

# Pacific Islands - Ocean and Climate Outlook Forum (OCOF) No. 192

Country: Tonga

Part 1: Recent climate

**TABLE 1: Monthly Rainfall**

Station (include data period)	Jun-2023	Jul-2023	Aug-2023				Rank
			Total (mm)	33%tile	67%tile	Median	
	Total (mm)	Total (mm)	Rainfall (mm)				
<i>Northern Division</i>							
Niufo'ou (1971-2023)	153.8	232.2	153.2	63.8	126.5	92.0	39/51
Niuatoputapu (1947-2023)	167.5	106.0	169.0	53.4	104.3	77.5	66/76
<i>Central Division</i>							
Vava'u (1947-2023)	149.7	130.0	307.6	62.0	127.0	88.0	76/77
Ha'apai (1947-2023)	145.3	99.5	109.8	59.1	118.0	78.0	49/77
<i>Southern Division</i>							
Fua'amotu (1979-2023)	86.8	60.9	77.4	69.3	133.0	91.6	16/44
Nuku'alofa (1944-2023)	89.5	56.5	72.5	59.0	137.0	98.0	30/79

**TABLE 2: Three-month Total Rainfall for June to August 2023**

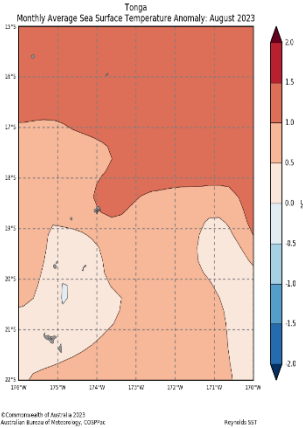
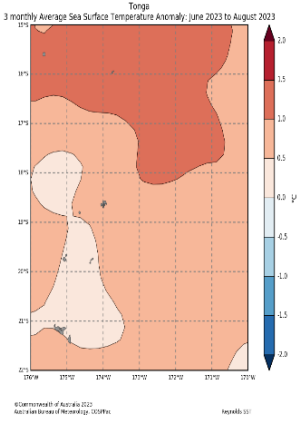
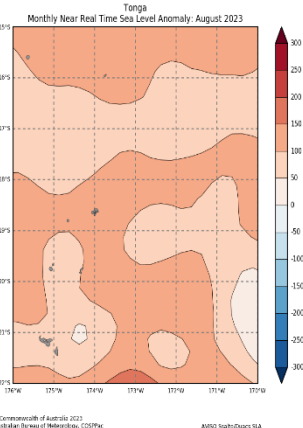
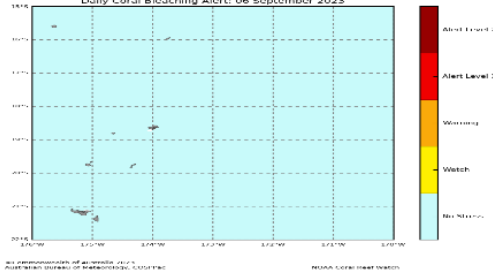
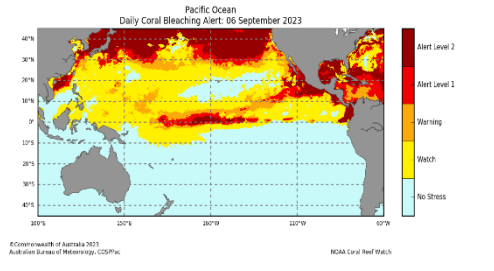
Station	Three-month Total	33%tile	67%tile	Median	Rank	
						Rainfall (mm)
<i>Northern Division</i>						
Niufo'ou (1971-2023)	539.2	Above normal	274.7	419.0	361.0	41/48
Niuatoputapu (1947-2023)	442.5	Above normal	250.7	371.3	316.0	60/76
<i>Central Division</i>						
Vava'u (1947-2023)	587.3	Above normal	249.0	354.0	308.0	68/77
Ha'apai (1947-2023)	354.6	Above normal	195.0	314.0	278.0	61/77
<i>Southern Division</i>						
Fua'amotu (1979-2023)	225.1	Below normal	271.1	401.0	349.0	12/44
Nuku'alofa (1944-2023)	218.5	Below normal	236.0	374.9	298.0	21/79

