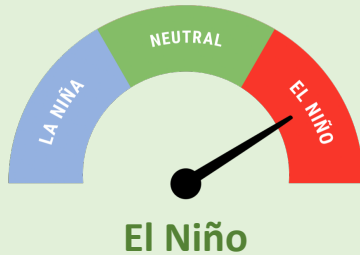


Island Climate Update



ENSO Watch
January 2024

Recent



El Niño was active during December and will very likely continue over the next three months.

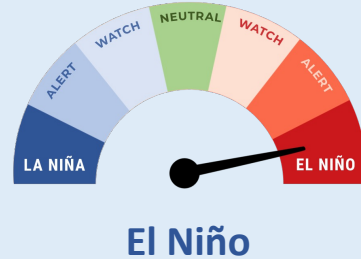
The Southern Oscillation Index (SOI) was -0.6 from October-December, on the El Niño side of neutral.

Tropical Pacific Ocean sea surface temperatures (SSTs) were within the range of a very strong El Niño during December.

100% chance for El Niño conditions to continue through **March 2024**

Chance for **neutral** conditions developing during **April-June 2024**

55%



Forecast

ENSO situation summary

El Niño continued during December and has around a 100% chance of persisting through March.

The monthly NINO3.4 Index anomaly (in the central equatorial Pacific) at the end of December was +2.01°C, within the range of a very strong El Niño (classified when the NINO3.4 Index is greater than 2.0°C).

The December 2023 NINO3.4 Index was exceeded by 2015, 1997, and 1982 with data back to 1981. From an oceanic perspective, this El Niño ranks with the most significant events in recent decades.

The Southern Oscillation Index (SOI) was in the neutral range during December (-0.4) and on the El Niño side of neutral during October-December (-0.6). This implies that El Niño's reflection in the atmosphere, via pressure and circulation patterns, has been atypical.

Trade wind strength was below or well below normal in the central and west-central equatorial Pacific during December. Trade wind strength is forecast to gradually increase during January. Based on this, it's likely that the El Niño event is near peak intensity as of early January.

In the sub-surface central and eastern equatorial Pacific Ocean, anomalies of +3°C to +6°C were occurring in the upper 100 metres as of late December. Anomalies of +2°C persisted near the International Dateline, giving the El Niño more of a "full-basin" appearance rather than a classical, east-based event.

In the sub-surface western equatorial Pacific, waters were 1 to 3°C cooler than average, signalling a shifting oceanic state and one that is favoured to return to neutral conditions between April-June as this cooler water gradually pushes eastward.

A marine heatwave is active between northern Vanuatu and Fiji, extending eastward to near Samoa and westward toward Papua New Guinea. While tropical cyclone activity looks unlikely during early-to-mid January, a pulse of the Madden-Julian Oscillation during late January into February may trigger development. All islands should remain vigilant, as tropical cyclone season continues through April.

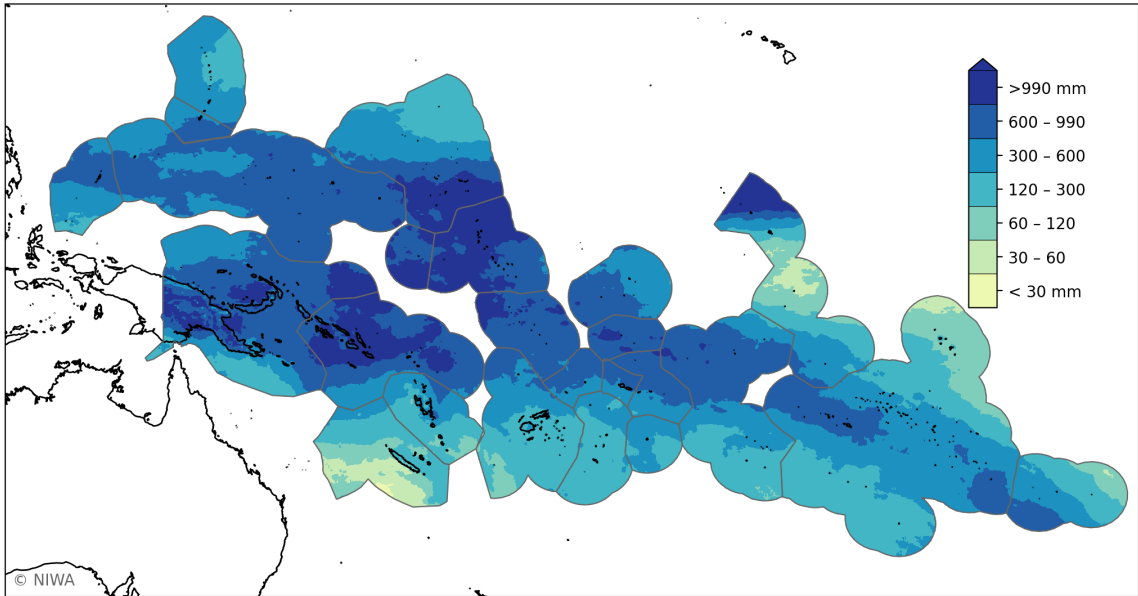
Regional situation summary (2 January 2024)

Rainfall summaries for the last month and three months are shown below.

