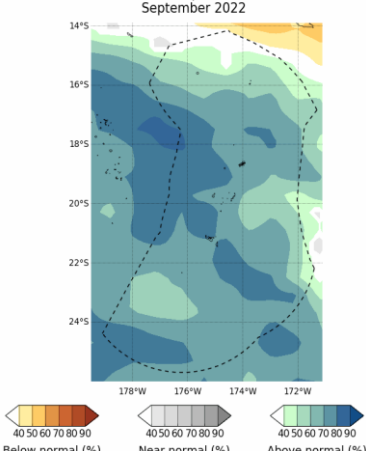
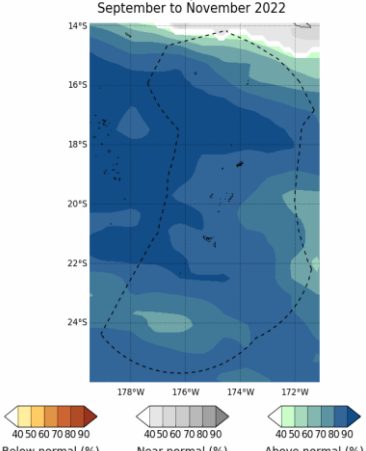
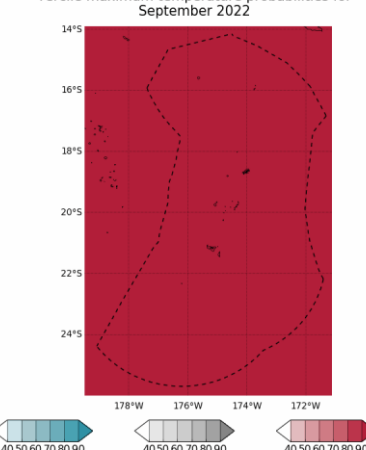
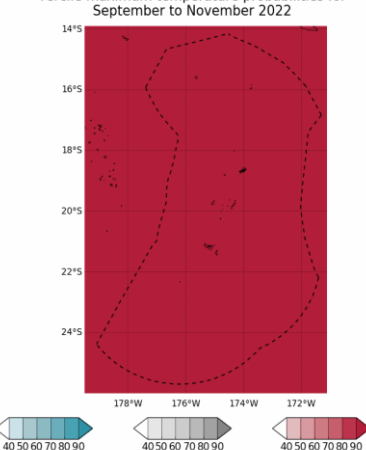
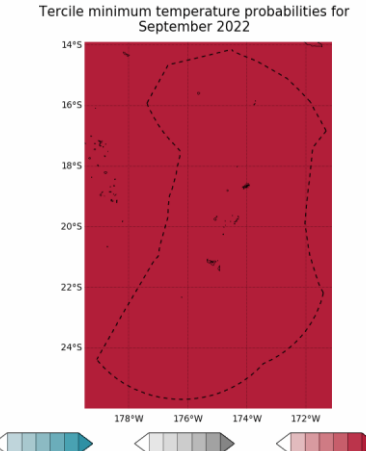
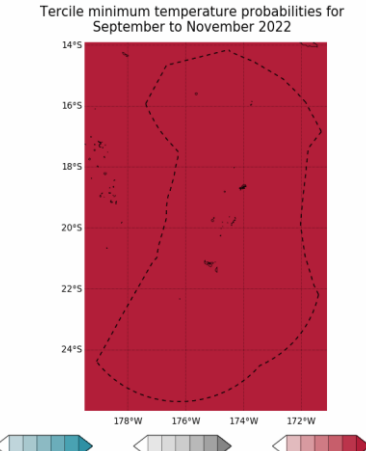
Moderate $5 \leq X < 10$

Good: $10 \leq X < 15$

High: $15 \leq X < 25$

Very High: $25 \leq X < 35$ Exceptional: $X \geq 35$

Part 1i. Monthly and Seasonal Outlooks for September and September to November 2022

