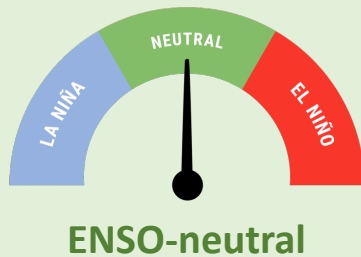


Island Climate Update



ENSO Watch
April 2023

Recent



ENSO-neutral conditions developed during March.

A neutral Southern Oscillation Index (SOI) suggests a trend away from La Niña-like atmospheric patterns.

Central Pacific sea surface temperatures (SSTs) were in the neutral range during March for the second consecutive month.

80% chance for **ENSO-neutral** conditions during **April-June 2023**.

Chance for **El Niño** conditions developing during **July-September 2023**

70%



Forecast

ENSO situation summary

The monthly NINO3.4 Index anomaly (in the central equatorial Pacific) at the end of March was -0.01°C, in the neutral range for the second consecutive month.

The SOI was neutral (0.0) during March and +0.6 from January-March, suggestive of a trend away from La Niña-like atmospheric patterns.

Trade wind strength was significantly reduced across the equatorial Pacific during March, owing to a westerly wind burst (WWB) during the first 10 days of the month. WWBs are a critical mechanism toward developing El Niño events.

The trade wind reduction was largest in the eastern part of the basin, which is also where the most substantial ocean warming took place. April shows a continued reduction in trade wind strength, particularly in the west-central part of the basin, which will likely lead to the eastward movement of warm water – an El Niño-like trend.

In the sub-surface equatorial Pacific, dramatic warming occurred during March, with widespread anomalies of 3°C to 5°C above average. In the central part of the basin, a downwelling oceanic Kelvin Wave was associated with a large, eastward-progressing area of warmer than average seas. This feature may reach the eastern Pacific and move toward the ocean's surface during the next two months. These features also suggest that the sub-surface ocean is exhibiting a strong trend toward an El Niño event.

