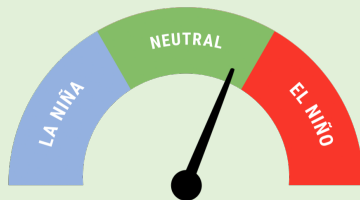


Island Climate Update



ENSO Watch
September 2023

Recent



ENSO-neutral

An El Niño Alert continued during August. The ocean-atmosphere system is expected to move into El Niño conditions during September.

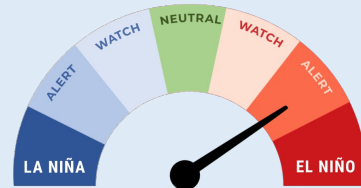
The Southern Oscillation Index (SOI) was -1.0 in August, on the El Niño threshold.

Tropical Pacific sea surface temperatures (SSTs) remained well above El Niño thresholds during August.

95% chance for **El Niño** conditions to develop sometime during **September-November 2023**

Chance for **El Niño** conditions persisting during **December 2023-February 2024**

95%



El Niño Alert

Forecast

ENSO situation summary

The monthly NINO3.4 Index anomaly (in the central equatorial Pacific) at the end of August was +1.34°C. The weekly value reached +1.5°C at the end of the month – the traditional threshold for a strong oceanic El Niño. Only August 1997 featured warmer conditions in the east-central Pacific (NINO1.2 and NINO3 Index) with records dating back to 1981.

The SOI was on the El Niño threshold (-1.0) during August. The SOI exhibited a negative, El Niño-like trend during August. Should this continue during September, the conditions needed to officially classify El Niño may be reached.

