

Pacific Islands - Ocean and Climate Outlook Forum (OCOF) No. 187

Country: Tonga

Part 1: Recent climate

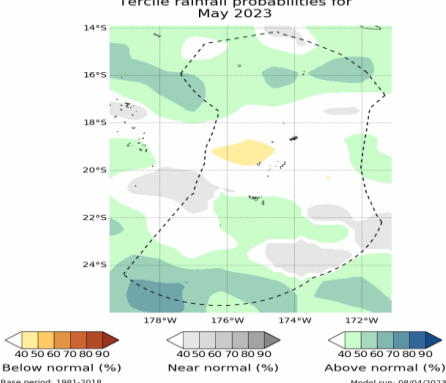
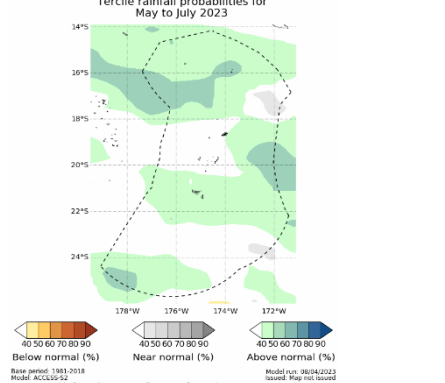
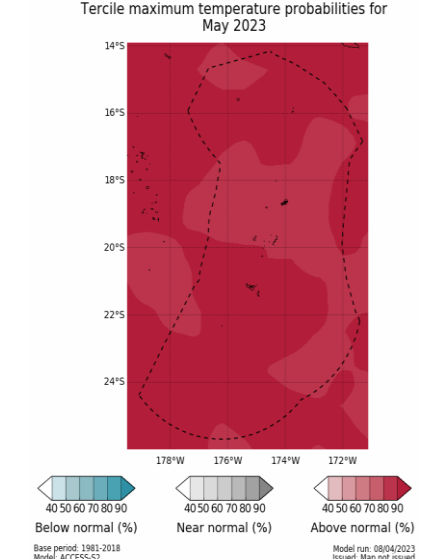
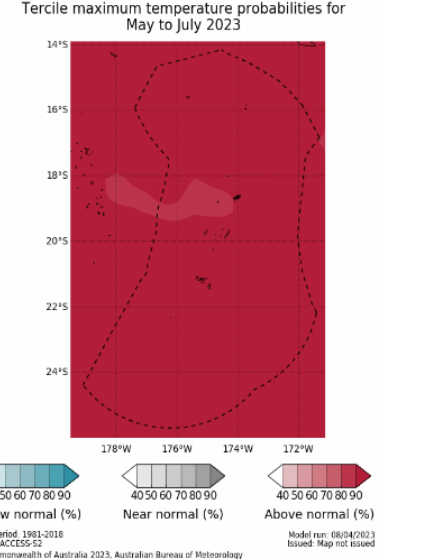
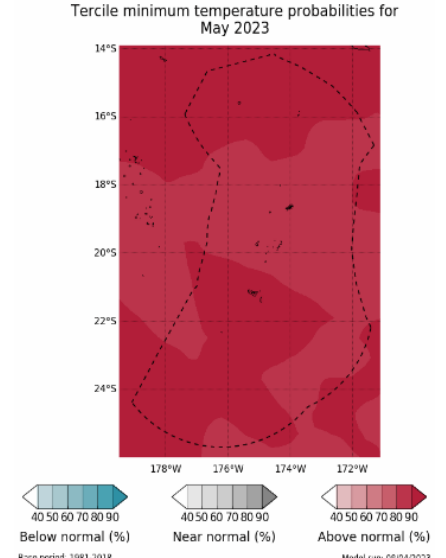
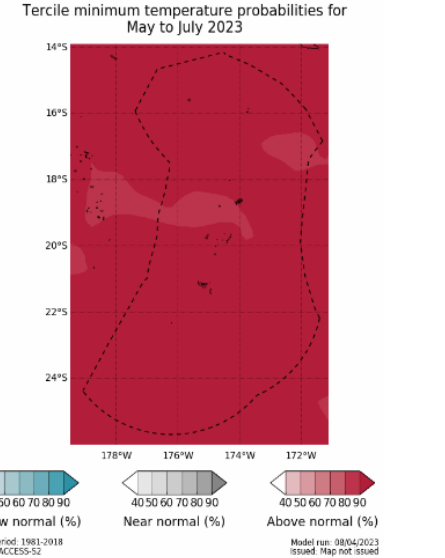
TABLE 1: Monthly Rainfall