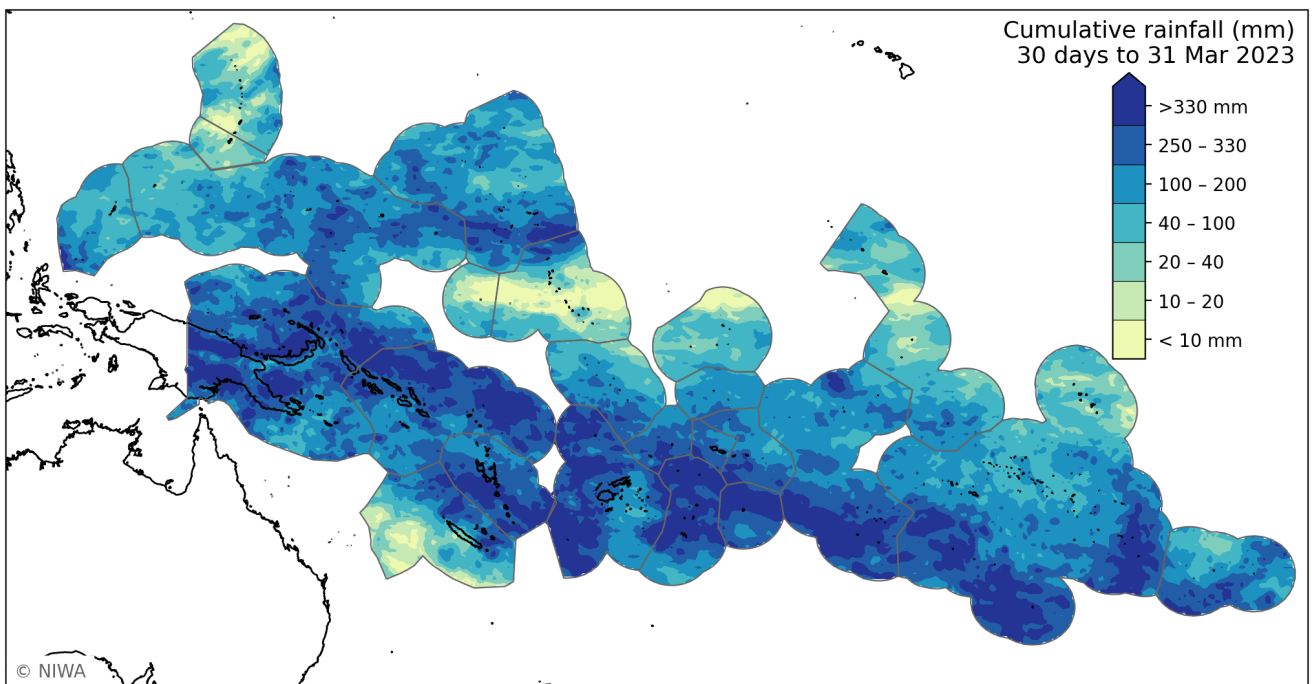
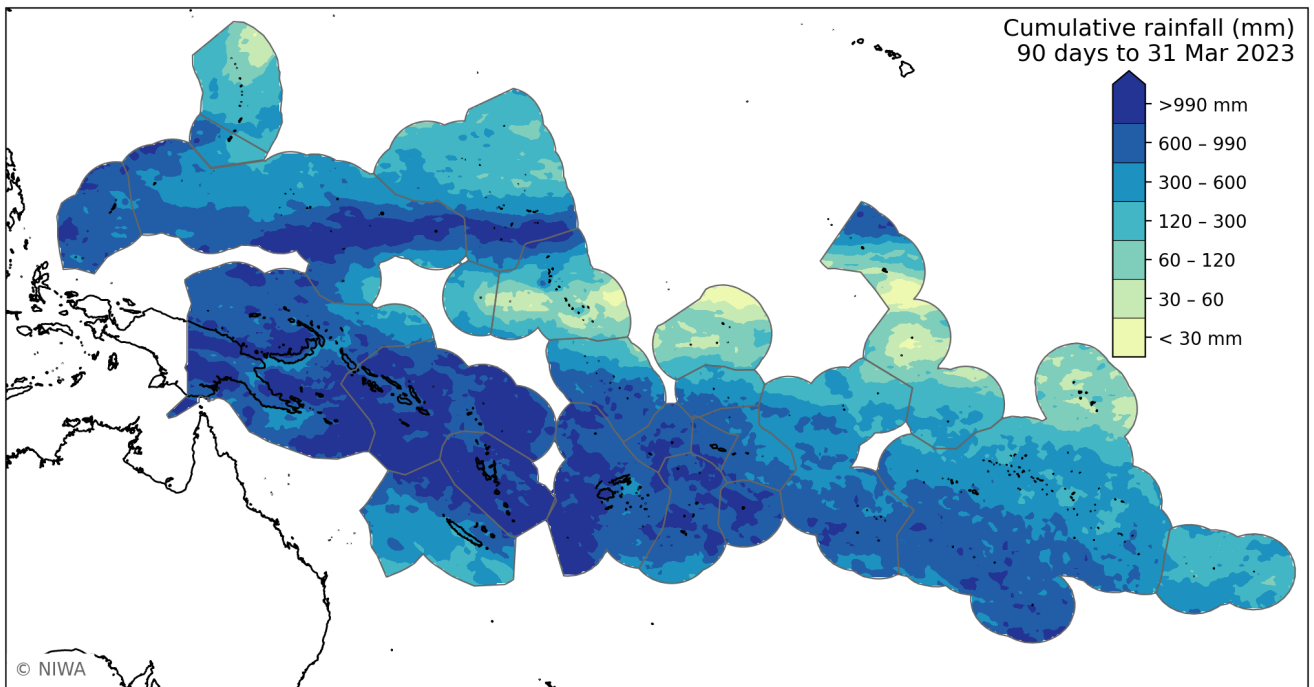
NIWA's analysis indicates that ENSO-neutral conditions have an 80% chance of continuing through June. Thereafter, El Niño has a 65-70% chance of developing. The changes observed during March, as described above, support a continued progression toward El Niño thresholds. NIWA's [ENSO criteria](#) supports a move to El Niño Watch.