Trade wind strength was below normal in the west-central Pacific and near or above normal farther east during August. There is the potential for a major reduction in trades in the west-central Pacific during late September, which may spawn a downwelling Kelvin Wave. The Kelvin Wave would cause additional warming in the central and eastern Pacific, potentially resulting a very strong El Niño by the end of the year.

In the sub-surface eastern equatorial Pacific Ocean, remarkable anomalies of 5 to 7°C above average were occurring in the upper 100 m as of late August.

The distribution of the anomalously warm water is consistent with the development of an east-based, canonical (classical) El Niño event. The abnormally warm waters are predicted to surface and expand westward over the course of the next three to six months, culminating in a strong or very strong El Niño event that may rival records.

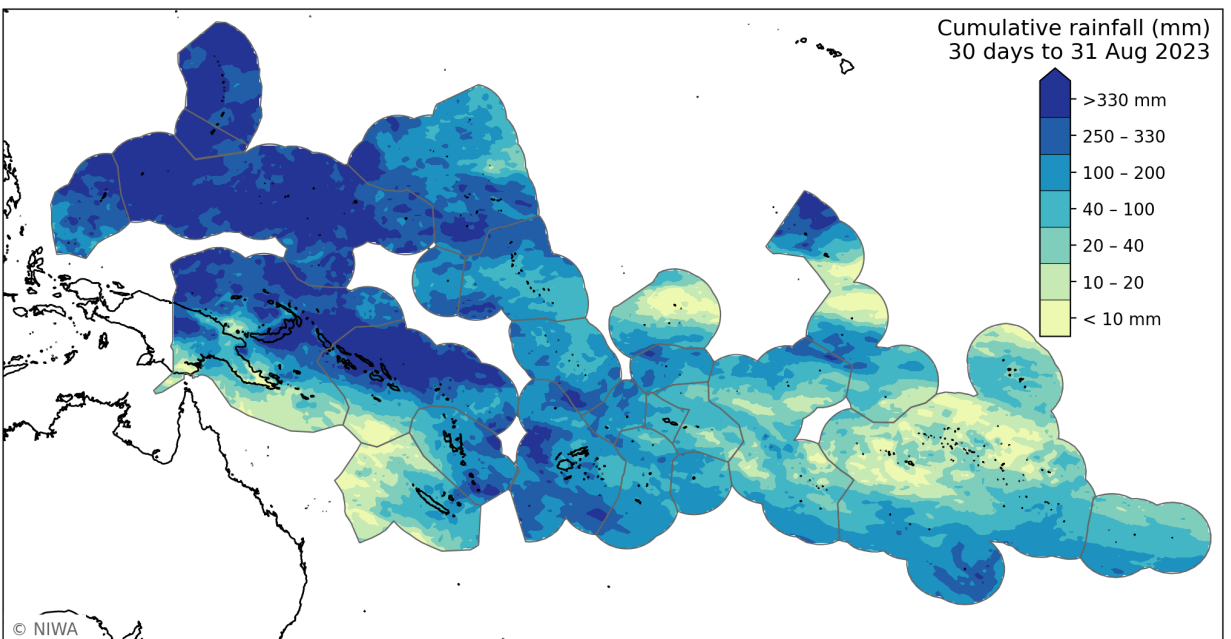
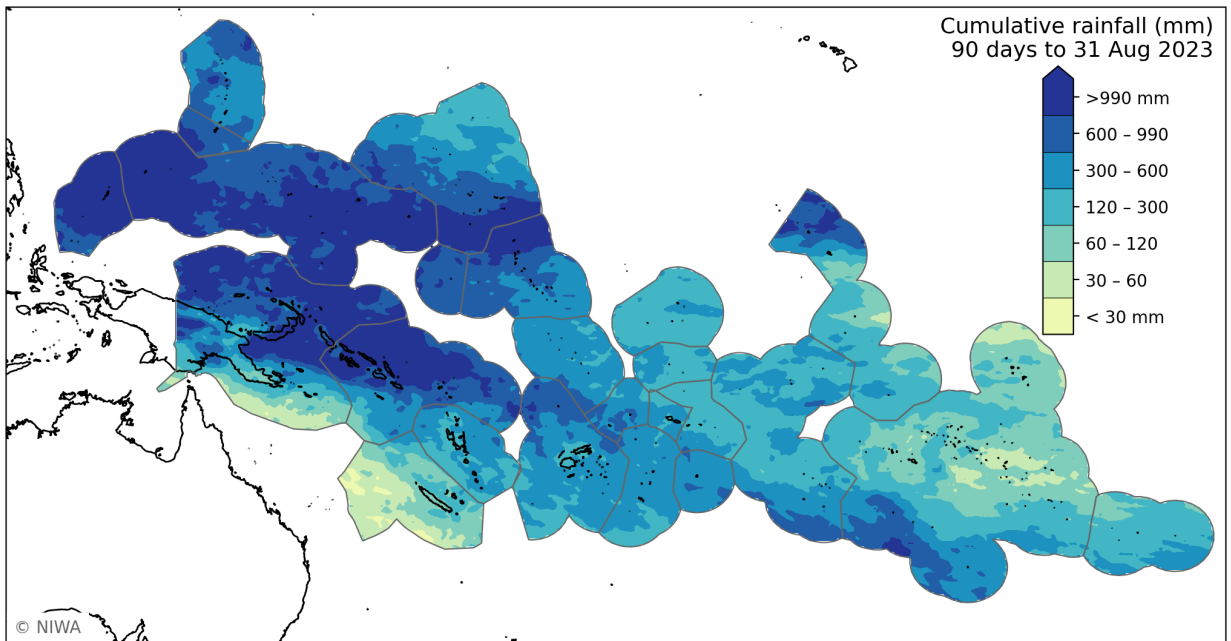
NIWA's analysis indicates that oceanic indicators have reached El Niño thresholds and atmospheric indicators are likely to be sustained in the El Niño range over the next month. El Niño, once it develops, has a 95% chance of continuing through February 2024.

