

Pacific Islands - Ocean and Climate Outlook Forum (OCOF) No. 193

Country: Tonga

Part 1: Recent climate

TABLE 1: Monthly Rainfall

Station (include data period)	Jul-2023	Aug-2023	Sep-2023				
			Total (mm)	33%tile	67%tile	Median	Rank
	Total (mm)	Total (mm)	Rainfall (mm)				
Northern Division							
Niuafo'ou (1971-2023)	232.2	153.2	6.7	81.0	156.0	129.0	1/50
Niuaatoputapu (1947-2023)	106.0	169.0	20.6	53.3	132.8	101.0	9/75
Central Division							
Vava'u (1947-2023)	130.0	307.6	30.6	80.0	173.0	110.6	6/77
Ha'apai (1947-2023)	99.5	109.8	32.9	61.0	132.7	93.0	11/77
Southern Division							
Fua'amotu (1979-2023)	60.9	77.4	26.5	82.0	141.0	104.8	4/44
Nuku'alofa (1944-2023)	56.5	72.5	15.5	76.0	145.0	103.0	3/79

TABLE 2: Three-month Total Rainfall for July to September 2023

Station	Three-month Total		33%tile	67%tile	Median	Rank
	Rainfall (mm)					
Northern Division						
Niuafo'ou (1971-2023)	392.1	Normal	257.9	436.5	338.5	29/49
Niuaatoputapu (1947-2023)	295.6	Normal	214.3	371.0	289.2	38/75
Central Division						
Vava'u (1947-2023)	468.2	Above normal	257.0	407.4	345.0	60/77
Ha'apai (1947-2023)	242.2	Normal	237.5	346.0	293.4	28/77
Southern Division						
Fua'amotu (1979-2023)	164.8	Below normal	298.0	417.0	365.5	5/44
Nuku'alofa (1944-2023)	144.5	Below normal	275.0	378.0	325.0	6/79

Part 1i. Monthly and Seasonal Outlooks for November and November 2023 to January 2024

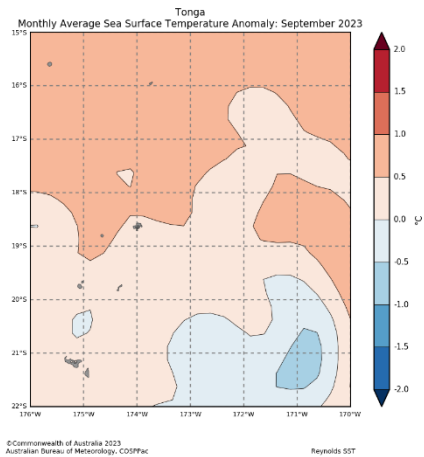
Monthly: November	Seasonal: November to January
Rainfall (Image 1)	Rainfall (Image 2)
<p>Tercile rainfall probabilities for November 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Map data extracted from Geoscience Australia (2023), Marine Boundaries (Geoscience Australia), Maritime Boundaries and Exclusive Economic Zones (2006), version 1.1. Available online at http://www.meteor.gov.au</p>	<p>Tercile rainfall probabilities for November 2023 to January 2024</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Map data extracted from Geoscience Australia (2023), Marine Boundaries (Geoscience Australia), Maritime Boundaries and Exclusive Economic Zones (2006), version 1.1. Available online at http://www.meteor.gov.au</p>
Monthly Maximum temperature (Image 3):	Seasonal maximum temperature (Image 4):
<p>Tercile maximum temperature probabilities for November 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Map data extracted from Geoscience Australia (2023), Marine Boundaries (Geoscience Australia), Maritime Boundaries and Exclusive Economic Zones (2006), version 1.1. Available online at http://www.meteor.gov.au</p>	<p>Tercile maximum temperature probabilities for November 2023 to January 2024</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Map data extracted from Geoscience Australia (2023), Marine Boundaries (Geoscience Australia), Maritime Boundaries and Exclusive Economic Zones (2006), version 1.1. Available online at http://www.meteor.gov.au</p>
Monthly minimum temperature (Image 5):	Seasonal minimum temperature (Image 6):
<p>Tercile minimum temperature probabilities for November 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Map data extracted from Geoscience Australia (2023), Marine Boundaries (Geoscience Australia), Maritime Boundaries and Exclusive Economic Zones (2006), version 1.1. Available online at http://www.meteor.gov.au</p>	<p>Tercile minimum temperature probabilities for November 2023 to January 2024</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Map data extracted from Geoscience Australia (2023), Marine Boundaries (Geoscience Australia), Maritime Boundaries and Exclusive Economic Zones (2006), version 1.1. Available online at http://www.meteor.gov.au</p>