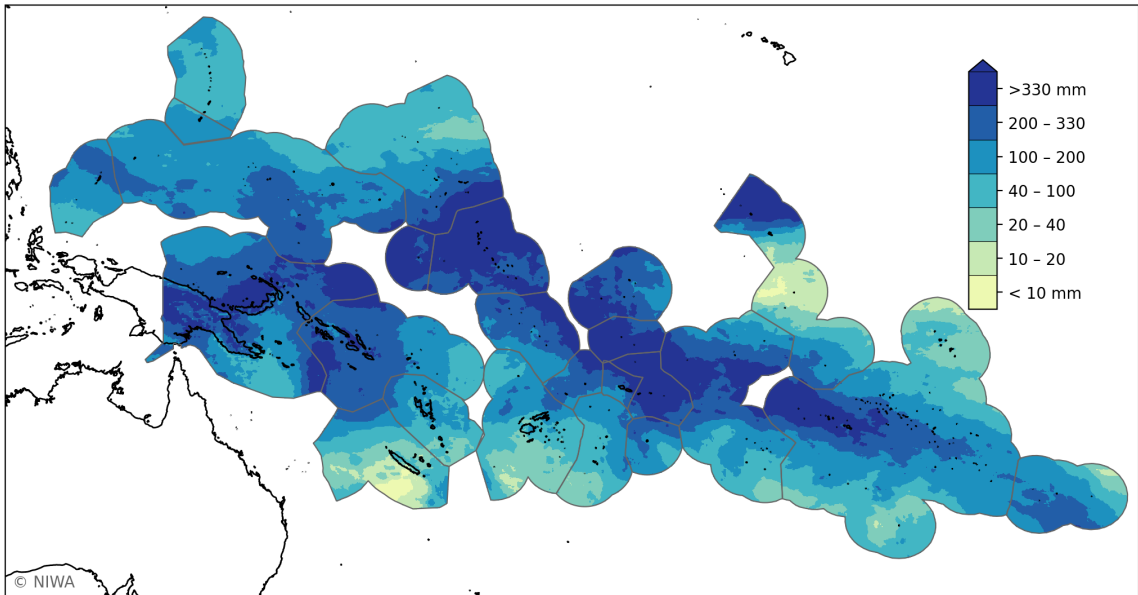
During October-December (top plot), over 990 mm of rain fell across parts of the southern Marshall Islands, parts of Papua New Guinea (PNG), the Solomon Islands, Nauru, the Gilbert Islands, the northern Line Islands, and Tuvalu. Less than 60 mm of rain fell in parts of New Caledonia.

During December (bottom plot), over 330 mm of rain fell across parts of southern Marshall Islands, Gilbert Islands, Phoenix Islands, northern Line Islands, PNG, Solomon Islands, Tokelau, Samoa, American Samoa, northern Cook Islands, and Society Islands. Less than 40 mm of rain fell in New Caledonia, Fiji, central Line Islands, and Marquesas. Southern Cook Islands (Rarotonga) and southern Tonga ('Eua/Tongatapu) have also reported abnormally dry conditions over the last few months.

Cumulative rainfall (mm), source: MSWEP 2.8.0
90 days to 02 Jan 2024



Cumulative rainfall (mm), source: MSWEP 2.8.0
30 days to 02 Jan 2024

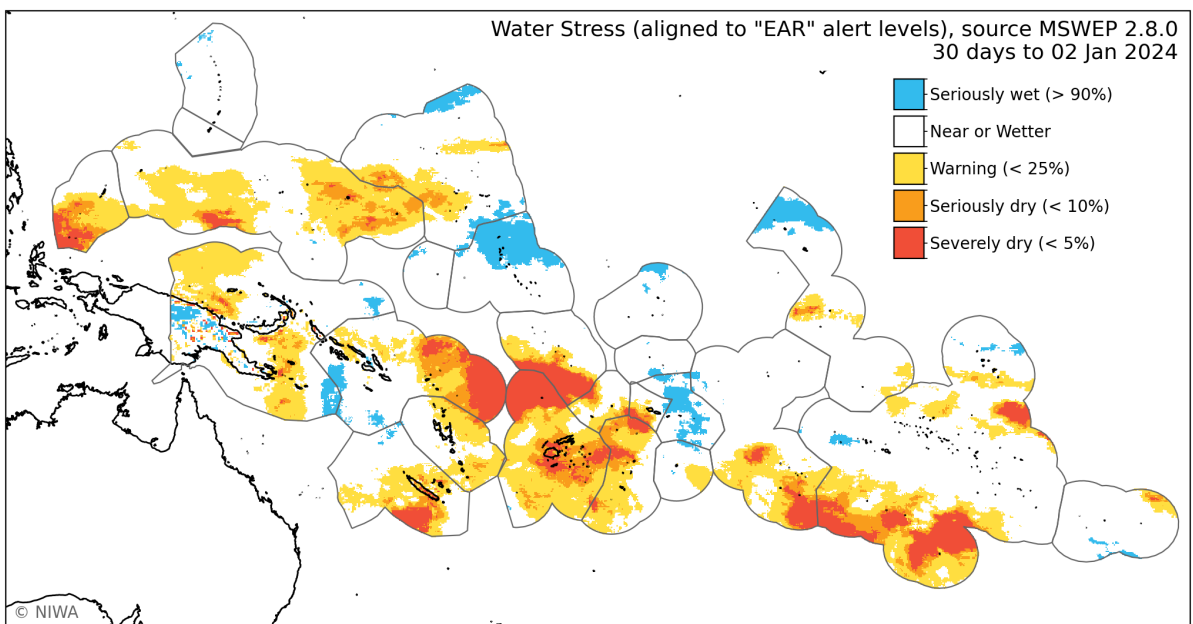
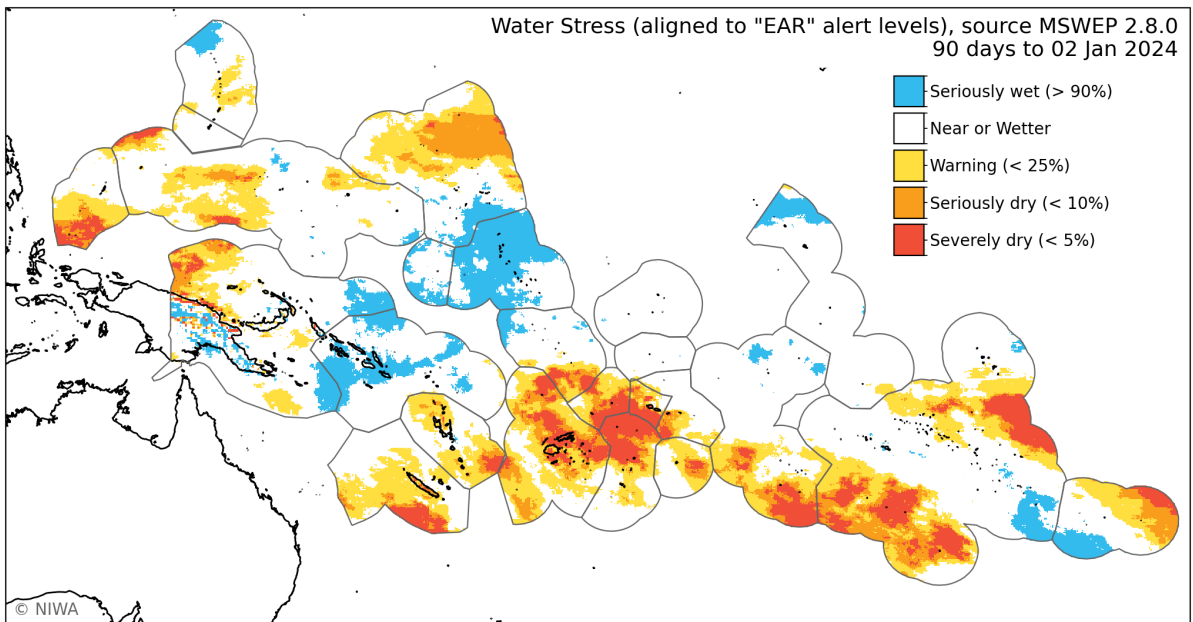