Regional situation summary (31 August 2023)

Satellite-derived rainfall summaries for the last month and three months are shown below.

During June-August (top plot), parts of Tuamotu Archipelago received less than 60 mm of rain. Over 990 mm fell across parts of Palau, Federated States of Micronesia (FSM), southern Marshall Islands, northern Gilbert Islands, northern Papua New Guinea (PNG), and the Solomon Islands.

During August (bottom plot), less than 40 mm of rain fell in parts of southern PNG, Phoenix Islands, Gilbert Islands, Society Islands, and Tuamotu Archipelago. Over 330 mm fell across Northern Marianas, Guam, Palau, FSM, southern Marshall Islands, and southern Vanuatu.

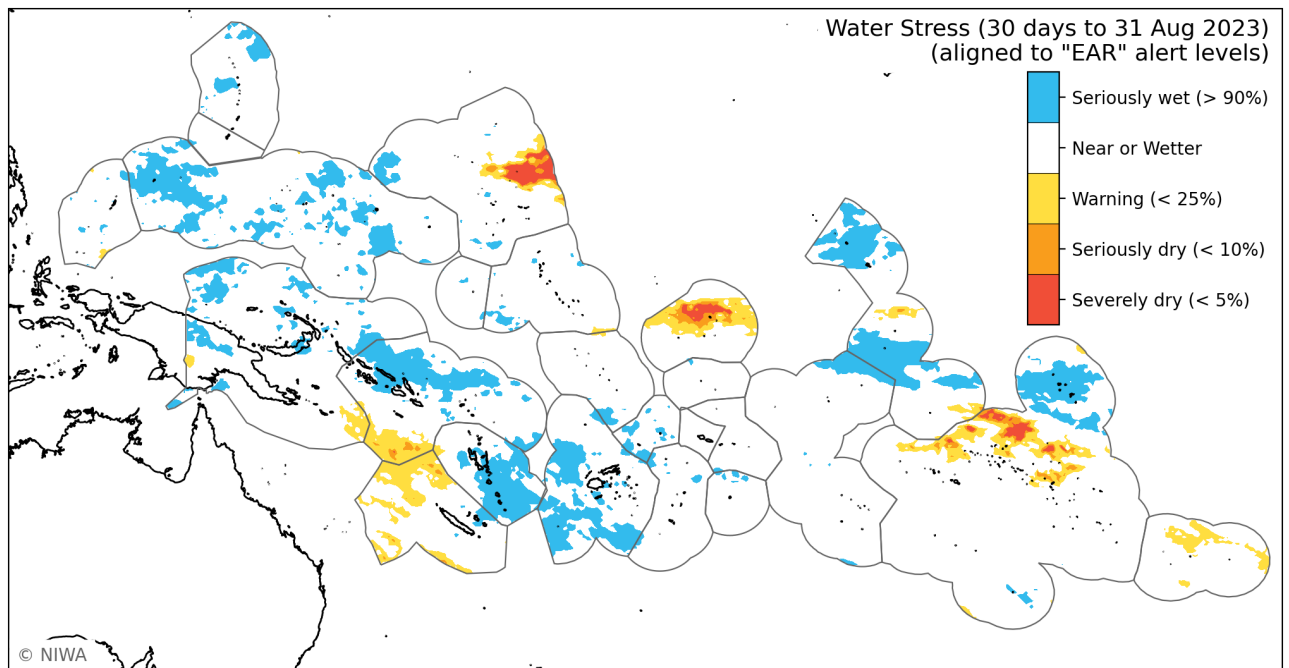
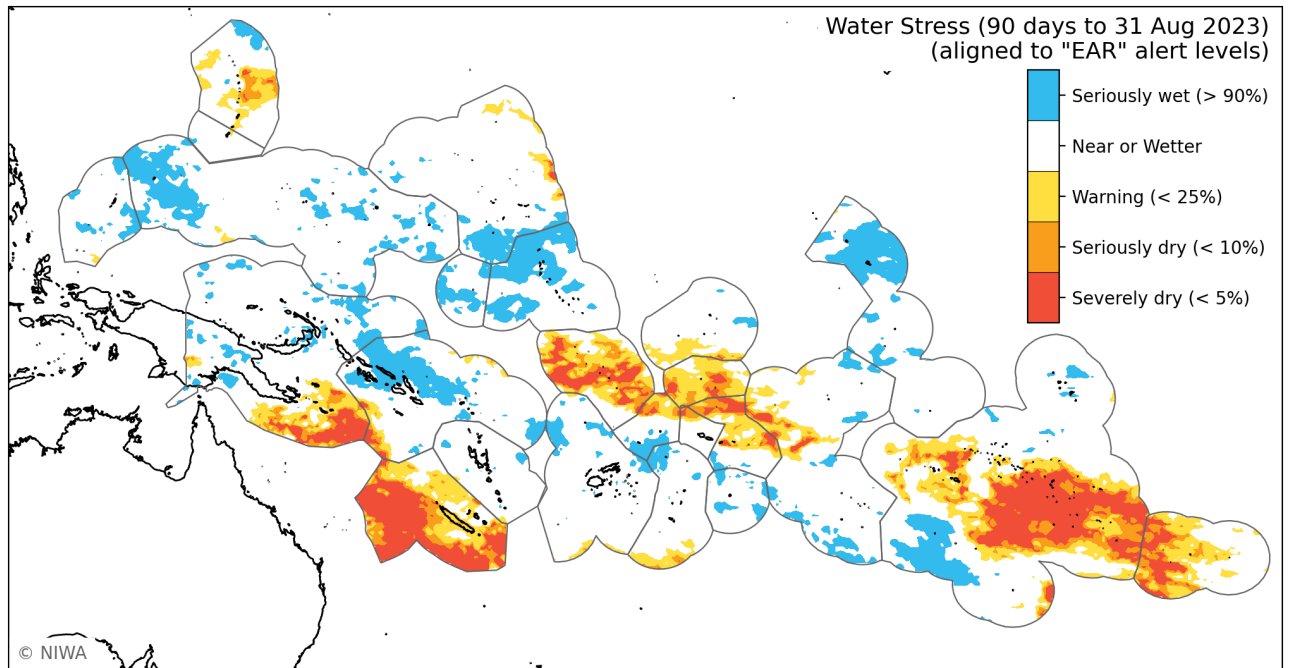


EAR regional situation summary (31 August 2023)

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

During June-August (top plot), severely or seriously dry conditions affected parts of New Caledonia, Tuvalu, Tokelau, American Samoa, Society Islands, Tuamotu Archipelago, and Pitcairn Islands.

During August (bottom plot), severely or seriously dry conditions affected parts of the Marshall Islands, the Phoenix Islands, and Tuamotu Archipelago.