Part 2: Recent Ocean Observation

Monthly/Three months: September and July to September 2023

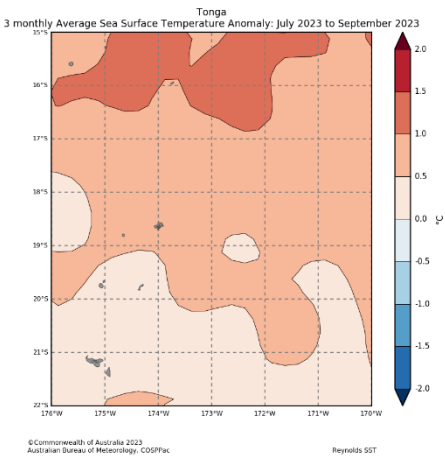
Monthly: September

Sea Surface Temperature (Image 1):

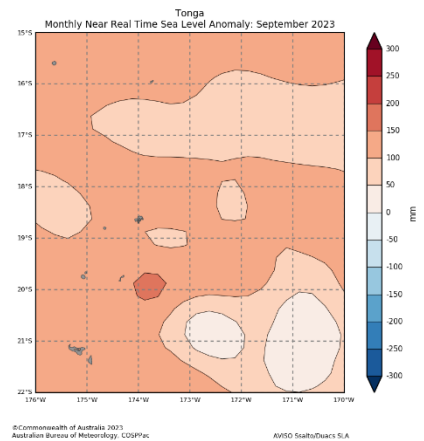


Last three months: July to September 2023:

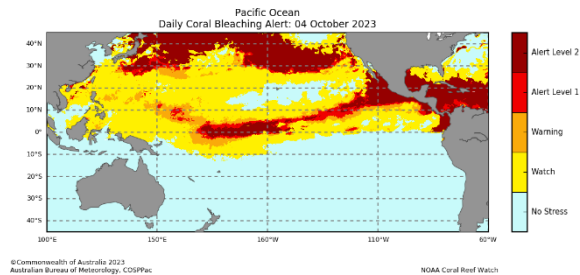
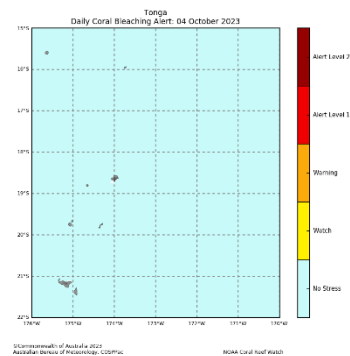
Sea Surface Temperature (Image 4):



Sea level (Image 2):



Daily coral bleaching alert (Image 3):



Part 2i. Monthly and Seasonal Outlooks for November and November 2023 to January 2024