Monthly: September	Seasonal: September to November
Rainfall (Image 1)	Rainfall (Image 2)
<p>Tercile rainfall probabilities for September 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Australian Maritime Authority (2019), Maritime Boundary Database: Maritime Boundaries and Exclusive Economic Zones (2009), version 11. Available online at http://www.maritime.gov.au</p>	<p>Tercile rainfall probabilities for September to November 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Australian Maritime Authority (2019), Maritime Boundary Database: Maritime Boundaries and Exclusive Economic Zones (2009), version 11. Available online at http://www.maritime.gov.au</p>
Monthly Maximum temperature (Image 3):	Seasonal maximum temperature (Image 4):
<p>Tercile maximum temperature probabilities for September 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Australian Maritime Authority (2019), Maritime Boundary Database: Maritime Boundaries and Exclusive Economic Zones (2009), version 11. Available online at http://www.maritime.gov.au</p>	<p>Tercile maximum temperature probabilities for September to November 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Australian Maritime Authority (2019), Maritime Boundary Database: Maritime Boundaries and Exclusive Economic Zones (2009), version 11. Available online at http://www.maritime.gov.au</p>
Monthly minimum temperature (Image 5):	Seasonal minimum temperature (Image 6):
<p>Tercile minimum temperature probabilities for September 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Australian Maritime Authority (2019), Maritime Boundary Database: Maritime Boundaries and Exclusive Economic Zones (2009), version 11. Available online at http://www.maritime.gov.au</p>	<p>Tercile minimum temperature probabilities for September to November 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Australian Maritime Authority (2019), Maritime Boundary Database: Maritime Boundaries and Exclusive Economic Zones (2009), version 11. Available online at http://www.maritime.gov.au</p>

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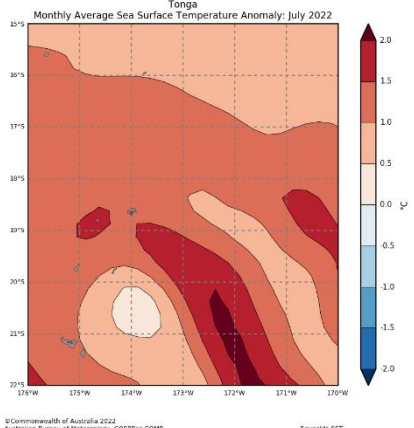
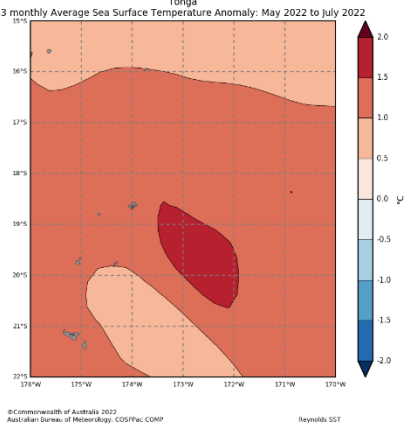
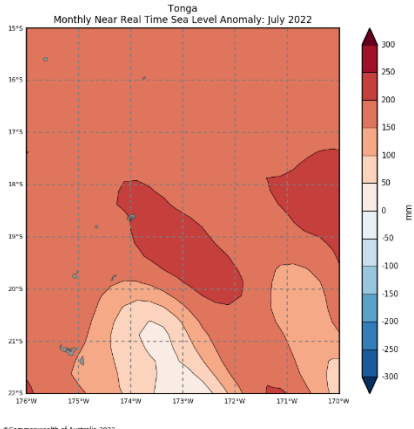
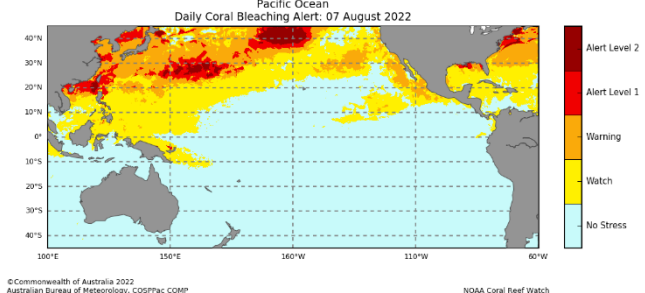
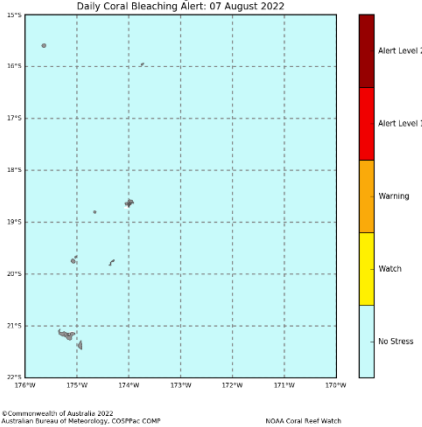
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Part 2: Recent Ocean Observation