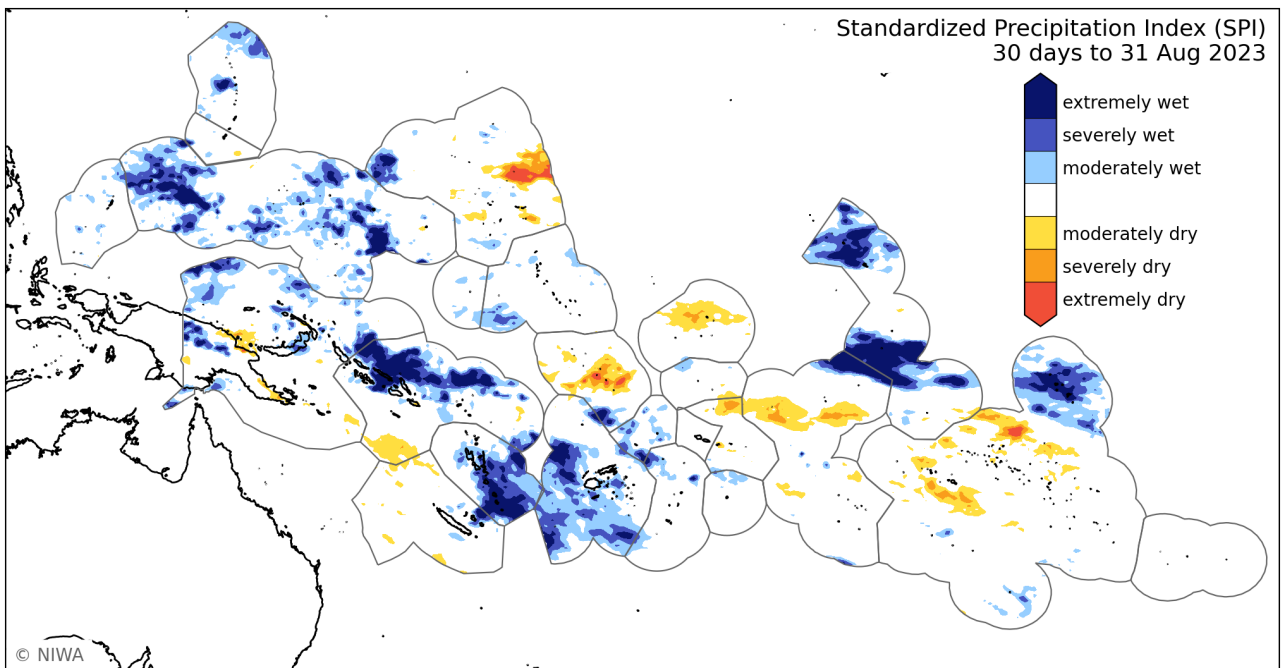
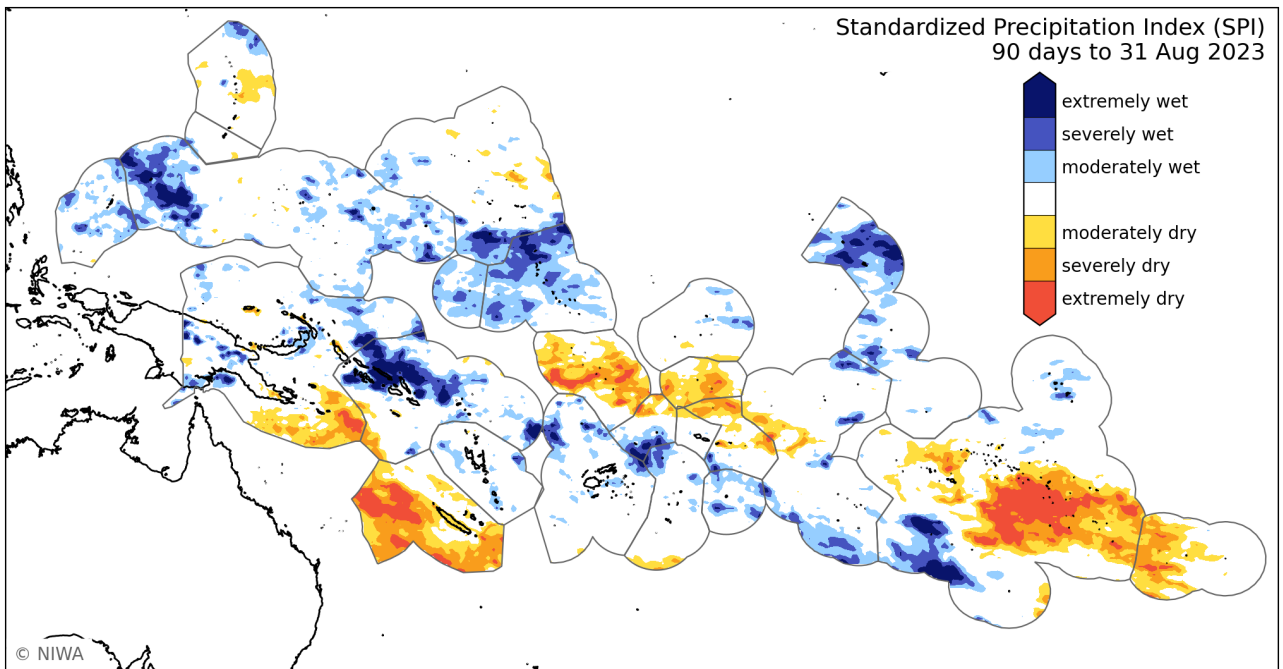


SPI Regional situation summary (31 August 2023)

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

During June-August (top plot), extremely or severely dry conditions occurred in parts of Tuvalu, Tokelau, American Samoa, Society Islands, Tuamotu Archipelago, and Pitcairn Islands.

During August (bottom plot), extremely or severely dry conditions occurred in isolated parts of the Marshall Islands and Tuvalu.