Station (include data period)	Jan-2023	Feb-2023	Mar-2023				
			Total (mm)	33%tile	67%tile	Median	Rank
	Total (mm)	Total (mm)	Rainfall (mm)				
Northern Division							
Niuafu'ou (1971-2023)	243.4	219.5	328.0	208.0	330.0	265.4	34/51
Niutoputapu (1947-2023)	219.3	156.0	369.5	175.1	271.7	226.5	55/72
Central Division							
Vava'u (1947-2023)	207.2	419.5	295.7	224.0	343.0	285.0	39/77
Ha'apai (1947-2023)	245.7	299.3	221.6	179.5	313.0	233.8	36/77
Southern Division							
Fua'amotu (1979-2023)	215.7	498.1	295.5	162.0	253.0	190.9	35/44
Nuku'alofa (1944-2023)	282.5	421.0	304.0	190.0	268.7	226.0	61/79

TABLE 2: Three-month Total Rainfall for January to March 2023

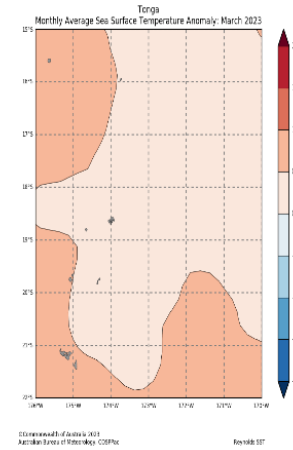
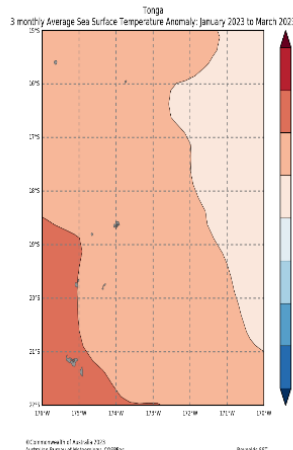
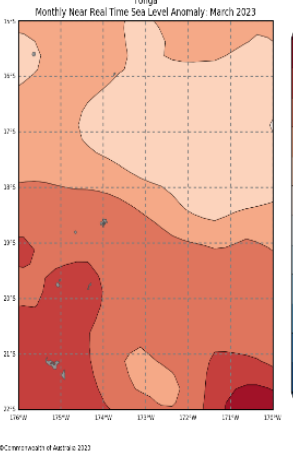
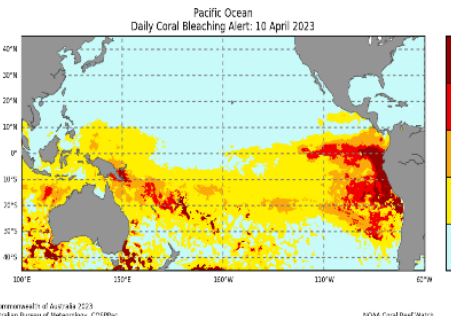
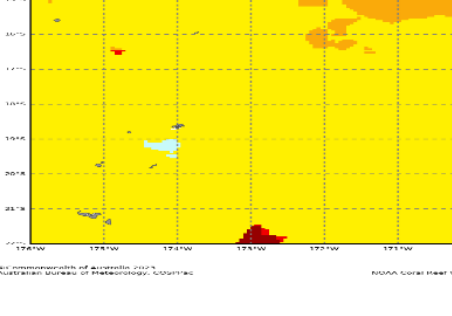
Station	Three-month Total		33%tile	67%tile	Median	Rank
	Rainfall (mm)					
Northern Division						
Niuafu'ou (1971-2023)	790.9	Normal	732.0	953.6	883.0	21/46
Niutoputapu (1947-2023)	744.8	Normal	642.4	938.4	805.4	32/72
Central Division						
Vava'u (1947-2023)	922.4	Normal	721.1	937.3	854.8	48/76
Ha'apai (1947-2023)	766.6	Normal	566.0	788.0	660.0	49/77
Southern Division						
Fua'amotu (1979-2023)	1009.3	Above normal	477.0	791.0	710.3	37/44
Nuku'alofa (1944-2023)	1007.5	Above normal	518.0	853.0	685.0	71/79