EAR regional situation summary (2 January 2024)

The regional thresholds for cumulative rainfall over the last 90 and 30 days are shown in the plots below.

During October-December (top plot), severely or seriously dry conditions affected parts of Palau, Federated States of Micronesia (FSM), Marshall Islands, PNG, Tuvalu, New Caledonia, Vanuatu, Fiji, Wallis & Futuna, Samoa, American Samoa, Tonga, Niue, southern Cook Islands, Austral Islands, Tuamotu Archipelago, and Pitcairn Islands.

During December (bottom plot), severely or seriously dry conditions affected parts of Palau, FSM, Marshall Islands, PNG, Solomon Islands, Tuvalu, New Caledonia, Fiji, Samoa, Tonga, southern Cook Islands, and Austral Islands.

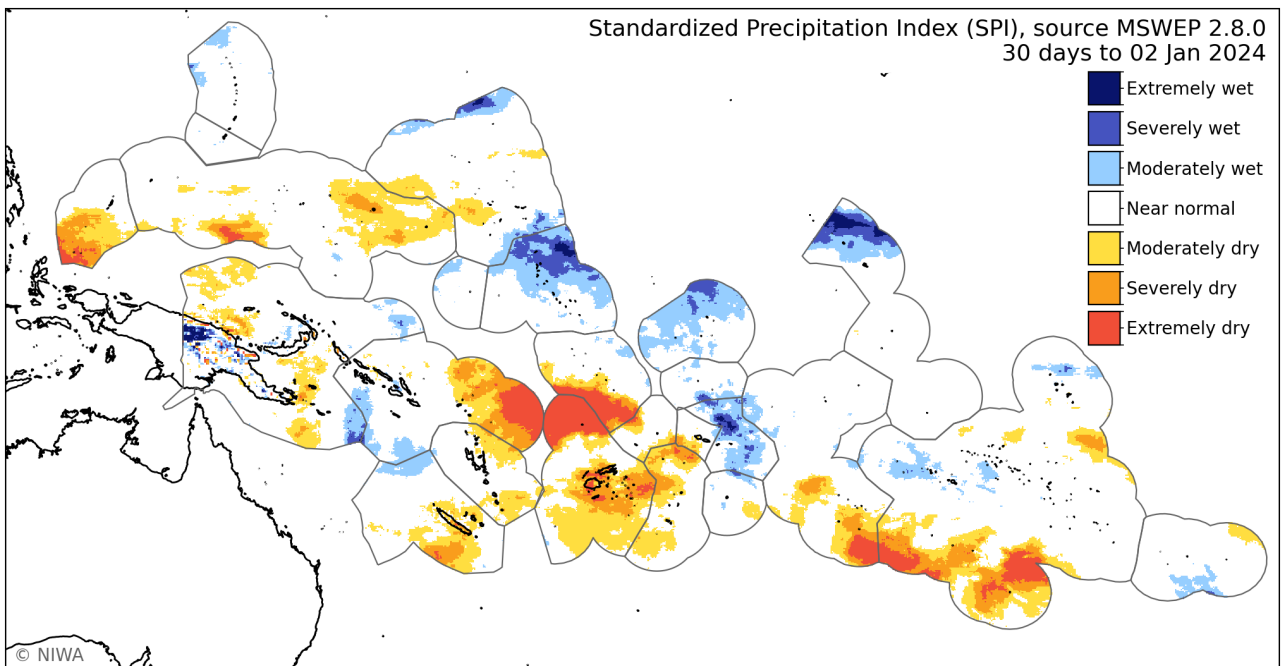
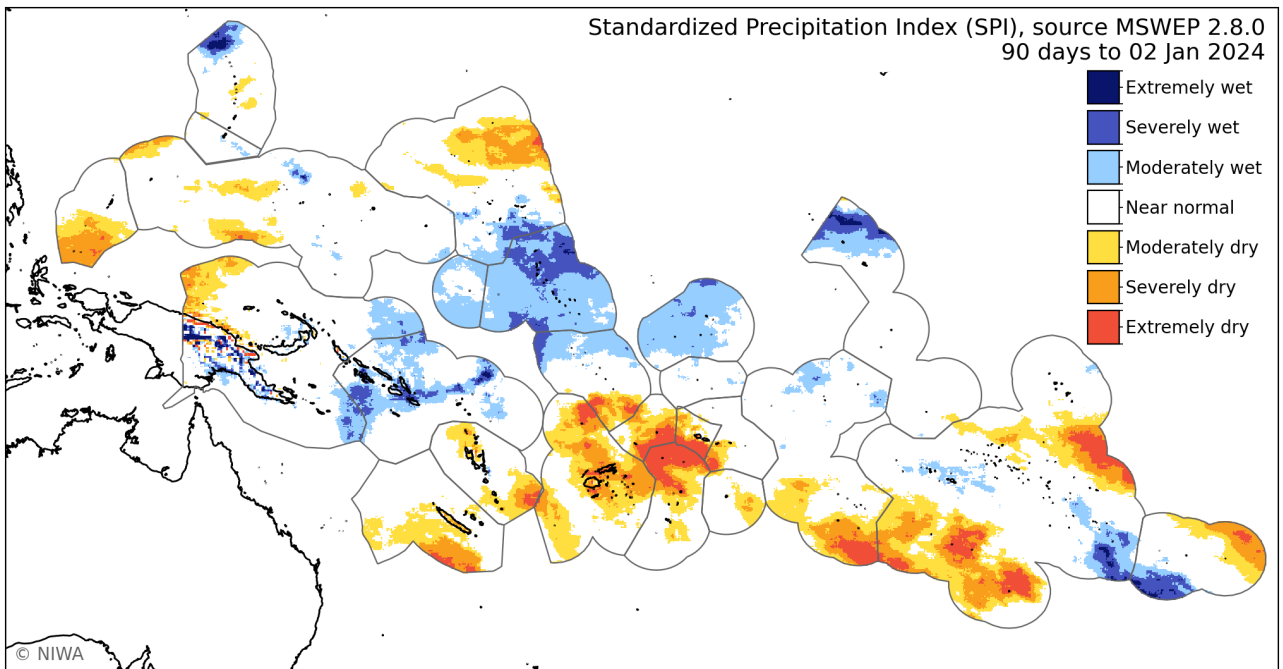