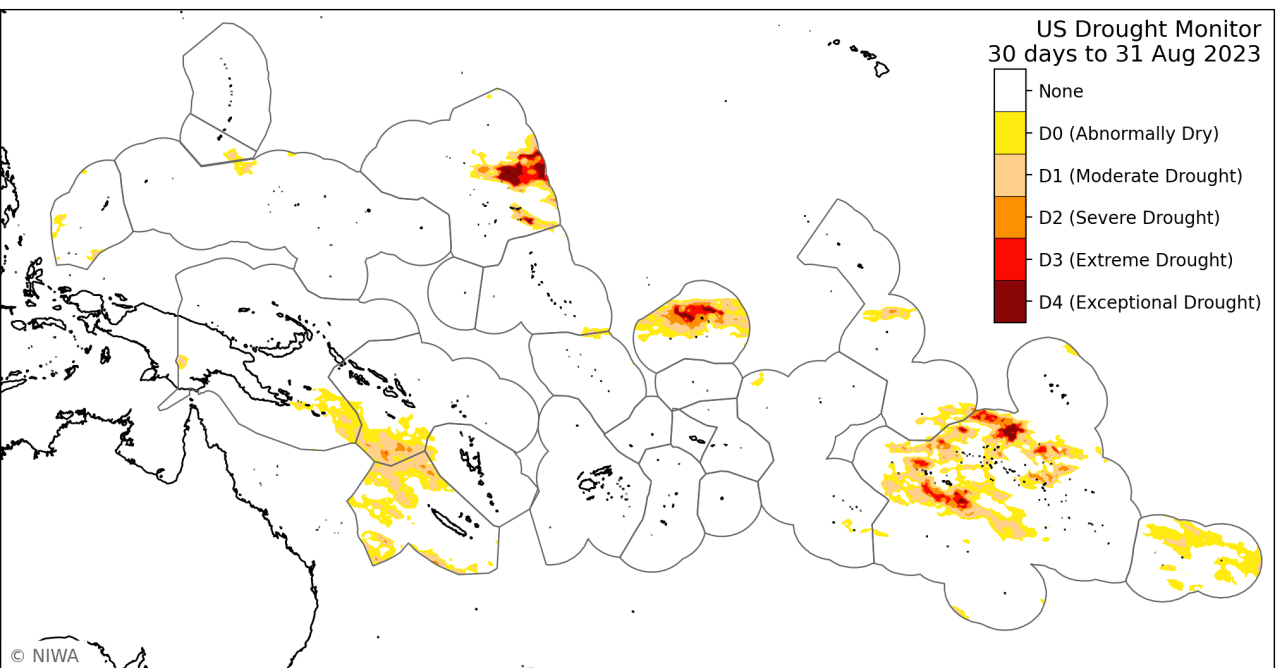
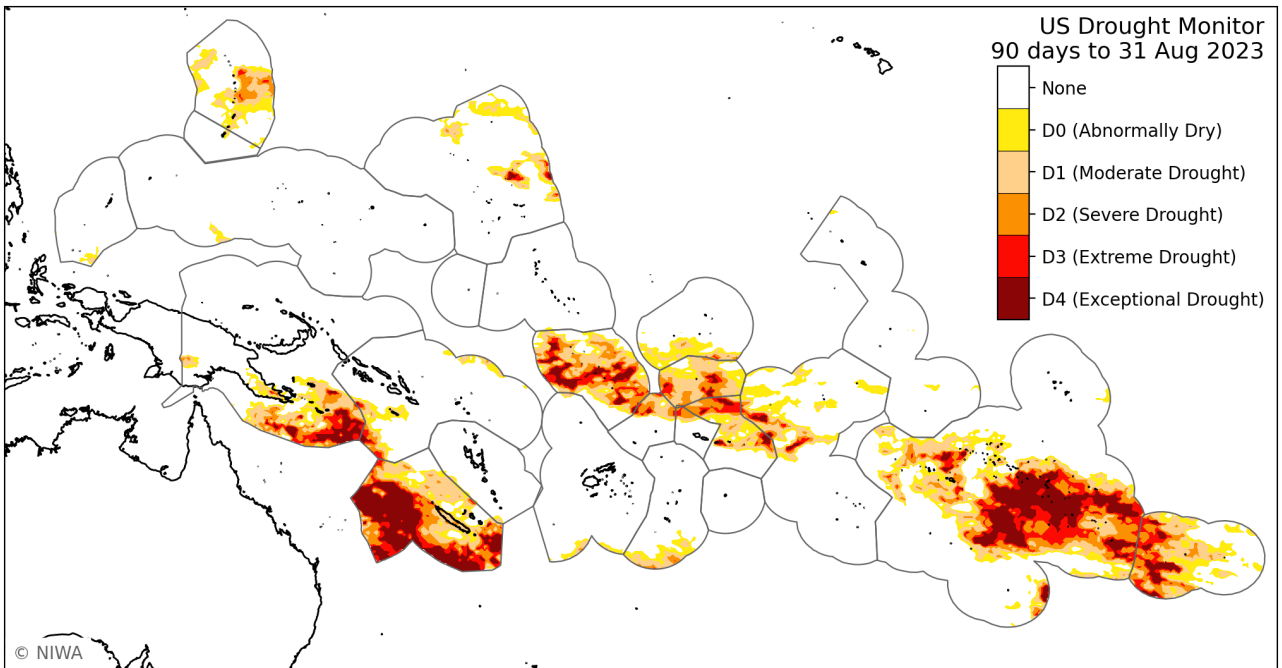


USDM Regional situation summary (31 August 2023)

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

During June-August (top plot), extreme or exceptional drought occurred in isolated parts of the Marshall Islands, southern PNG, New Caledonia, Tuvalu, Tokelau, American Samoa, Society Islands, Tuamotu Archipelago, and Pitcairn Islands.

During August (bottom plot), extreme or exceptional drought occurred in isolated parts of the Northern Marianas, the Phoenix Islands, Society Islands, and Tuamotu Archipelago.

