

# Pacific Islands - Ocean and Climate Outlook Forum (OCOF) No. 178

Country: Tonga

## Part 1: Recent climate

**TABLE 1: Monthly Rainfall**

Station (include data period)	Apr-2022	May-2022	Jun-2022				
			Total (mm)	33%tile	67%tile	Median	Rank
	Total (mm)	Total (mm)	Rainfall (mm)				
Northern Division							
Niuafo'ou (1971-2022)	142.4	102.7	74.5	72.3	152.7	112.0	18/49
Niuaatoputapu (1947-2022)	69.0	120.0	62.5	68.8	168.3	92.5	24/76
Central Division							
Vava'u (1947-2022)	346.9	79.1	59.9	56.7	133.0	90.0	28/76
Ha'apai (1947-2022)	206.4	72.8	69.2	44.7	108.7	74.5	36/76
Southern Division							
Fua'amotu (1979-2022)	276.1	22.3	32.2	71.8	138.9	103.3	5/43
Nuku'alofa (1944-2022)	300.5	29.0	36.5	58.0	115.5	84.0	17/78

**TABLE 2: Three-month Total Rainfall for April to June 2022**

Station	Three-month Total		33%tile	67%tile	Median	Rank
	Rainfall (mm)					
Northern Division						
Niuafo'ou (1971-2022)	319.6	Below normal	497.0	650.0	586.0	5/48
Niuaatoputapu (1947-2022)	251.5	Below normal	435.3	613.0	535.0	5/69
Central Division						
Vava'u (1947-2022)	485.9	Normal	411.7	585.5	493.5	37/76
Ha'apai (1947-2022)	348.4	Normal	294.5	435.5	356.0	30/75
Southern Division						
Fua'amotu (1979-2022)	330.6	Normal	322.7	517.7	455.2	18/43
Nuku'alofa (1944-2022)	366.0	Normal	291.5	440.0	362.0	41/77

**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 August and August to October 2022

Monthly: August	Seasonal: August to October
Rainfall (Image 1)	Rainfall (Image 2)
<p>Tercile rainfall probabilities for August 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Flinders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2004N), version 1.1. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>	<p>Tercile rainfall probabilities for August to October 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Flinders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2004N), version 1.1. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>
Monthly Maximum temperature (Image 3):	Seasonal maximum temperature (Image 4):
<p>Tercile maximum temperature probabilities for August 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Flinders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2004N), version 1.1. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>	<p>Tercile maximum temperature probabilities for August to October 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Flinders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2004N), version 1.1. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>
Monthly minimum temperature (Image 5):	Seasonal minimum temperature (Image 6):
<p>Tercile minimum temperature probabilities for August 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Flinders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2004N), version 1.1. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>	<p>Tercile minimum temperature probabilities for August to October 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Flinders Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2004N), version 1.1. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>

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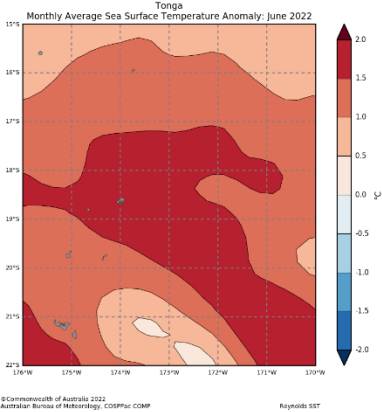
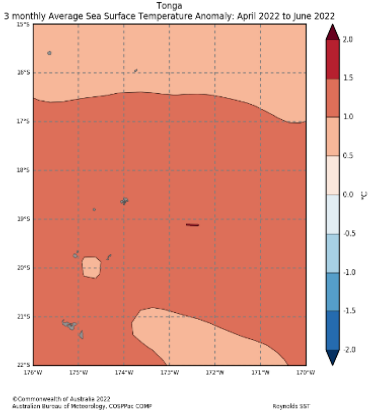
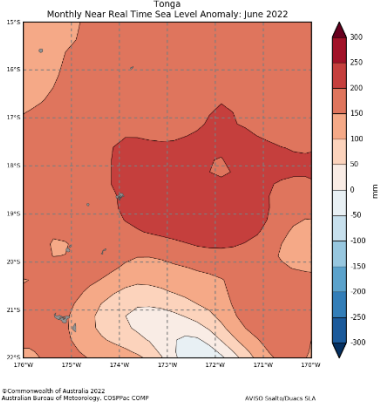
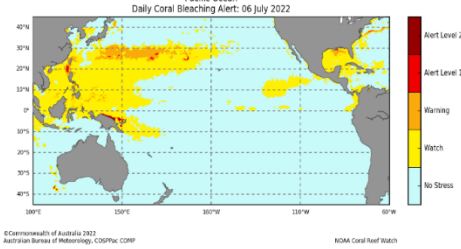
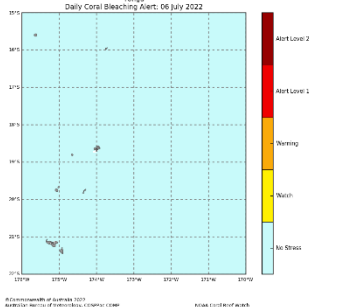
Good:  $10 \leq X < 15$