Monthly: July 2022

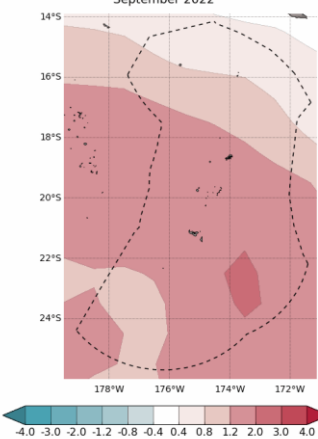
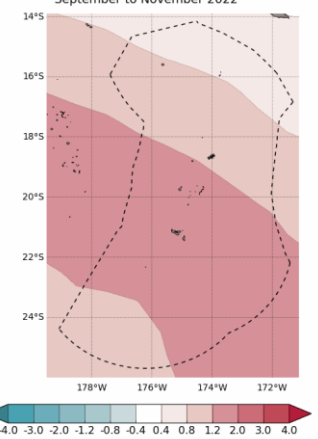
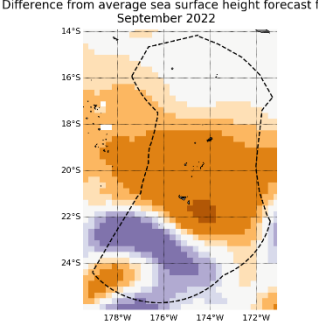
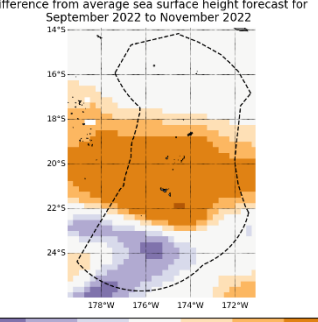
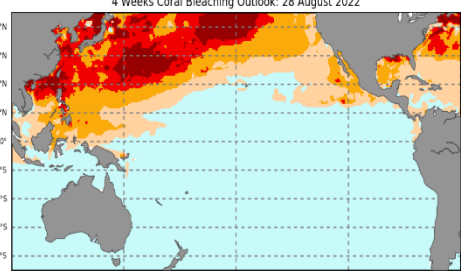
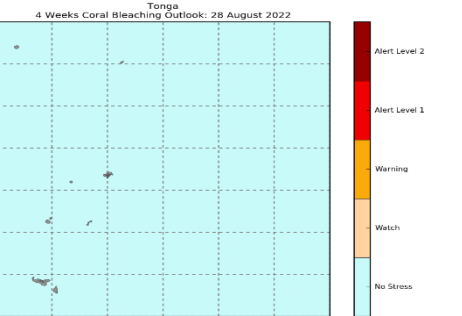
Monthly: July	Last three months: May to July 2022:
Sea Surface Temperature (Image 1): <div></div>	Sea Surface Temperature (Image 4): <div></div>
Sea level (Image 2): <div></div>	
Daily coral bleaching alert (Image 3): <div></div>	<div></div>

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Part 2i. Monthly and Seasonal Outlooks for September and September to November 2022

