

Pacific Islands - Ocean and Climate Outlook Forum (OCOF) No. 170

Country: Tonga

Part 1: Recent climate

TABLE 1: Monthly Rainfall

Station (include data period)	Aug-2021	Sep-2021	Oct-2021				
			Total (mm)	33%tile	67%tile	Median	Rank
	Total (mm)	Total (mm)	Rainfall (mm)				
Northern Division							
Niuafo'ou (1971-2021)	154.7	26.0	56.6	144.4	202.3	173.0	7/49
Niuaatoputapu (1947-2021)	144.9	33.2	20.6	120.0	216.5	167.0	3/72
Central Division							
Vava'u (1947-2021)	267.0	194.0	144.4	103.3	178.3	144.0	38/75
Ha'apai (1947-2021)	141.2	97.5	58.3	60.3	127.3	95.4	25/75
Southern Division							
Fua'amotu (1979-2021)	82.0	104.8	110.3	55.3	120.0	83.2	26/42
Nuku'alofa (1944-2021)	74.0	79.5	100.0	58.0	128.3	94.0	41/78

TABLE 2: Three-month Total Rainfall for August to October 2021

Station	Three-month Total		33%tile	67%tile	Median	Rank
	Rainfall (mm)					
Northern Division						
Niuafo'ou (1971-2021)	237.3	Below normal	331.0	479.7	417.0	8/49
Niuaatoputapu (1947-2021)	198.7	Below normal	284.0	515.4	358.5	12/72
Central Division						
Vava'u (1947-2021)	605.4	Above normal	332.7	474.6	401.0	67/75
Ha'apai (1947-2021)	297.0	Normal	238.7	427.0	292.7	38/75
Southern Division						
Fua'amotu (1979-2021)	297.1	Normal	280.0	407.6	359.0	17/42
Nuku'alofa (1944-2021)	253.5	Below normal	274.9	399.8	329.7	23/77

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 December and December 2021 to February 2022

Monthly	Seasonal
Rainfall (Image 1)	Rainfall (Image 2)
<p>Tercile rainfall probabilities for December 2021</p> <p>Base period: 1981-2018 Issued: 04/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Copyright data extracted from: Tasmanian Marine Institute (2018), Marine Researcher Guidelines: Maritime Boundaries and Exclusive Economic Zones (2008), version 1.1. Available online at http://www.marine.gov.au</p>	<p>Tercile rainfall probabilities for December 2021 to February 2022</p> <p>Base period: 1981-2018 Issued: 04/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Copyright data extracted from: Tasmanian Marine Institute (2018), Marine Researcher Guidelines: Maritime Boundaries and Exclusive Economic Zones (2008), version 1.1. Available online at http://www.marine.gov.au</p>
Monthly Maximum temperature (Image 3):	Seasonal maximum temperature (Image 4):
<p>Tercile maximum temperature probabilities for December 2021</p> <p>Base period: 1981-2018 Issued: 04/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Copyright data extracted from: Tasmanian Marine Institute (2018), Marine Researcher Guidelines: Maritime Boundaries and Exclusive Economic Zones (2008), version 1.1. Available online at http://www.marine.gov.au</p>	<p>Tercile maximum temperature probabilities for December 2021 to February 2022</p> <p>Base period: 1981-2018 Issued: 04/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Copyright data extracted from: Tasmanian Marine Institute (2018), Marine Researcher Guidelines: Maritime Boundaries and Exclusive Economic Zones (2008), version 1.1. Available online at http://www.marine.gov.au</p>
Monthly minimum temperature (Image 5):	Seasonal minimum temperature (Image 6):
<p>Tercile minimum temperature probabilities for December 2021</p> <p>Base period: 1981-2018 Issued: 04/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Copyright data extracted from: Tasmanian Marine Institute (2018), Marine Researcher Guidelines: Maritime Boundaries and Exclusive Economic Zones (2008), version 1.1. Available online at http://www.marine.gov.au</p>	<p>Tercile minimum temperature probabilities for December 2021 to February 2022</p> <p>Base period: 1981-2018 Issued: 04/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Copyright data extracted from: Tasmanian Marine Institute (2018), Marine Researcher Guidelines: Maritime Boundaries and Exclusive Economic Zones (2008), version 1.1. Available online at http://www.marine.gov.au</p>