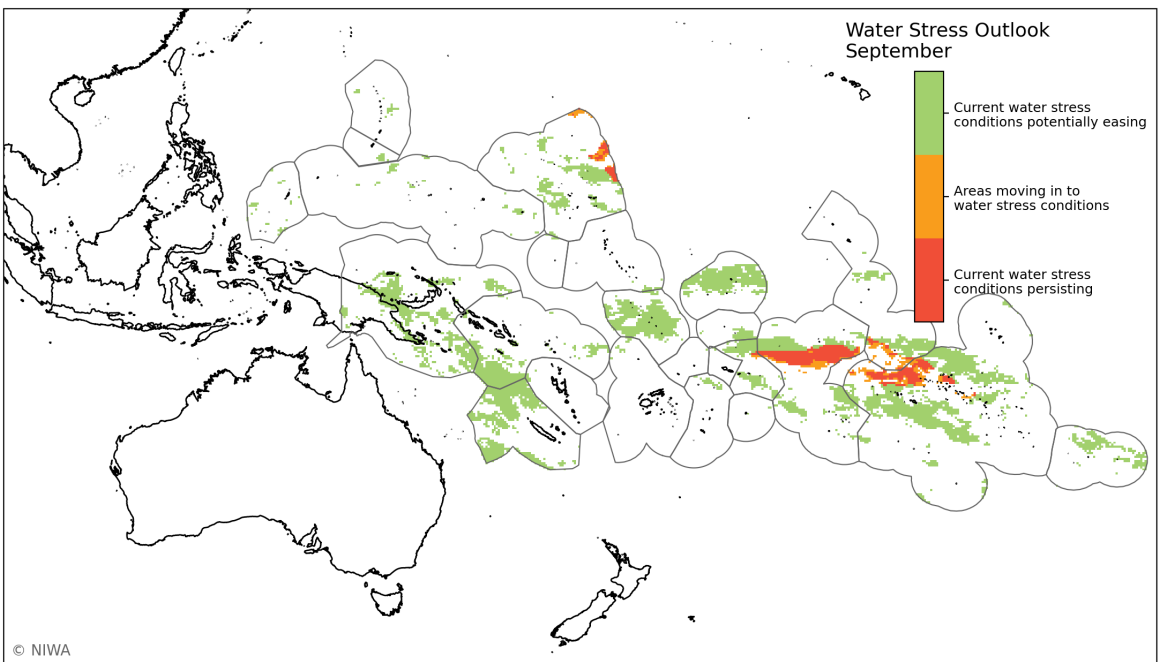
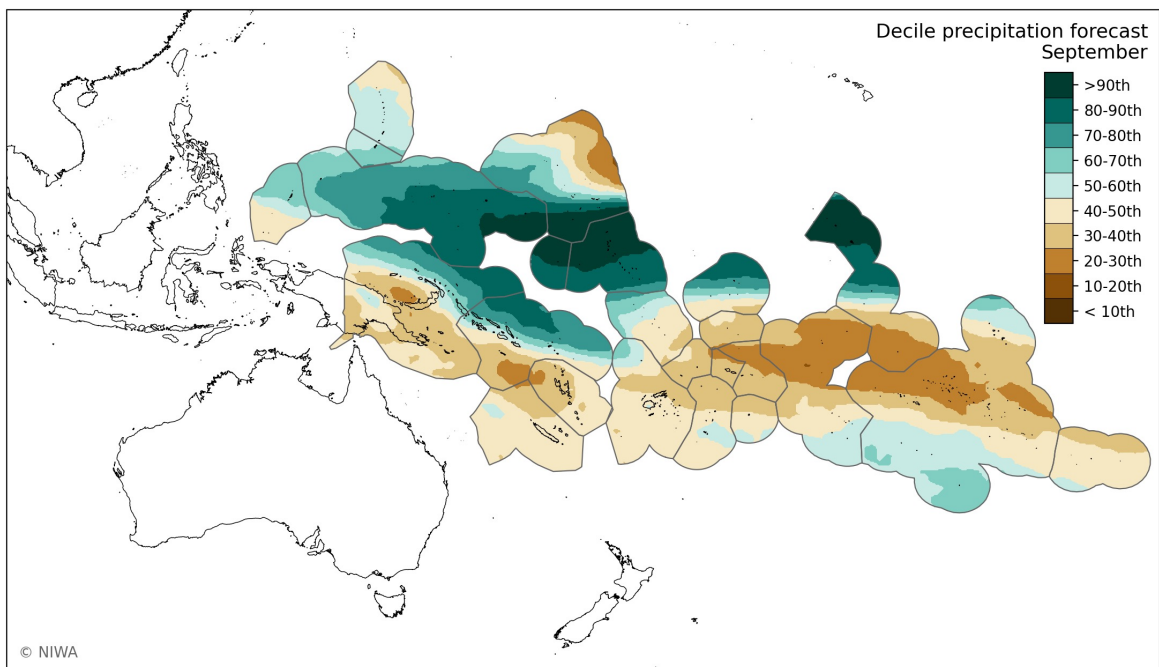


September 2023 forecast summary

During September, below normal rainfall is forecast across many island groups, including parts of the Marshall Islands, PNG, southern Solomon Islands, New Caledonia, Vanuatu, Fiji, Tokelau, Tuvalu, Samoa, American Samoa, Tonga, Niue, Cook Islands, Society Islands, Tuamotu Archipelago, Marquesas, and Pitcairn Islands.

Above normal rainfall is forecast in Northern Marianas, Guam, Palau, FSM, Marshall Islands, northern Solomon Islands, Nauru, Gilbert Islands, Phoenix Islands, Line Islands, and Austral Islands.

Water stress conditions may persist or develop in parts of the Marshall Islands, Northern Cook Islands, and parts of the northern Tuamotu Archipelago.