Monthly: September	Seasonal: September to November
Monthly sea surface temperature (Image 5):	Seasonal sea surface temperature (Image 6):
<p>Difference from average sea surface temperature forecast for September 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Natural Earth Institute (2015). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (EEXZs), version 1.1. Available online at http://www.maritimesystems.org/</p> <p>Model run: 13/08/2022 Issued: 15/08/2022</p>	<p>Difference from average sea surface temperature forecast for September to November 2022</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Natural Earth Institute (2015). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (EEXZs), version 1.1. Available online at http://www.maritimesystems.org/</p> <p>Model run: 13/08/2022 Issued: 15/08/2022</p>
Monthly sea level (Image 7):	Seasonal sea level (Image 8):
<p>Difference from average sea surface height forecast for September 2022</p>  <p>© Commonwealth of Australia 2022 Bureau of Meteorology</p> <p>Model: ACCESS-S2 Base Period: 1981-2018</p> <p>Model Run: 28/07/2022 Issued: 03/08/2022</p>	<p>Difference from average sea surface height forecast for September 2022 to November 2022</p>  <p>© Commonwealth of Australia 2022 Bureau of Meteorology</p> <p>Model: ACCESS-S2 Base Period: 1981-2018</p> <p>Model Run: 28/07/2022 Issued: 03/08/2022</p>
4-week Coral Bleaching (Image 9):	
<p>Pacific Ocean 4 Weeks Coral Bleaching Outlook: 28 August 2022</p>  <p>© Commonwealth of Australia 2022 Australian Bureau of Meteorology, COSPac CORP</p> <p>NOAA Coral Reef Watch</p>	<p>Tonga 4 Weeks Coral Bleaching Outlook: 28 August 2022</p>  <p>© Commonwealth of Australia 2022 Australian Bureau of Meteorology, COSPac CORP</p> <p>NOAA Coral Reef Watch</p>

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Summary Statement

Monthly and last three months: July 2022/May to July 2022 statement (Highly significant changes)

For July, below normal rainfall was recorded in Ha'apai, Fua'amotu and Nuku'alofa, while at Vava'u and the Northern Division rainfall was near-normal. Ha'apai recorded its seventh, Fua'amotu its third and Nuku'alofa its fourth lowest July rainfall on record respectively.

For May to July, below normal rainfall was recorded for the Tonga. Fua'amotu and Nuku'alofa recorded their lowest May to July rainfall on record.

Part 1i. Monthly and Seasonal Outlooks for September and September to November 2022

Monthly /Seasonal rainfall and temperature Outlook statements (Highly significant changes)

The monthly September outlook and the seasonal September to November outlook for Tonga show rainfall is likely to be above normal across the whole country.

Tonga's temperature outlooks show maximum and minimum temperatures are very likely to be above normal for both September and September to November.

Part 2: Recent Ocean summary statement

Monthly and last three months: July/May to July 2022 (Highly significant changes)

For July, Tonga experienced SSTs ranging from 0.5 to 2.0 degrees Celsius above average. The most significant anomalies of +1.5 to +2.0 °C were located over the Vava'u Group and areas to the east and southeast. For May to July, SSTs were also above average, with differences above normal of 0.5 to 1.5 °C for majority of Tonga.

Tonga's July sea levels were mostly 100 to 200 mm above average, with a significant region of +200 to +250 mm anomalies located around Vava'u and areas to the east. Sea level was close to normal in a small region in the south of Tonga's EEZ.

Coral bleaching alert for Tonga reveals no thermal stress.

Part 2i. Monthly and Seasonal Outlooks for September and September to November 2022

The monthly and seasonal SST outlooks for Tonga forecast SSTs of 0.8-3.0 degrees Celsius above average for September and September to November.

The monthly and seasonal sea surface height outlooks forecast near-normal sea surface heights in northern Tonga, and above normal sea surface heights of 100mm to 200mm over Tongatapu, Ha'apai and Vava'u. In addition, the southern EEZ of Tonga is forecast to have sea levels ranging from 60mm to 200mm below normal.

Coral bleaching outlook for Tonga reveals no thermal stress.

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TABLE 3: Stakeholder Engagement- Evaluations of how effective NMS engage with stakeholders

Product	Date: July 2022	Stakeholder	Total Number of Participants	Number of male	Number of female
Climate Bulletin	3 July	Government ministries, NGOs,Media. Private sectors	155	118	37
EAR Watch					
Monthly Climate Briefing					
Ocean Outlook	3 July	Government ministries, NGOs,Media. Private sectors	155	118	37
Climate data request					
Total			310	236	74

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