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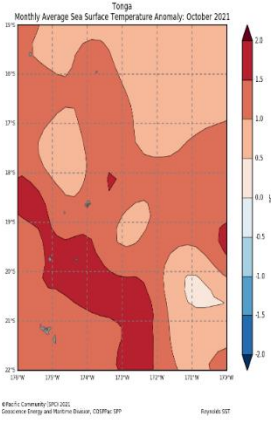
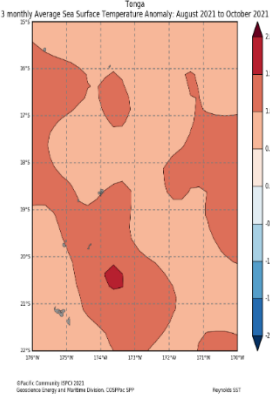
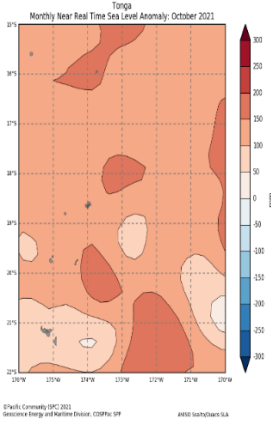
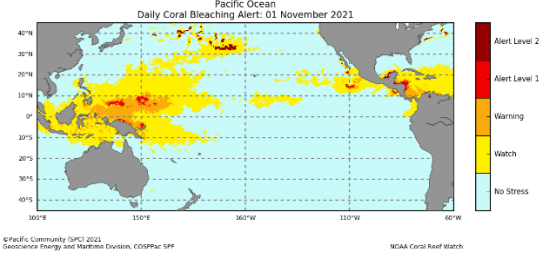
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Part 2: Recent Ocean summary statement

Monthly: October 2021

Monthly: October	Last three months: August to October 2021:
<p>Sea Surface Temperature (Image 1):</p>  <p>Tonga Monthly Average Sea Surface Temperature Anomaly: October 2021</p> <p>©Pacific Community (SPC) 2021 Geoscience Energy and Maritime Division, COSPPac SPP</p>	<p>Sea Surface Temperature (Image 4):</p>  <p>Tonga 3 monthly Average Sea Surface Temperature Anomaly: August 2021 to October 2021</p> <p>©Pacific Community (SPC) 2021 Geoscience Energy and Maritime Division, COSPPac SPP</p>
<p>Sea level (Image 2):</p>  <p>Tonga Monthly Near Real Time Sea Level Anomaly: October 2021</p> <p>©Pacific Community (SPC) 2021 Geoscience Energy and Maritime Division, COSPPac SPP</p>	
<p>Daily coral bleaching alert (Image 3):</p>  <p>Pacific Ocean Daily Coral Bleaching Alert: 01 November 2021</p> <p>©Pacific Community (SPC) 2021 Geoscience Energy and Maritime Division, COSPPac SPP</p> <p>NOAA Coral Reef Watch</p>	

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Part 2i. Monthly and Seasonal Outlooks for December and December 2021 to February 2022