High:  $15 \leq X < 25$

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Part 2: Recent Ocean observations

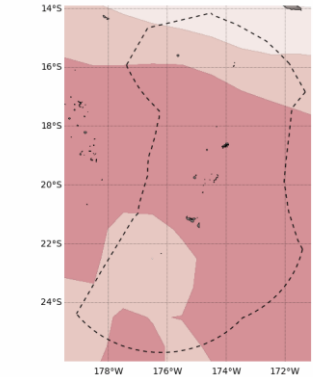
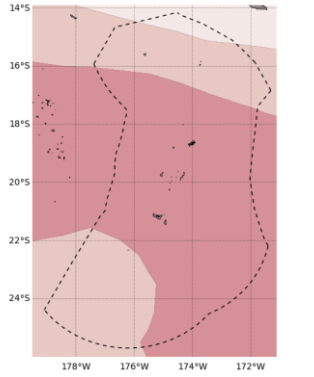
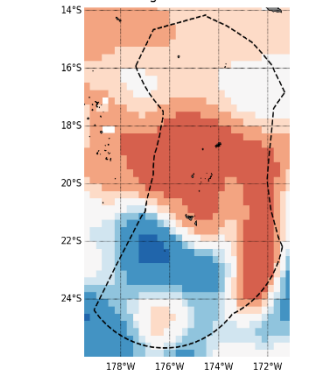
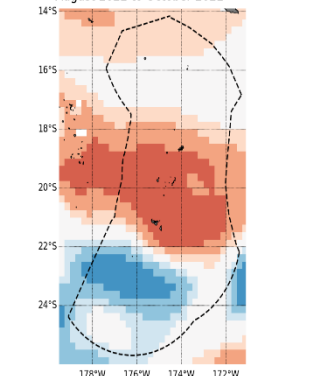
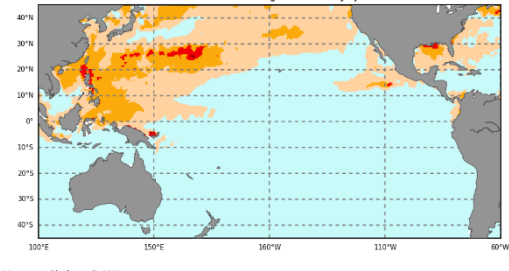
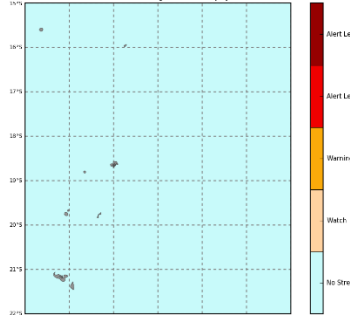
Monthly: June 2022

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

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## Part 2i. Monthly and Seasonal Outlooks for August and August to October 2022