Regional situation summary (1 April 2023)

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

During January-March (top plot), less than 60 mm of rain fell in parts of Nauru, Kiribati, and Marquesas.

During March (bottom plot), less than 20 mm of rain fell in parts of Northern Marianas, Nauru, and the Gilbert and Line Islands. Over 330 mm fell across island groups extending south-east of Papua New Guinea (PNG), but it was a drier month in New Caledonia compared to January-February.

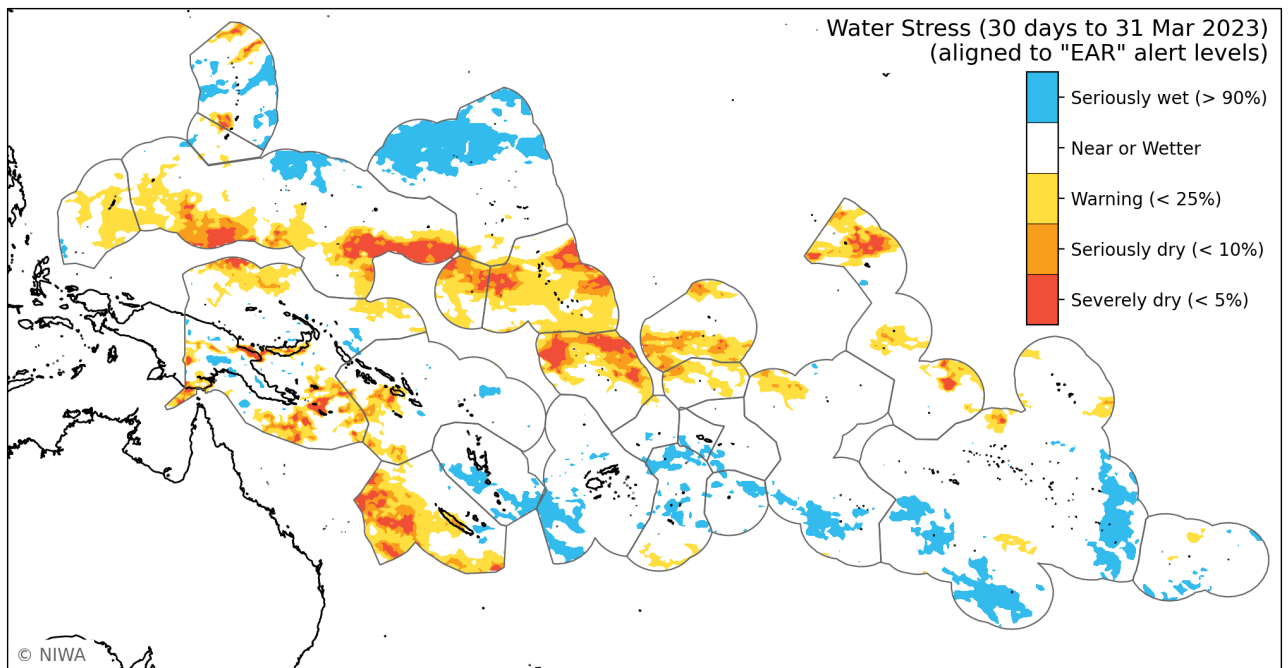
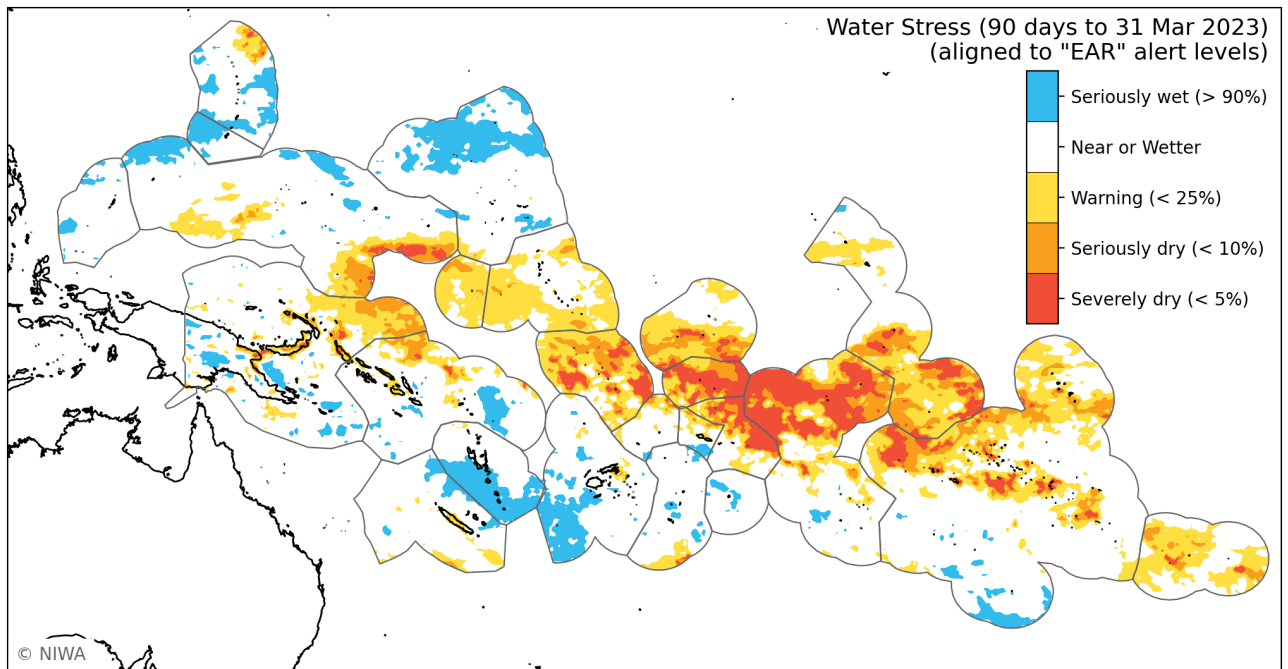