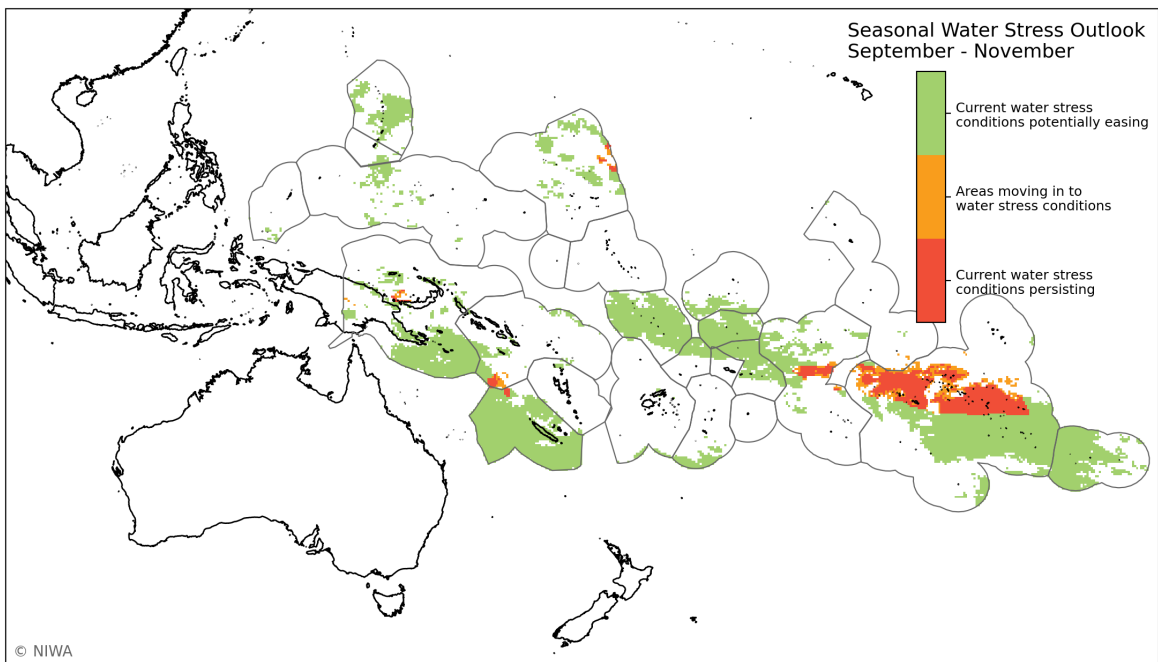
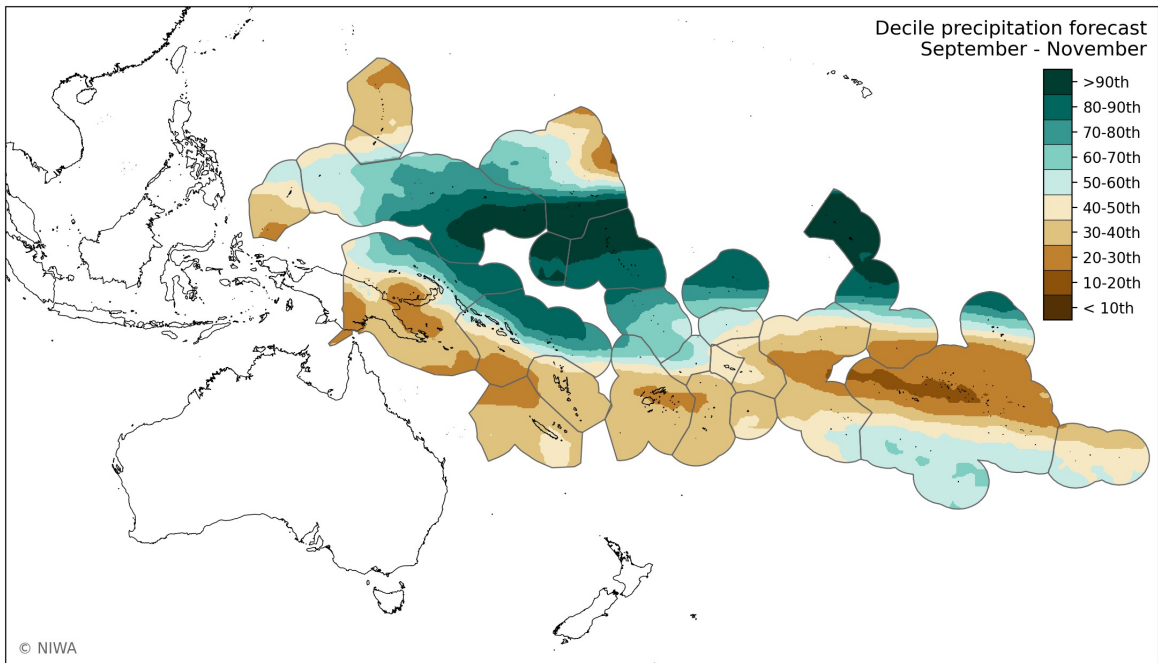


September-November 2023 forecast summary

During September-November, below normal rainfall is forecast across many island groups, including Northern Marianas, Guam, Palau, parts of the Marshall Islands, PNG, southern Solomon Islands, New Caledonia, Vanuatu, Fiji, Samoa, American Samoa, Tonga, Niue, Cook Islands, Society Islands, Tuamotu Archipelago, southern Marquesas, and Pitcairn Islands.

Above normal rainfall is forecast in FSM, parts of Marshall Islands, northern Solomon Islands, Nauru, Kiribati, Tuvalu, Wallis & Futuna, northern Marquesas, and Austral Islands.

Water stress conditions may persist or develop in parts of PNG, Northern Cook Islands - Society Islands, and Tuamotu Archipelago.