SPI Regional situation summary (2 January 2024)

The Standardized Precipitation Index (SPI) thresholds for cumulative rainfall over the last 90 and 30 days are shown in the plots below.

During October-December (top plot), extremely or severely dry conditions occurred in parts of Palau, PNG, New Caledonia, Vanuatu, Fiji, Wallis & Futuna, Samoa, American Samoa, Tonga, southern Cook Islands, and Austral Islands.

During December (bottom plot), extremely or severely dry conditions occurred in parts of Palau, FSM, PNG, Solomon Islands, New Caledonia, Tuvalu, Fiji, Tonga, southern Cook Islands, and Austral Islands.

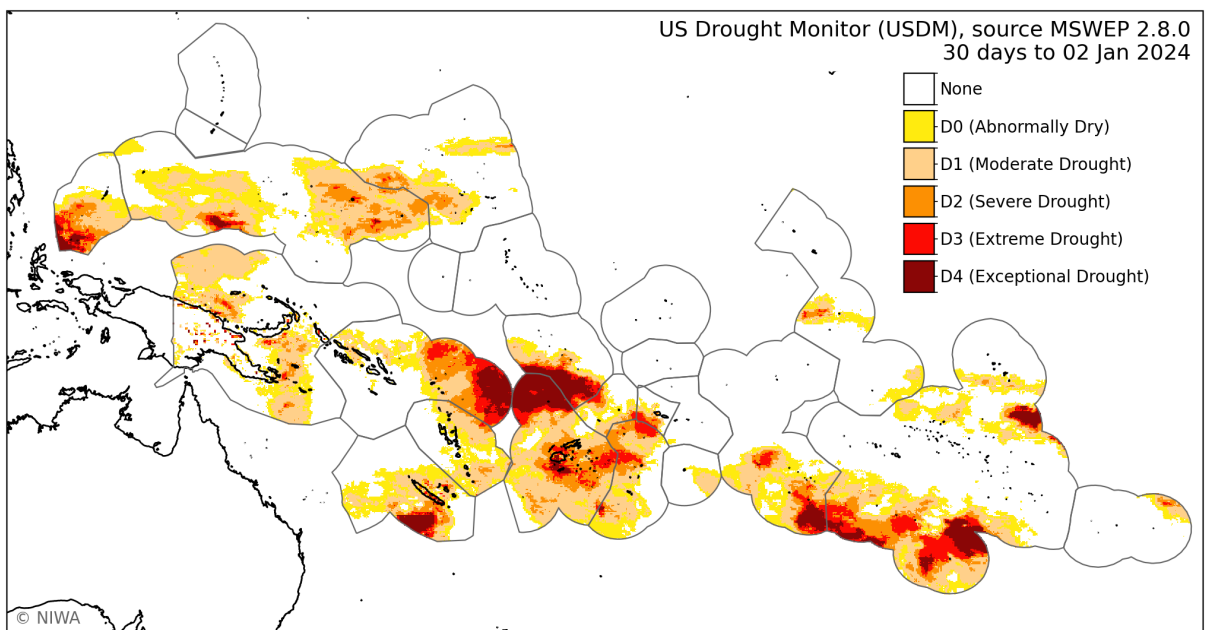
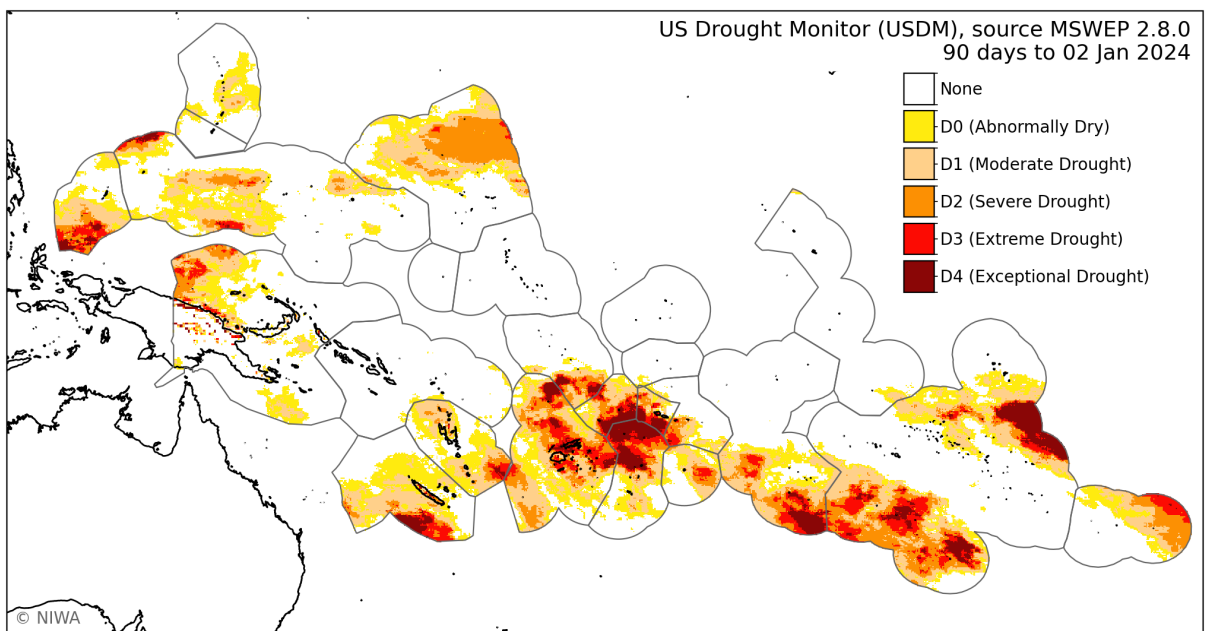


USDM Regional situation summary (2 January 2024)

The US Drought Monitor Index (USDM) levels for cumulative rainfall over the last 90 and 30 days are shown in the plots below.

During October-December (top plot), extreme or exceptional drought occurred in parts of Palau, FSM, Marshall Islands, PNG, Tuvalu, New Caledonia, Vanuatu, Fiji, Wallis & Futuna, Samoa, American Samoa, Tonga, southern Cook Islands, the northern Tuamotu Archipelago, and Austral Islands.

During December (bottom plot), extreme or exceptional drought occurred in parts of Palau, FSM, PNG, New Caledonia, Fiji, Tonga, southern Cook Islands, and Austral Islands.