Monthly: August	Seasonal: August to October
Monthly sea surface temperature (Image 5):	Seasonal sea surface temperature (Image 6):
<p>Difference from average sea surface temperature forecast for August 2022</p>  <p>Difference from average (°C)</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from IHO Hydrographic Database (2010), Maritime Boundaries, Maritime Boundaries and Exclusive Economic Zones (2006), version 11. Available online at <a href="http://www.marinegovernance.org/">http://www.marinegovernance.org/</a></p> <p>Model run: 16/07/2022 Issued: 16/07/2022</p>	<p>Difference from average sea surface temperature forecast for August to October 2022</p>  <p>Difference from average (°C)</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from IHO Hydrographic Database (2010), Maritime Boundaries, Maritime Boundaries and Exclusive Economic Zones (2006), version 11. Available online at <a href="http://www.marinegovernance.org/">http://www.marinegovernance.org/</a></p> <p>Model run: 16/07/2022 Issued: 16/07/2022</p>
Monthly sea level (Image 7):	Seasonal sea level (Image 8):
<p>Difference from average sea surface height forecast for August 2022</p>  <p>Difference from average (mm)</p> <p>© Commonwealth of Australia 2022 Bureau of Meteorology</p> <p>Model: ACCESS-S2 Base Period: 1981-2018</p> <p>Model Run: 28/06/2022 Issued: 12/07/2022</p>	<p>Difference from average sea surface height forecast for August 2022 to October 2022</p>  <p>Difference from average (mm)</p> <p>© Commonwealth of Australia 2022 Bureau of Meteorology</p> <p>Model: ACCESS-S2 Base Period: 1981-2018</p> <p>Model Run: 28/06/2022 Issued: 12/07/2022</p>
4-week Coral Bleaching (Image 9):	
<p>Pacific Ocean 4 Weeks Coral Bleaching Outlook: 31 July 2022</p>  <p>Alert Level 2 Alert Level 1 Warning Watch No Stress</p> <p>© Commonwealth of Australia 2022 Australian Bureau of Meteorology, COSPPac COMP</p> <p>NOAA Coral Reef Watch</p>	<p>Tonga 4 Weeks Coral Bleaching Outlook: 31 July 2022</p>  <p>Alert Level 2 Alert Level 1 Warning Watch No Stress</p> <p>© Commonwealth of Australia 2022 Australian Bureau of Meteorology, COSPPac COMP</p> <p>NOAA Coral Reef Watch</p>

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## Summary Statement

### **Monthly and last three months: June 2022/April to June 2022 statement (Highly significant changes)**

Below normal to normal rainfall was recorded across the country in June. Normal rainfall was recorded at Niuafu'ou, Vava'u and Ha'apai. Below normal rainfall was received at Niuatoputapu, Fua'amotu and Nuku'alofa.

For April to June, normal rainfall was recorded in the Central and Southern Divisions, and below normal rainfall occurred across the Northern Division. Niuafu'ou and Niuatoputapu both recorded their fifth driest April to June on record.

## **Part 1i. Monthly and Seasonal Outlooks for August and August to October 2022**

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

The August outlook for Tonga shows rainfall is likely to be above normal across most islands, apart from Niuatoputapu where near-normal is the most likely outcome. The outlook for August to October shows rainfall is likely to be above normal for the whole country.

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

## **Part 2: Recent Ocean summary statement**

### **Monthly and last three months: June/April to June 2022 (Highly significant changes)**

For June, 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 April to June, SSTs were also above average, with differences from normal of 1.0 to 1.5 °C for the majority of Tonga.

Tonga's June 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.

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## **Part 2i. Monthly and Seasonal Outlooks for August and August to October 2022**

The monthly and seasonal SST outlooks for Tonga forecast SSTs of 0.8-2.0 degrees Celsius above average for August and August to October.

The monthly and seasonal sea surface height outlooks forecast near-normal sea surface heights in northern Tonga, and sea surface heights of 100mm to 200mm above normal 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: June 2022	Stakeholder	Total Number of Participants	Number of male	Number of female
Climate Bulletin	3 June	Government ministries, NGOs,Media. Private sectors	155	118	37
EAR Watch					
Monthly Climate Briefing					
Ocean Outlook	3 June	Government ministries, NGOs,Media. Private sectors	155	118	37
Climate data request					
<b>Total</b>			<b>156</b>	<b>236</b>	<b>74</b>

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