# Part 1i. Monthly and Seasonal Outlooks for October and October to December 2023

Monthly: October	Seasonal: October to December
<p><b>Rainfall (Image 1)</b></p> <p>Tercile rainfall probabilities for October 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023. Australian Bureau of Meteorology Datafile data extracted from: Climate Monitor, version 10.15. Maritime Boundaries: Geobase; Maritime Boundaries and Exclusive Economic Zones (EEZs), version 11. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>	<p><b>Rainfall (Image 2)</b></p> <p>Tercile rainfall probabilities for October to December 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023. Australian Bureau of Meteorology Datafile data extracted from: Climate Monitor, version 10.15. Maritime Boundaries: Geobase; Maritime Boundaries and Exclusive Economic Zones (EEZs), version 11. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>
<p><b>Monthly Maximum temperature (Image 3):</b></p> <p>Tercile maximum temperature probabilities for October 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023. Australian Bureau of Meteorology Datafile data extracted from: Climate Monitor, version 10.15. Maritime Boundaries: Geobase; Maritime Boundaries and Exclusive Economic Zones (EEZs), version 11. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>	<p><b>Seasonal maximum temperature (Image 4):</b></p> <p>Tercile maximum temperature probabilities for October to December 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023. Australian Bureau of Meteorology Datafile data extracted from: Climate Monitor, version 10.15. Maritime Boundaries: Geobase; Maritime Boundaries and Exclusive Economic Zones (EEZs), version 11. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>
<p><b>Monthly minimum temperature (Image 5):</b></p> <p>Tercile minimum temperature probabilities for October 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023. Australian Bureau of Meteorology Datafile data extracted from: Climate Monitor, version 10.15. Maritime Boundaries: Geobase; Maritime Boundaries and Exclusive Economic Zones (EEZs), version 11. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>	<p><b>Seasonal minimum temperature (Image 6):</b></p> <p>Tercile minimum temperature probabilities for October to December 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023. Australian Bureau of Meteorology Datafile data extracted from: Climate Monitor, version 10.15. Maritime Boundaries: Geobase; Maritime Boundaries and Exclusive Economic Zones (EEZs), version 11. Available online at <a href="http://www.marine.gov.au">http://www.marine.gov.au</a></p>

# Part 2: Recent Ocean Observation

## Monthly/Three months: August and June to August 2023

<p><b>Monthly: August</b></p>	<p><b>Last three months: June to August 2023:</b></p>
<p><b>Sea Surface Temperature (Image 1):</b></p>  <p>Tonga Monthly Average Sea Surface Temperature Anomaly: August 2023</p> <p>©Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/PSMC KeyMapB 307</p>	<p><b>Sea Surface Temperature (Image 4):</b></p>  <p>Tonga 3 monthly Average Sea Surface Temperature Anomaly: June 2023 to August 2023</p> <p>©Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/PSMC KeyMapB 311</p>
<p><b>Sea level (Image 2):</b></p>  <p>Tonga Monthly Near Real Time Sea Level Anomaly: August 2023</p> <p>©Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/PSMC AIRS2 SeaLevel SA</p>	
<p><b>Daily coral bleaching alert (Image 3):</b></p>  <p>Tonga Daily Coral Bleaching Alert: 06 September 2023</p> <p>©Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/PSMC NOAA Coral Reef Watch</p>	<p><b>Daily coral bleaching alert (Image 3):</b></p>  <p>Pacific Ocean Daily Coral Bleaching Alert: 06 September 2023</p> <p>©Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/PSMC NOAA Coral Reef Watch</p>