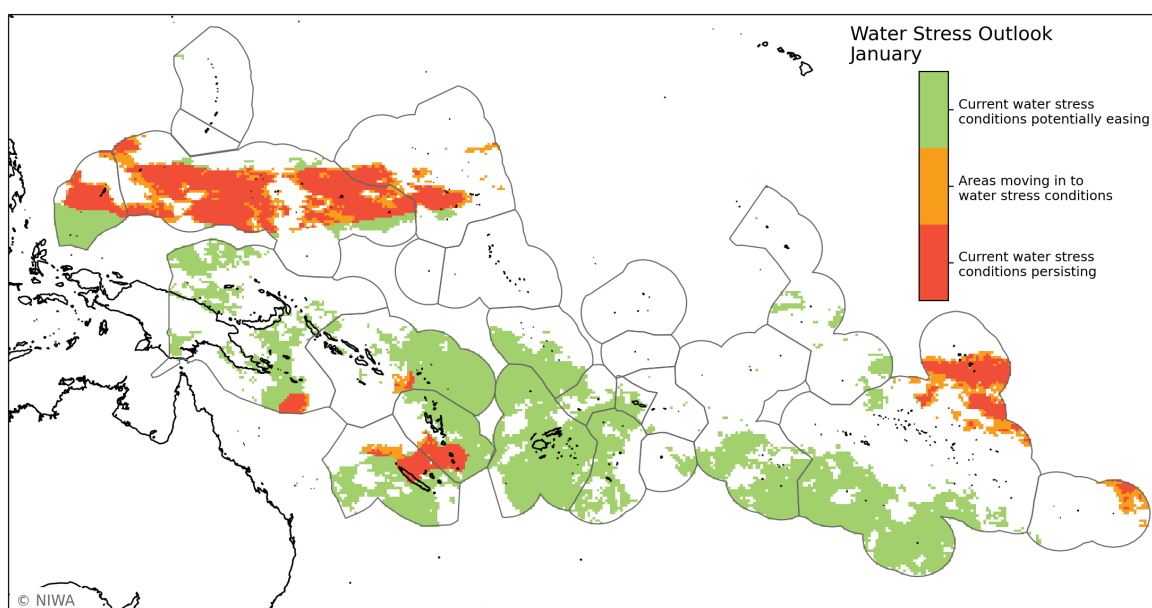
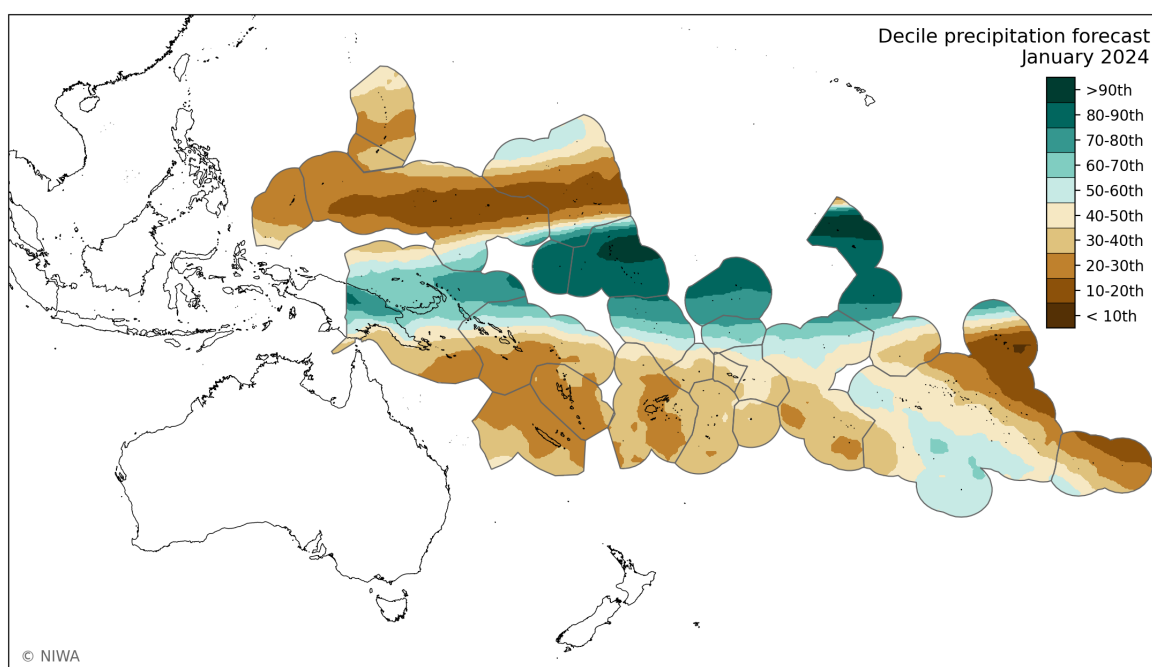


January 2024 forecast summary

During January, below normal rainfall is favoured in Northern Marianas, Gaum, Palau, most of FSM, Marshall Islands, southern PNG, Solomon Islands, New Caledonia, Vanuatu, Fiji, Wallis & Futuna, Samoa, American Samoa, Tonga, Niue, Southern Cook Islands, Marquesas, Austral Islands, Tuamotu Archipelago, and Pitcairn Islands.