EAR regional situation summary (1 April 2023)

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

During January-March (top plot), severely or seriously dry conditions affected parts of southern Federated States of Micronesia (FSM), northern PNG, New Caledonia, Kiribati (Phoenix and southern Line Islands), Tuvalu, Tokelau, Samoa, American Samoa, northern Cook Islands, Society Islands, Tuamotu Archipelago, Marquesas, and Pitcairn Islands.

During March (bottom plot), severely or seriously dry conditions occurred in southern FSM, northern PNG, Solomon Islands, New Caledonia, Nauru, Kiribati, and Tuvalu.

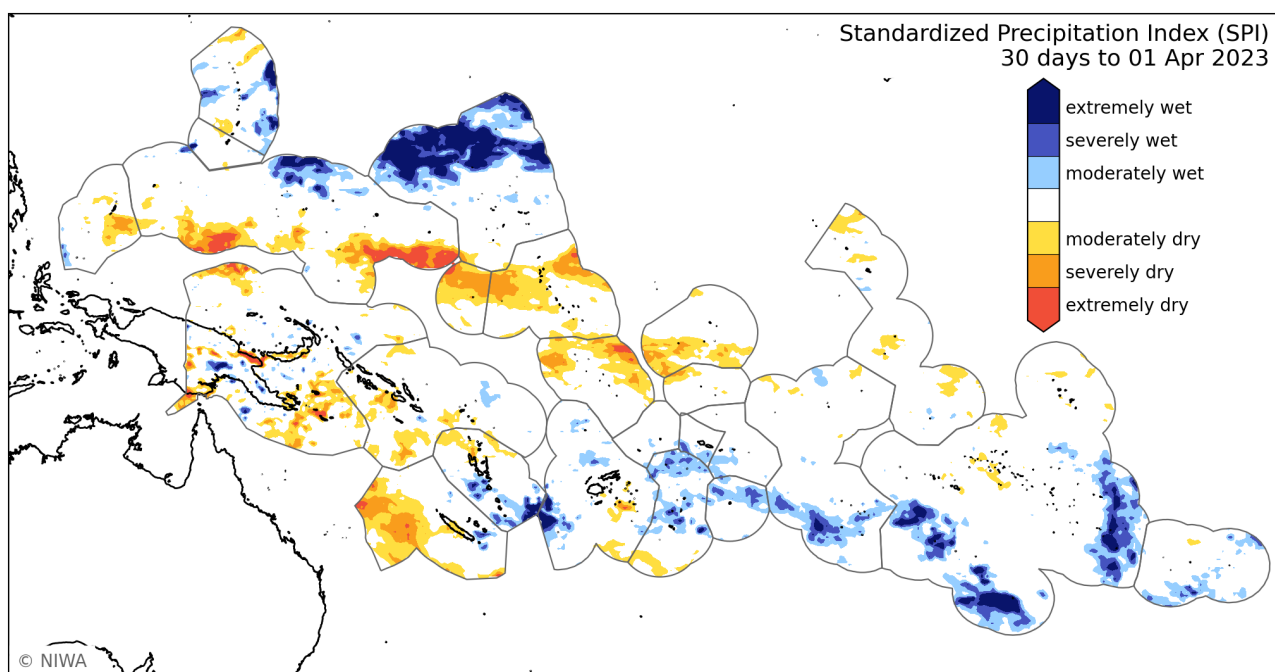
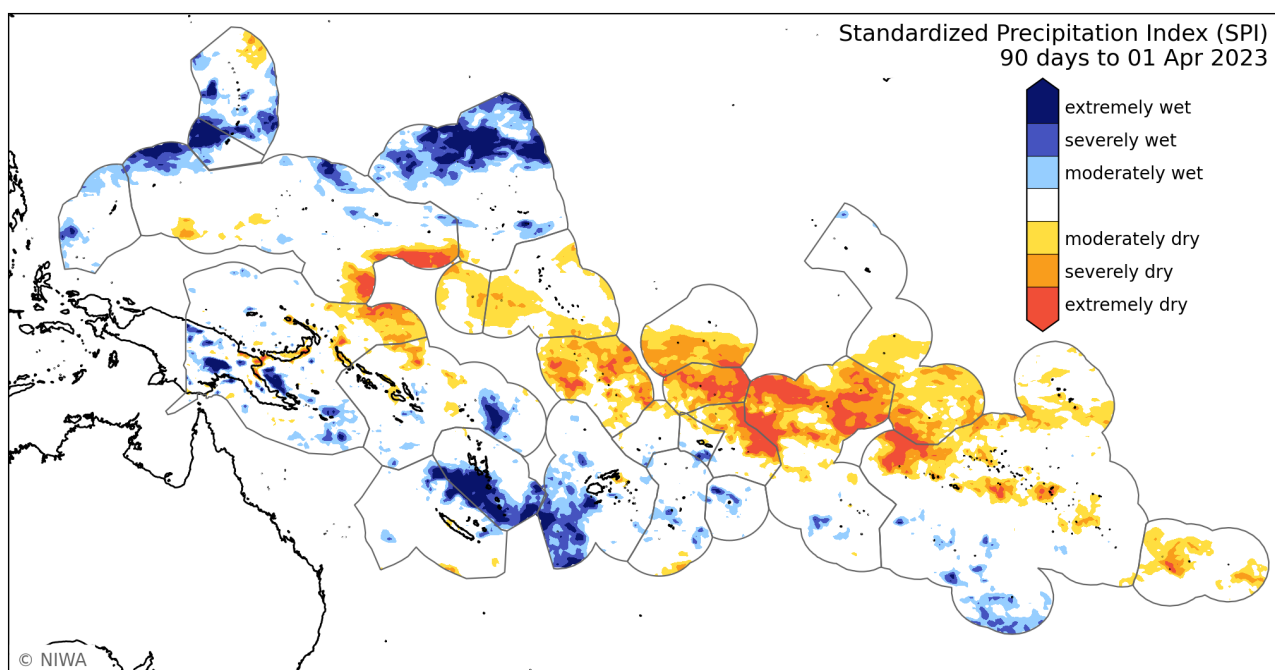