<p>Monthly: November</p> <p>Monthly sea surface temperature (Image 5):</p> <p>Difference from average sea surface temperature forecast for November 2023</p> <p>Map period: 2023-2024 Model: ACC2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Spatial data provided by the Australian Bureau of Meteorology, National Oceanographic and Atmospheric Administration (NOAA), and the Australian Antarctic Data Centre (AADC)</p>	<p>Seasonal: November to January</p> <p>Seasonal sea surface temperature (Image 6):</p> <p>Difference from average sea surface temperature forecast for November 2023 to January 2024</p> <p>Map period: 2023-2024 Model: ACC2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Spatial data provided by the Australian Bureau of Meteorology, National Oceanographic and Atmospheric Administration (NOAA), and the Australian Antarctic Data Centre (AADC)</p>
<p>Monthly sea level (Image 7):</p> <p>Difference from average sea surface height forecast for November 2023</p> <p>Map period: 2023-2024 Model: ACC2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Spatial data provided by the Australian Bureau of Meteorology, National Oceanographic and Atmospheric Administration (NOAA), and the Australian Antarctic Data Centre (AADC)</p>	<p>Seasonal sea level (Image 8):</p> <p>Difference from average sea surface height forecast for November 2023 to January 2024</p> <p>Map period: 2023-2024 Model: ACC2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Spatial data provided by the Australian Bureau of Meteorology, National Oceanographic and Atmospheric Administration (NOAA), and the Australian Antarctic Data Centre (AADC)</p>
<p>4-week Coral Bleaching (Image 9):</p> <p>4 Weeks Coral Bleaching Outlook: 29 October 2023</p> <p>Map period: 2023-2024 Model: ACC2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Spatial data provided by the Australian Bureau of Meteorology, National Oceanographic and Atmospheric Administration (NOAA), and the Australian Antarctic Data Centre (AADC)</p>	<p>4-week Coral Bleaching (Image 10):</p> <p>4 Weeks Coral Bleaching Outlook: 29 October 2023</p> <p>Map period: 2023-2024 Model: ACC2023 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Spatial data provided by the Australian Bureau of Meteorology, National Oceanographic and Atmospheric Administration (NOAA), and the Australian Antarctic Data Centre (AADC)</p>

Summary Statement

Monthly and last three months: September 2023/July to September 2023 statement

September rainfall was well below normal across the country. Niuafo'ou posted its lowest September rainfall in 50 years of record, and the second lowest of any month, the lowest being 4.0mm in May 1988. In addition, Nuku'alofa, Fua'amotu, and Vava'u had their third, fourth and sixth lowest September totals, respectively.

For July to September 2023, Vava'u recorded above normal rainfall, the Northern Division and Ha'apai recorded normal rainfall, and the Southern Division recorded below normal rainfall. Fua'amotu had its fifth lowest July to September rainfall in 44 years of record, and Nuku'alofa had its sixth lowest in 79 years of record.

Part 1i. Monthly and Seasonal Outlooks for November and November 2023 to January 2024

Monthly /Seasonal rainfall and temperature Outlook statements

The rainfall for November is likely to be below normal over much Tonga, apart from the Northern Division where there is little guidance.

The rainfall for November to January is likely or very likely to be below normal over Tonga, except for the far northwest around Niuafo'ou where the outlook offers little guidance.

Maximum and minimum temperatures during November are likely or very likely to be above normal over the Northern Division, likely to be below normal in the Southern Division, but there's little guidance for the area around Vava'u and Ha'apai.

Maximum and minimum temperatures averaged over November to January are likely or very likely to be above normal over the northern half of Tonga, including Vava'u, Niuafo'ou and Niuatoputapu. Over Ha'apai, Tongatapu and 'Eua, temperatures for the coming three months are likely to near-normal.

Part 2: Recent Ocean summary statement

Monthly and last three months: September 2023/July to September 2023

September ocean temperatures around Niuafo'ou and Niuatoputapu were 0.5 to 1.0°C above normal, while the averaged July to September ocean temperatures reveal that these two islands were 1.0 to 1.5°C above normal. The remaining parts of the country were near normal.

September sea levels around Tonga were 100mm to 150mm above normal.

Coral bleaching alert reveals no thermal stress for Tonga.

Part 2i. Monthly and Seasonal Outlooks for November and November 2023 to January 2024

Ocean Variable statement

November ocean temperatures around Tongatapu are predicted to be -0.8 to -0.4°C below normal. In Vava'u and Ha'apai are likely to be near normal and the Niuafo'ou are 0.4 to 0.8°C above normal.

Averaged over November to January, ocean temperatures around Niuafo'ou and Niuatoputapu are predicted to be 0.4 to 0.8°C above normal. The remaining parts are likely to be near normal.

November and averaged over November to July sea levels around Tonga are predicted to be near normal.

Coral bleaching outlook is predicted to have no thermal stress in the next four weeks.

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

Product	Date: September 2023	Stakeholder	Total Number of Participants	Number of Male	Number of Female	Comments (If there are comments from you Stakeholders)
Climate Bulletin	3 Sept	Government ministries, NGOs, Media Private Sector.	155	118	37	
EAR Watch						
Monthly Climate Briefing						
Ocean Outlook	3 Sept	Government ministries, NGOs, Media Private Sector.	155	118	37	
Climate data request						
Total			310	236	74	