Above normal rainfall is favoured in southern FSM, most of PNG, Nauru, Kiribati, Tuvalu, Tokelau, and parts of the Austral Islands.

Water stress conditions may persist or develop in parts of Palau, FSM, Marshall, Islands, New Caledonia, Vanuatu, Marquesas, and northern Tuamotu Archipelago,

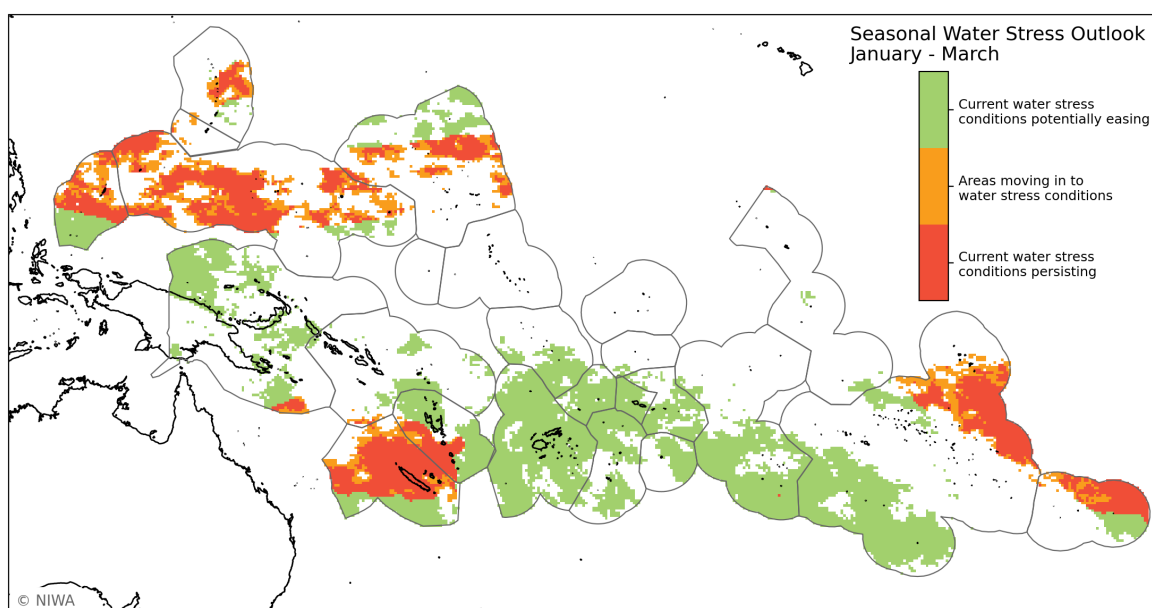
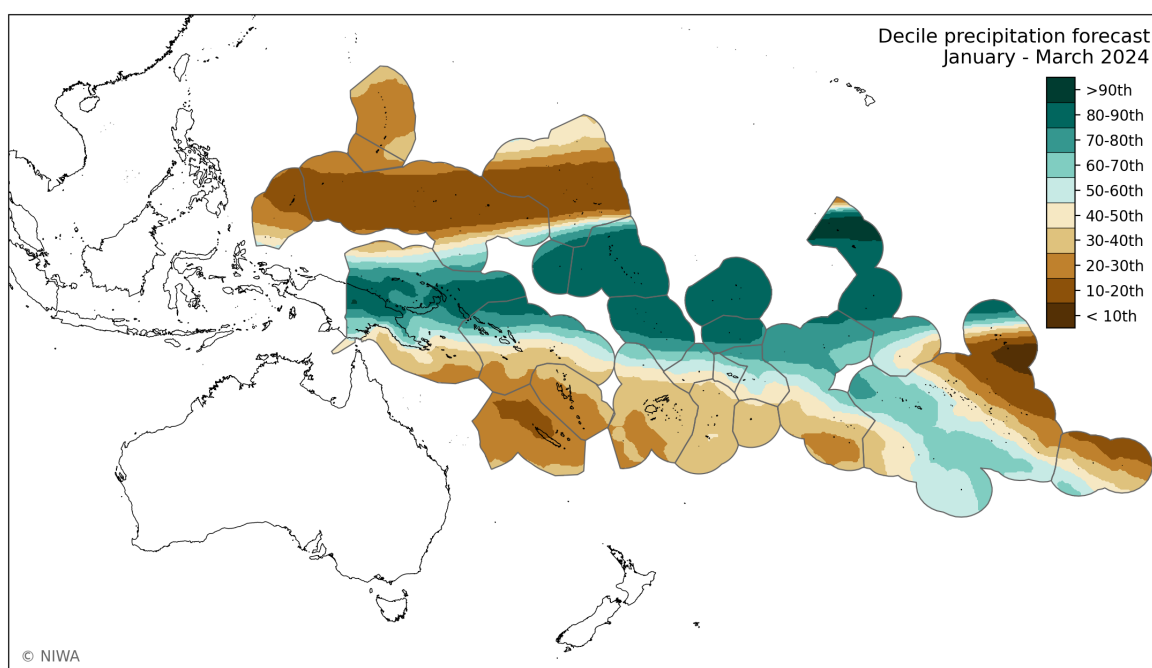