Part 1i. Monthly and Seasonal Outlooks for May and May to July 2023

Monthly: May	Seasonal: May to July
Rainfall (Image 1)	Rainfall (Image 2)
<p>Tercile rainfall probabilities for May 2023</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Randers Marine Institute (2019), Maritime Boundaries Geodatabase Exclusive Economic Zones (2008), version 1.1. Available online at http://www.maritime.gov.au</p> <p>Model run: 08/04/2023 Issued: Map not issued</p>	<p>Tercile rainfall probabilities for May to July 2023</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Randers Marine Institute (2019), Maritime Boundaries Geodatabase Exclusive Economic Zones (2008), version 1.1. Available online at http://www.maritime.gov.au</p> <p>Model run: 08/04/2023 Issued: Map not issued</p>
Monthly Maximum temperature (Image 3):	Seasonal maximum temperature (Image 4):
<p>Tercile maximum temperature probabilities for May 2023</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Randers Marine Institute (2019), Maritime Boundaries Geodatabase Exclusive Economic Zones (2008), version 1.1. Available online at http://www.maritime.gov.au</p> <p>Model run: 08/04/2023 Issued: Map not issued</p>	<p>Tercile maximum temperature probabilities for May to July 2023</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Randers Marine Institute (2019), Maritime Boundaries Geodatabase Exclusive Economic Zones (2008), version 1.1. Available online at http://www.maritime.gov.au</p> <p>Model run: 08/04/2023 Issued: Map not issued</p>
Monthly minimum temperature (Image 5):	Seasonal minimum temperature (Image 6):
<p>Tercile minimum temperature probabilities for May 2023</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Randers Marine Institute (2019), Maritime Boundaries Geodatabase Exclusive Economic Zones (2008), version 1.1. Available online at http://www.maritime.gov.au</p> <p>Model run: 08/04/2023 Issued: Map not issued</p>	<p>Tercile minimum temperature probabilities for May to July 2023</p>  <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Shapefile data extracted from Randers Marine Institute (2019), Maritime Boundaries Geodatabase Exclusive Economic Zones (2008), version 1.1. Available online at http://www.maritime.gov.au</p> <p>Model run: 08/04/2023 Issued: Map not issued</p>

Part 2: Recent Ocean Observation

Monthly/Three months: March and January to March 2023

Monthly: March		Last three months: January to March 2023:	
Sea Surface Temperature (Image 1):		Sea Surface Temperature (Image 4):	
 <p>Monthly Average Sea Surface Temperature Anomaly: March 2023</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/ANU</p> <p>Reynolds SST</p>		 <p>3 monthly Average Sea Surface Temperature Anomaly: January 2023 to March 2023</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/ANU</p> <p>Reynolds SST</p>	
Sea level (Image 2):			
 <p>Monthly Near Real Time Sea Level Anomaly: March 2023</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/ANU</p> <p>AVISO SeaWiFS SLA</p>			
Daily coral bleaching alert (Image 3):			
 <p>Pacific Ocean Daily Coral Bleaching Alert: 10 April 2023</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/ANU</p> <p>NOAA Coral Reef Watch</p>		 <p>Tonga Daily Coral Bleaching Alert: 10 April 2023</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, CSIRO/ANU</p> <p>NOAA Coral Reef Watch</p>	

