

# Pacific Islands - Ocean and Climate Outlook Forum (OCOF) No. 181

Country: Tonga

## Part 1: Recent climate

**TABLE 1: Monthly Rainfall**

Station (include data period)	Jul-2022	Aug-2022	Sep-2022				
			Total (mm)	33%tile	67%tile	Median	Rank
	Total (mm)	Total (mm)	Rainfall (mm)				
Northern Division							
Niuafo'ou (1971-2022)	83.0	93.0	43.3	81.0	156.6	115.0	7/50
Niuaatoputapu (1947-2022)	92.0	104.0	178.0	53.7	132.1	101.0	61/73
Central Division							
Vava'u (1947-2022)	74.7	105.9	57.5	80.6	173.3	112.6	15/76
Ha'apai (1947-2022)	21.0	32.0	94.0	57.3	133.1	92.0	39/76
Southern Division							
Fua'amotu (1979-2022)	22.5	91.6	96.1	80.7	145.0	106.4	19/43
Nuku'alofa (1944-2022)	20.5	37.9	50.5	78.3	146.0	103.0	14/78

**TABLE 2: Three-month Total Rainfall for July to September 2022**

Station	Three-month Total		33%tile	67%tile	Median	Rank
	Rainfall (mm)					
Northern Division						
Niuafo'ou (1971-2022)	219.3	Below normal	257.2	426.4	338.5	10/49
Niuaatoputapu (1947-2022)	374.0	Above normal	214.7	368.0	289.2	48/73
Central Division						
Vava'u (1947-2022)	238.1	Below normal	258.3	402.7	346.0	20/76
Ha'apai (1947-2022)	147.0	Below normal	238.5	351.0	293.8	10/76
Southern Division						
Fua'amotu (1979-2022)	210.2	Below normal	311.3	419.0	366.5	8/43
Nuku'alofa (1944-2022)	108.9	Below normal	276.3	383.3	326.5	3/78

**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 November and November to January 2023

Monthly: November	Seasonal: November to January
Rainfall (Image 1)	Rainfall (Image 2)
<p>Tercile rainfall probabilities for November 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Randers-Marine Institute (2020), Maritime Boundary Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2000M), version 11. Available online at <a href="http://www.marinegaps.org/">http://www.marinegaps.org/</a></p>	<p>Tercile rainfall probabilities for November 2022 to January 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Randers-Marine Institute (2020), Maritime Boundary Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2000M), version 11. Available online at <a href="http://www.marinegaps.org/">http://www.marinegaps.org/</a></p>
Monthly Maximum temperature (Image 3):	Seasonal maximum temperature (Image 4):
<p>Tercile maximum temperature probabilities for November 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Randers-Marine Institute (2020), Maritime Boundary Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2000M), version 11. Available online at <a href="http://www.marinegaps.org/">http://www.marinegaps.org/</a></p>	<p>Tercile maximum temperature probabilities for November 2022 to January 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Randers-Marine Institute (2020), Maritime Boundary Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2000M), version 11. Available online at <a href="http://www.marinegaps.org/">http://www.marinegaps.org/</a></p>
Monthly minimum temperature (Image 5):	Seasonal minimum temperature (Image 6):
<p>Tercile minimum temperature probabilities for November 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Randers-Marine Institute (2020), Maritime Boundary Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2000M), version 11. Available online at <a href="http://www.marinegaps.org/">http://www.marinegaps.org/</a></p>	<p>Tercile minimum temperature probabilities for November 2022 to January 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapefile data extracted from Randers-Marine Institute (2020), Maritime Boundary Geodatabase: Maritime Boundaries and Exclusive Economic Zones (2000M), version 11. Available online at <a href="http://www.marinegaps.org/">http://www.marinegaps.org/</a></p>

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Part 2: Recent Ocean Observation

Monthly/Three months: September 2022 and July to September 2022

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

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

Monthly: November	Seasonal: November to January
Monthly sea surface temperature (Image 5):	Seasonal sea surface temperature (Image 6):
<p>Difference from average sea surface temperature forecast for November 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapfile data extracted from Flinders Marine Institute (2019). Maritime Boundaries Geodatabase: 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>Model run: 10/10/2022 Issued: 12/10/2022</p>	<p>Difference from average sea surface temperature forecast for November 2022 to January 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapfile data extracted from Flinders Marine Institute (2019). Maritime Boundaries Geodatabase: 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>Model run: 10/10/2022 Issued: 12/10/2022</p>
Monthly sea level (Image 7):	Seasonal sea level (Image 8):
<p>Difference from average sea surface height forecast for November 2022</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapfile data extracted from Flinders Marine Institute (2019). Maritime Boundaries Geodatabase: 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>Model run: 10/10/2022 Issued: 12/10/2022</p>	<p>Difference from average sea surface height forecast for November 2022 to January 2023</p> <p>Base period: 1981-2018 Model: ACCESS-S2 © Commonwealth of Australia 2022, Australian Bureau of Meteorology Shapfile data extracted from Flinders Marine Institute (2019). Maritime Boundaries Geodatabase: 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>Model run: 10/10/2022 Issued: 12/10/2022</p>
4-week Coral Bleaching (Image 9):	
<p>Pacific Ocean 4 Weeks Coral Bleaching Outlook: 30 October 2022</p> <p>©Commonwealth of Australia 2022 Australian Bureau of Meteorology, COSPAC CORP</p> <p>NOAA Coral Reef Watch</p>	<p>Tonga 4 Weeks Coral Bleaching Outlook: 30 October 2022</p> <p>©Commonwealth of Australia 2022 Australian Bureau of Meteorology, COSPAC CORP</p> <p>NOAA Coral Reef Watch</p>

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## Summary Statement

### Monthly and last three months: September 2022/July to September 2022 statement

September rainfall was above normal at Niuatoputapu, normal at Ha'apai and Fua'amotu, and below normal at Niuafo'ou, Vava'u and Nuku'alofa.

For July to September, above normal rainfall was recorded at Niuatoputapu and below normal rainfall was recorded for the rest of Tonga. Nuku'alofa recorded its third lowest rainfall for July to September on record.

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

### Monthly /Seasonal rainfall and temperature Outlook statements

Tonga's rainfall for November and over the November to January 2023 period is likely or very likely to be above normal across the country, especially in the south.

## Part 2: Recent Ocean summary statement

### Monthly and last three months: September/July to September 2022

Tonga experienced above average SSTs in September and July to September 2022. Differences from normal ranged from 0 to 0.5°C above in the northeast of the region, to 1.5°C to 2.0°C above in parts of the south.

Sea level anomaly was also above normal for September, reaching a maximum of 250mm above average.

## Part 2i. Monthly and Seasonal Outlooks for September and September to January 2023

The monthly and seasonal SST outlooks for Tonga forecast above normal SSTs ranging from 0.4 to 2.0 degrees Celsius above average for November and November to January 2023.

The monthly and seasonal sea surface height outlooks forecast near-normal sea surface heights in northern Tonga, and sea surface heights of 30mm to 100mm above normal over Tongatapu, Ha'apai and Vava'u. In addition, the southern EEZ of Tonga is forecast to have sea levels ranging from -30mm 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: September 2022	Stakeholder	Total Number of Participants	Number of male	Number of female
Climate Bulletin	3 September	Government ministries, NGOs, Media, Private sectors	155	118	37
EAR Watch					
Monthly Climate Briefing					
Ocean Outlook	3 September	Government ministries, NGOs, Media, Private sectors	155	118	37
Climate data request					
<b>Total</b>			<b>310</b>	<b>236</b>	<b>74</b>

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