January-March 2024 forecast summary

During January-March, below normal rainfall is favoured across Northern Marianas, Guam, Palau, most of FSM, Marshall Islands, southern PNG, southern Solomon Islands, New Caledonia, Vanuatu, Wallis & Futuna, Fiji, Tonga, Niue, southern Cook Islands, southern Marquesas, Tuamotu Archipelago, and Pitcairn Islands.

Above normal rainfall is favoured in southern FSM, northern PNG, northern Solomon Islands, Nauru, Kiribati, Tuvalu, Tokelau, northern Cook Islands, Society Islands, and Austral Islands.

Water stress conditions may persist or develop in parts of the Northern Marianas, Palau, FSM, Marshall Islands, New Caledonia, Vanuatu, Marquesas, and Pitcairn Islands.

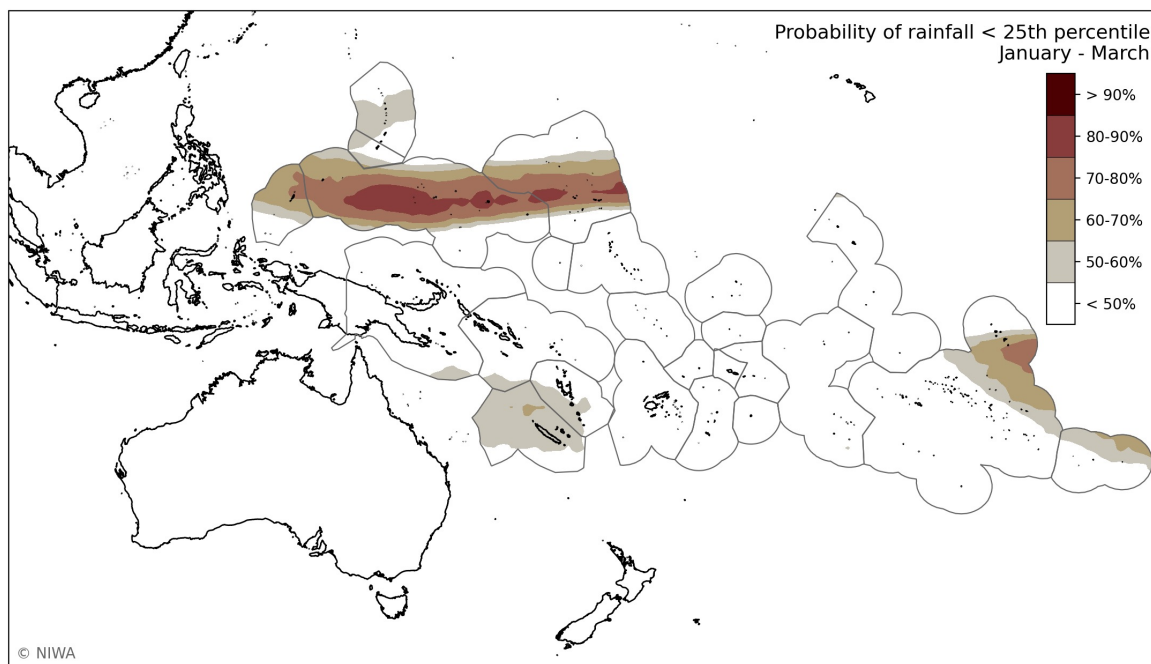
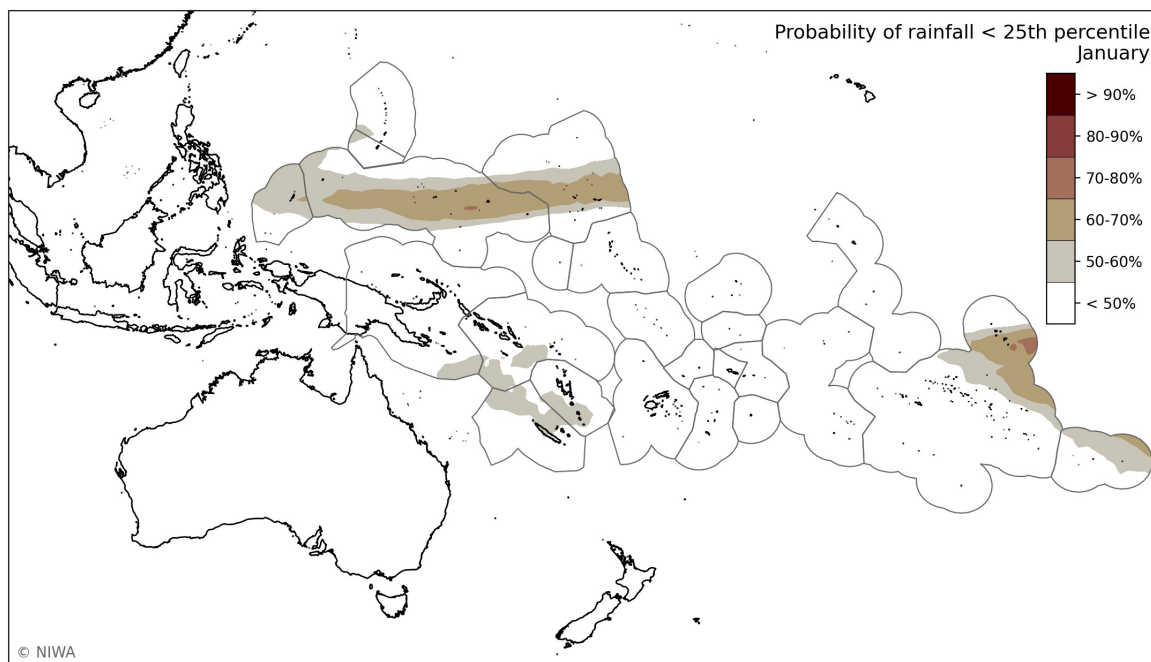