Part 2i. Monthly and Seasonal Outlooks for May and May to July 2023

Monthly: May	Seasonal: May to July
<p>Monthly sea surface temperature (Image 5):</p> <p>Difference from average sea surface temperature forecast for May 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Sea surface data extracted from European Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2006), version 11. Available online at http://www.maritime.gov.au</p> <p>Model run: 10/04/2023 Issued: 12/04/2023</p>	<p>Seasonal sea surface temperature (Image 6):</p> <p>Difference from average sea surface temperature forecast for May to July 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Sea surface data extracted from European Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2006), version 11. Available online at http://www.maritime.gov.au</p> <p>Model run: 10/04/2023 Issued: 12/04/2023</p>
<p>Monthly sea level (Image 7):</p> <p>Difference from average sea surface height forecast for May 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Sea surface data extracted from European Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2006), version 11. Available online at http://www.maritime.gov.au</p> <p>Model run: 10/04/2023 Issued: 12/04/2023</p>	<p>Seasonal sea level (Image 8):</p> <p>Difference from average sea surface height forecast for May to July 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2023, Australian Bureau of Meteorology Sea surface data extracted from European Marine Institute (2019), Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2006), version 11. Available online at http://www.maritime.gov.au</p> <p>Model run: 10/04/2023 Issued: 12/04/2023</p>
<p>4-week Coral Bleaching (Image 9):</p> <p>Tonga 4 Weeks Coral Bleaching Outlook: 30 April 2023</p> <p>© Commonwealth of Australia 2023 Australian Bureau of Meteorology, COSPPac</p> <p>NOAA Coral Reef Watch</p>	<p>4-week Coral Bleaching (Image 10):</p> <p>Pacific Ocean 4 Weeks Coral Bleaching Outlook: 30 April 2023</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: March 2023/January to March 2023 statement

March rainfall was below normal at Niuafo'ou, Vava'u and Ha'apai, above normal for the rest of the Country. Fua'amotu had its ninth highest March on record respectively.

January to March rainfall was below normal at Niuafo'ou, Niuatoputapu, Vava'u and Ha'apai, above normal for Fua'amotu and Nuku'alofa. Fua'amotu had its seventh highest and Nuku'alofa its eighth highest January to March rainfall on record respectively.

Part 1i. Monthly and Seasonal Outlooks for May and May to July 2023

Monthly /Seasonal rainfall and temperature Outlook statements

May rainfall is likely to be above normal over the northern islands and parts of the Southern Division. In the Central Division, however, the outlook offers little guidance for May rainfall.

May to July rainfall is likely to be above normal over the Northern and Southern Divisions. In the Central Division, Ha'apai's May to July rainfall is likely to be near-normal, but there is little guidance for Vava'u.

Maximum and minimum temperatures during May and averaged over May to July, are very likely to be above normal across the country.

Part 2: Recent Ocean summary statement

Monthly and last three months: March 2023/January to March 2023

March ocean temperature around Tonga were utmost 1.0°C above normal.

Averaged over January to March 2023, ocean temperatures were utmost 1.5°C above normal.

February sea levels around Tonga were 100mm to 250mm above normal.

Coral bleaching alert reveals 'Alert level 2' for Tonga, with 'Watch to Alert 1' for remaining waters,

Part 2i. Monthly and Seasonal Outlooks for May and May to July 2023

Ocean Variable statement

May and averaged May to July ocean temperatures around Tonga are predicted to be 0.4 to 1.2°C above normal.

May and average May to July sea levels around Tonga are predicted to be near normal in northern Tonga, with sea surface heights of up to 200mm for southern Tonga.

The 4 weeks coral bleaching outlook to 30th April 2023 shows 'Warning' for far northern waters, and 'Watch' status for majority of Tonga.

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

Product	Date: March 2023	Stakeholder	Total Number of Participants	Number of male	Number of female
Climate Bulletin	3 March	Government ministries, NGOs, Media, Private sector	155	118	37
EAR Watch					
Monthly Climate Briefing					
Ocean Outlook	3 March	Government ministries, NGOs, Media, Private sector	155	118	37
Climate data request					
Total			310	236	74