Monthly: December	Seasonal: December to February
Monthly sea surface temperature (Image 5):	Seasonal sea surface temperature (Image 6):
<p>Difference from average sea surface temperature forecast for December 2021</p> <p>Base period: 1981-2018 Issued: 03/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Model: ACCESS-S2 Sea surface data extracted from: Tropical Sea Surface Temperature (TSST), Sea Level, Sea Surface Salinity, Marine Boundaries and Exclusive Economic Zones (2019M), version 1.1. Available online at https://www.marine-geo.org</p>	<p>Difference from average sea surface temperature forecast for December 2021 to February 2022</p> <p>Base period: 1981-2018 Issued: 03/11/2021 Model run: 01/11/2021 © Commonwealth of Australia 2021, Australian Bureau of Meteorology Model: ACCESS-S2 Sea surface data extracted from: Tropical Sea Surface Temperature (TSST), Sea Level, Sea Surface Salinity, Marine Boundaries and Exclusive Economic Zones (2019M), version 1.1. Available online at https://www.marine-geo.org</p>
Monthly sea level (Image 7):	Seasonal sea level (Image 8):
<p>Difference from average sea surface height forecast for December 2021</p> <p>© Commonwealth of Australia 2021 Bureau of Meteorology Model: ACCESS-S2 Base Period: 1981-2018 Model Run: 27/10/2021 Issued: Map not issued</p>	<p>Difference from average sea surface height forecast for December 2021 to February 2022</p> <p>© Commonwealth of Australia 2021 Bureau of Meteorology Model: ACCESS-S2 Base Period: 1981-2018 Model Run: 27/10/2021 Issued: Map not issued</p>
4-week Coral Bleaching (Image 9):	
<p>Pacific Ocean 4 Weeks Coral Bleaching Outlook: 21 November 2021</p> <p>© Pacific Community (SPC) 2021 Geoscience Energy and Maritime Division, COSFPAc SPP NOAA Coral Reef Watch</p>	

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Summary Statement

Monthly and last three months: October 2021/August to October statement (Highly significant changes)

For October, Near normal rainfall was recorded in Vava'u, Fua'amotu and Nuku'alofa. Below normal rainfall was recorded in Niuafo'ou, Niuatoputapu and Ha'apai. Niuatoputapu recorded its third driest October on record.

For August to October, above normal rainfall was recorded in Vava'u. Near normal rainfall at Ha'apai and Fua'amotu. Below normal rainfall was recorded in Niuafo'ou, Niuatoputapu and Nuku'alofa.

Part 1i. Monthly and Seasonal Outlooks for December and December 2021 to February 2022

Monthly /Seasonal rainfall and temperature Outlook statements.

The outlook for Tonga for November is very likely to be above normal. Above normal rainfall is very likely for Vava'u, Ha'apai and Tongatapu. The outlook for Niuatoputapu for the period of December is likely to be near normal. The outlook for Niuafo'ou offers little guidance as the chances of above normal, normal and below normal are similar.

The outlook for Tonga for December to February is very likely to be above normal. The outlook for Vava'u, Ha'apai and Tongatapu for the period of December to February is very likely to be above normal. The outlook for Niuafo'ou and Niuatoputapu for the period of December to February offers little guidance.

The maximum and minimum temperatures outlook for Tonga for December and December 2021 to February 2022 is very likely to be above normal

Part 2: Recent Ocean summary statement

Monthly and last three months: October/August to October 2021 (Highly significant changes)

The October Sea Surface Temperature for all of Tonga shows above normal temperature differences of 1.0°C to 2.0°C for the month of August. Patches of SST ranging from 1 to 2°C above normal were noted around Tonga.

The August to October Sea Surface Temperature for Tonga Shows warmer temperature conditions, with difference of 0.5°C to 1.5°C.

Part 2i. Monthly and Seasonal Outlooks for December and December 2021 to February 2022

Ocean Variable statement

In December the sea level anomaly was up to 200 mm above average in the Ha'apai and Vava'u group, and up to 150 mm in the Tongatapu group.

The coral bleaching shows no stress for Tonga

The outlook for Tonga archipelago shows sea surface temperatures are likely to be near normal for December, ranging from 0.4, 0.8°C. The outlook for Tonga shows near normal to slightly above normal conditions ranging from 0.4, 0.8°C.

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

Product	Date: October 2021	Stakeholder	Total Number of Participants	Number of male	Number of female
Climate Bulletin		General Public	132	66	34
EAR Watch					
Monthly Climate Briefing					
Ocean Outlook					
Climate data request		General Public	132	66	34
PICOF 9					
Total			132	66	34

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