Probabilities of rainfall < 25th percentile

The probability (likelihood) of very dry conditions with cumulative rainfall being less than the 25th percentile for January (top plot) and for the season January-March (bottom plot) are shown.

For January, the highest chances for very dry conditions are across Palau, FSM, Marshall Islands, New Caledonia, southern Vanuatu, Marquesas, northern Tuamotu Archipelago, and Pitcairn Islands.

For January-March, the highest chances for very dry conditions are across Northern Marianas, Palau, FSM, Marshall Islands, New Caledonia, Vanuatu, Marquesas, northern Tuamotu Archipelago, and Pitcairn Islands.



Island Climate Update



About

Understanding the Island Climate Update bulletin

The ICU utilises rainfall data from the [Multi-Source Weighted-Ensemble Precipitation](#) (MSWEP) and a multi-model ensemble forecast utilising 550+ members derived from nine global climate models available from the [Copernicus Data Store](#).

Bulletin page	Description
Rainfall watch	Rainfall plots are derived from MSWEP data. Regional rainfall accumulation is shown for the last 30 days (1 month) and 90 days (3 months).
Water stress watch	Plots are derived from MSWEP data. Different Pacific Island Meteorological Services use different approaches to defining drought and water stress. Hence current regional water stress classifications are shown for the Early Action Rainfall (Page 3), Standard Precipitation Index (Page 4) and US Drought Monitoring (Page 5) alert levels for the last 90 and 30 days of accumulated rainfall.
Water stress outlook	<p>Outlook water stress classifications are based on both the satellite rainfall data and a multi-model ensemble forecast derived from nine global climate models for the next month and three months.</p> <p>The top plots on each page show the rainfall decile band for the next 1 and 3 months for which the cumulative probability derived from the multi-model ensemble forecasts reaches 50%.</p> <p>The bottom plots bring together conditions over the past 3 months and forecast conditions over the next month:</p> <ul style="list-style-type: none"> • Current water stress conditions potentially easing: Past 3 month accumulation less than 25th percentile. 1 month / seasonal accumulation forecast greater than 25th percentile. • Areas moving in to water stress: Past 3 month accumulation between the 40th and 25th percentile. 1 month / seasonal accumulation forecast less than 25th percentile. • Current water stress conditions persisting: Past 3 month accumulation less than 25th percentile. 1 month / seasonal accumulation forecast less than 25th percentile. <p>The final page shows the probability that forecast rainfall over the next 1 or 3 months is within the lowest 25% of cumulative rainfall over the same period (a measure of the confidence in a low rainfall forecast).</p>
<p>Online Resources</p>	<p>Additional regional and country-level resources are available online:</p> <ul style="list-style-type: none"> • Daily updated plots for 30, 60, 90, 180 and 365 day: accumulative rainfall, number of dry days, number of days since last rainfall > 1 mm, EAR, SPI and USDM indices. • A range of probabilistic one to five monthly and seasonal forecast plots updated around the 11th of each month. • Click here for the imagery and here for the underlying data.



NIWA is the Network co-lead for the [WMO RA V Regional Climate Centre Node](#) on Long Range Forecast and consortium member for nodes on Climate Monitoring, Operational Data Services and Training.

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