# Part 2i. Monthly and Seasonal Outlooks for October and October to December 2023

Monthly: October	Seasonal: October to December
<p><b>Monthly sea surface temperature (Image 5):</b></p> <p>Difference from average sea surface temperature forecast for October 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p> <p>Model run: 04/09/2023 Issued: 06/09/2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p>	<p><b>Seasonal sea surface temperature (Image 6):</b></p> <p>Difference from average sea surface temperature forecast for October to December 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p> <p>Model run: 04/09/2023 Issued: 06/09/2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p>
<p><b>Monthly sea level (Image 7):</b></p> <p>Difference from average sea surface height forecast for October 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p> <p>Model run: 04/09/2023 Issued: 06/09/2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p>	<p><b>Seasonal sea level (Image 8):</b></p> <p>Difference from average sea surface height forecast for October to December 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p> <p>Model run: 04/09/2023 Issued: 06/09/2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Bureau of Meteorology 2023. All rights reserved. Data source: Marine Boundaries and Ocean Data Centre (2023), version 1.1. Available online at <a href="http://www.bom.gov.au">http://www.bom.gov.au</a></p>
<p><b>4-week Coral Bleaching (Image 9):</b></p> <p>Tonga 4 Weeks Coral Bleaching Outlook: 01 October 2023</p> <p>Alert Level 2 Alert Level 1 Warning Watch No Stress</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, COSPPac</p> <p>NOAA Coral Reef Watch</p>	<p><b>4-week Coral Bleaching (Image 9):</b></p> <p>Pacific Ocean 4 Weeks Coral Bleaching Outlook: 01 October 2023</p> <p>Alert Level 2 Alert Level 1 Warning Watch No Stress</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, COSPPac</p> <p>NOAA Coral Reef Watch</p>

## Summary Statement

### Monthly and last three months: August 2023/June to August 2023 statement

For August 2023, above normal rainfall was recorded at Niuafu'ou, Niuafo'ou, Niuafo'ou and Vava'u, while near-normal rainfall was recorded at Ha'apai, Fua'amotu and Nuku'alofa. Vava'u had its second highest August rainfall of record.

For June to August 2023, above normal rainfall was recorded across the Northern and Central Divisions, while below normal rainfall was recorded at Fua'amotu and Nuku'alofa.

## Part 1i. Monthly and Seasonal Outlooks for October and October to December 2023

### Monthly /Seasonal rainfall and temperature Outlook statements

The outlook offers little guidance for August rainfall across the main island groups, but over the far south of the EEZ rainfall is likely to be below normal.

The rainfall for October to December is likely to be above normal at Niuafu'ou, below normal at Vava'u, and near-normal at Ha'apai and the Southern Division. At Niuafo'ou, the outlook offers little guidance.

Maximum and minimum temperatures during October and averaged over October to December are likely or very likely to be above normal over the Northern Division and Vava'u, while near-normal temperatures are likely over the Southern Division and Ha'apai.

## Part 2: Recent Ocean summary statement

### Monthly and last three months: August 2023/June to August 2023

August ocean temperatures around Tonga were utmost 1.5 above normal.

Averaged over June to August, ocean temperatures around Tonga were utmost 1.5 above normal.

August sea levels around Tonga were 50mm to 150mm above normal.

Coral bleaching alert reveals no thermal stress for Tonga.

## Part 2i. Monthly and Seasonal Outlooks for October and October to December 2023

### Ocean Variable statement

October ocean temperatures, and average over October to December ocean temperatures around Tonga are predicted to be 0.4 to 0.8 above normal for the Niuafo'ou and Vava'u. The remaining parts of Tonga are predicted to be near normal.

October sea levels around Tonga are predicted to be 30mm to 60mm below normal for the Ha'apai and Vava'u. The remaining parts of Tonga is predicted to be near normal.

Averaged over October to December, sea levels around Tonga are predicted to be near normal.

Coral bleaching outlook for the next four weeks reveals no thermal stress for Tonga.

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

<b>Product</b>	<b>Date: August 2023</b>	<b>Stakeholder</b>	<b>Total Number of Participants</b>	<b>Number of Male</b>	<b>Number of Female</b>	<b>Comments (If there are comments from you Stakeholders)</b>
Tonga Climate Outlook	12 Aug.	General Public	100	65	35	
EAR Watch						
Monthly Climate Briefing						
Tonga Ocean Outlook	12 Aug.	Government ministries. NGOs,Media, Private Sector	100	65	35	
Climate data request	1 – 31 Aug.	Varions stakeholders and Academia	25	20	5	
<b>Total</b>			<b>125</b>	<b>85</b>	<b>75</b>	