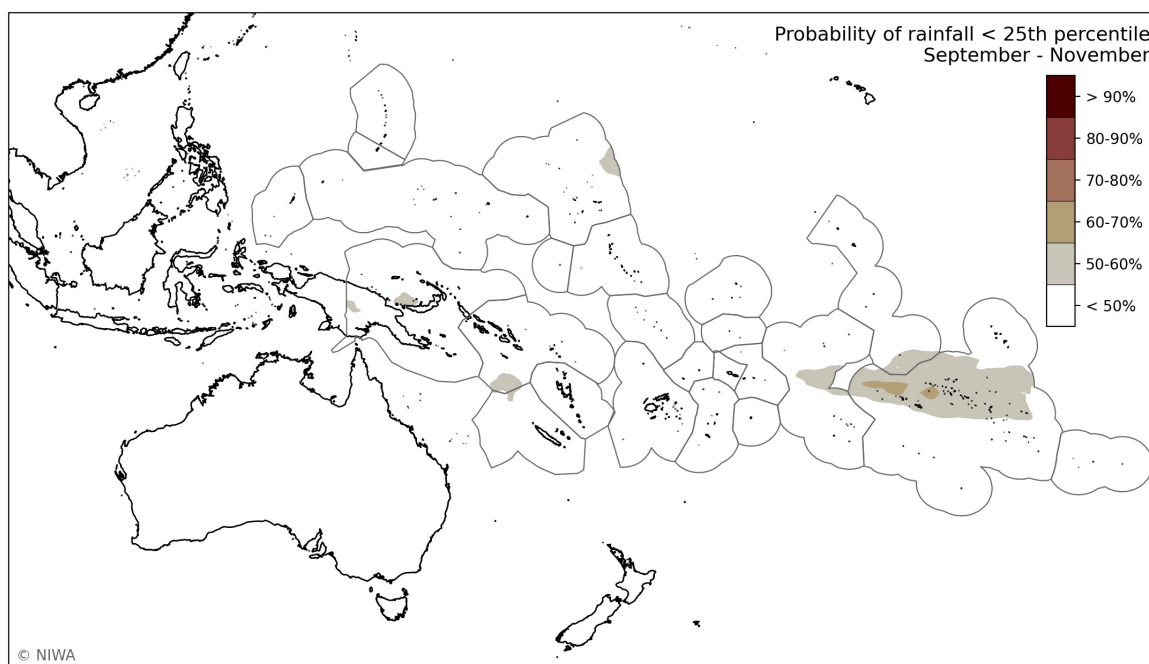
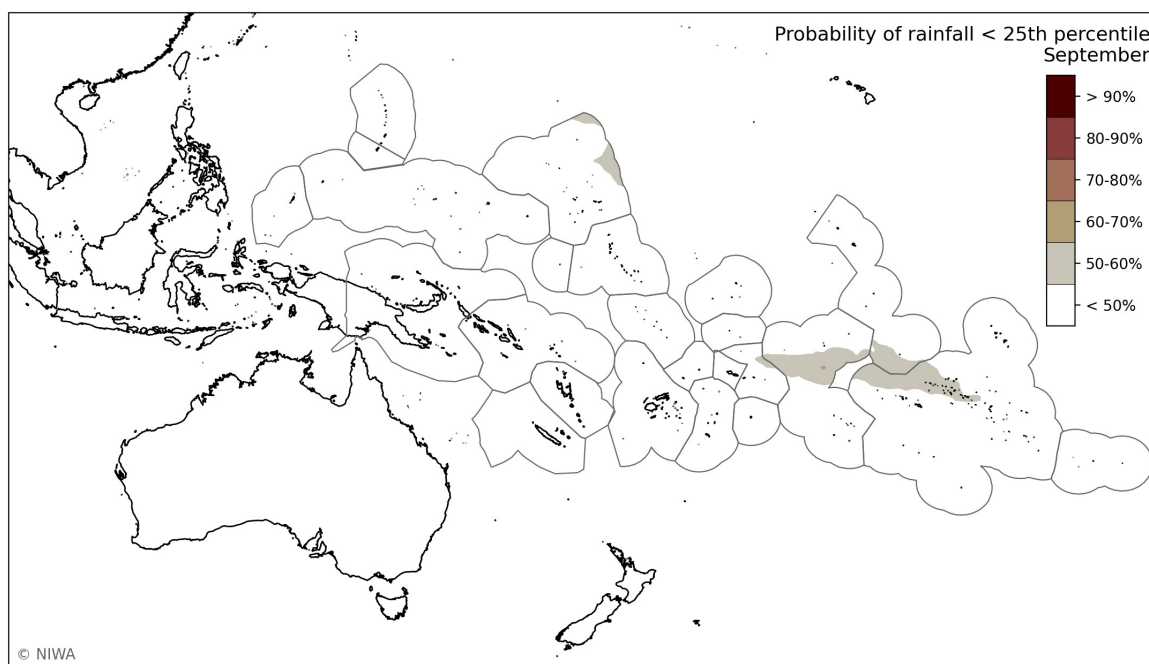


Probabilities of rainfall < 25th percentile

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

For September, the highest chances for very dry conditions are confined to small areas near the Northern Cook Islands and the northern Tuamotu archipelago.

For September-November, very dry conditions may affect parts of PNG, Northern Cook Islands, Society Islands, and the Tuamotu Archipelago.



Island Climate Update



About

Understanding the Island Climate Update bulletin

The ICU utilises satellite rainfall data from the [NASA GPM-IMERG](#) and a multi-model ensemble forecast utilising 550+ members derived from nine Global Climate Models available from the [Copernicus Climate Data Store](#).

Bulletin page	Description
Rainfall watch	Rainfall plots are derived from NASA GPM-IMERG satellite rainfall 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 NASA GPM-IMERG satellite rainfall 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. Click here for the imagery and here for the underlying data. • A range of probabilistic one to five monthly and seasonal forecast plots updated shortly after the 15th of each month. Imagery and data to be made available soon.



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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