SPI Regional situation summary (1 April 2023)

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

During January-March (top plot), extremely or severely dry conditions occurred in southern FSM, northern PNG, Kiribati (Phoenix and southern Line Islands), Tuvalu, Tokelau, American Samoa, Northern Cook Islands, Society Islands, Tuamotu Archipelago, Marquesas, and Pitcairn Islands.

During March (bottom plot), extremely or severely dry conditions occurred in southern FSM, parts of PNG, Nauru, parts of Kiribati, and Fiji (eastern division).

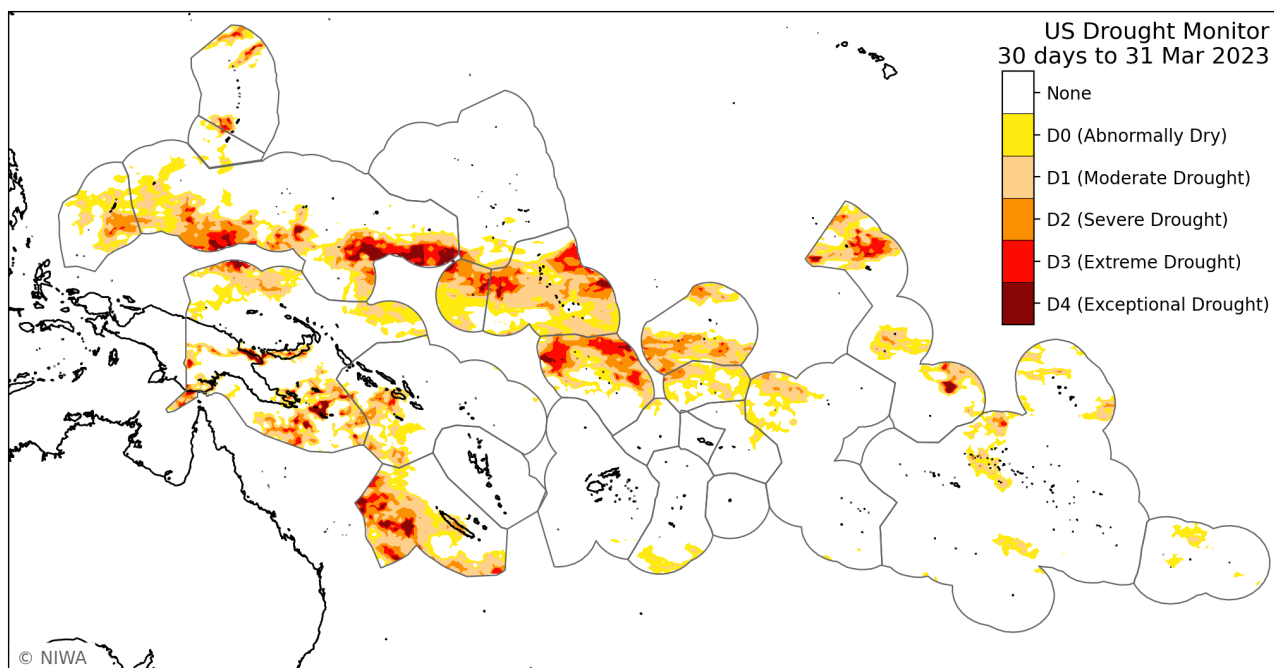
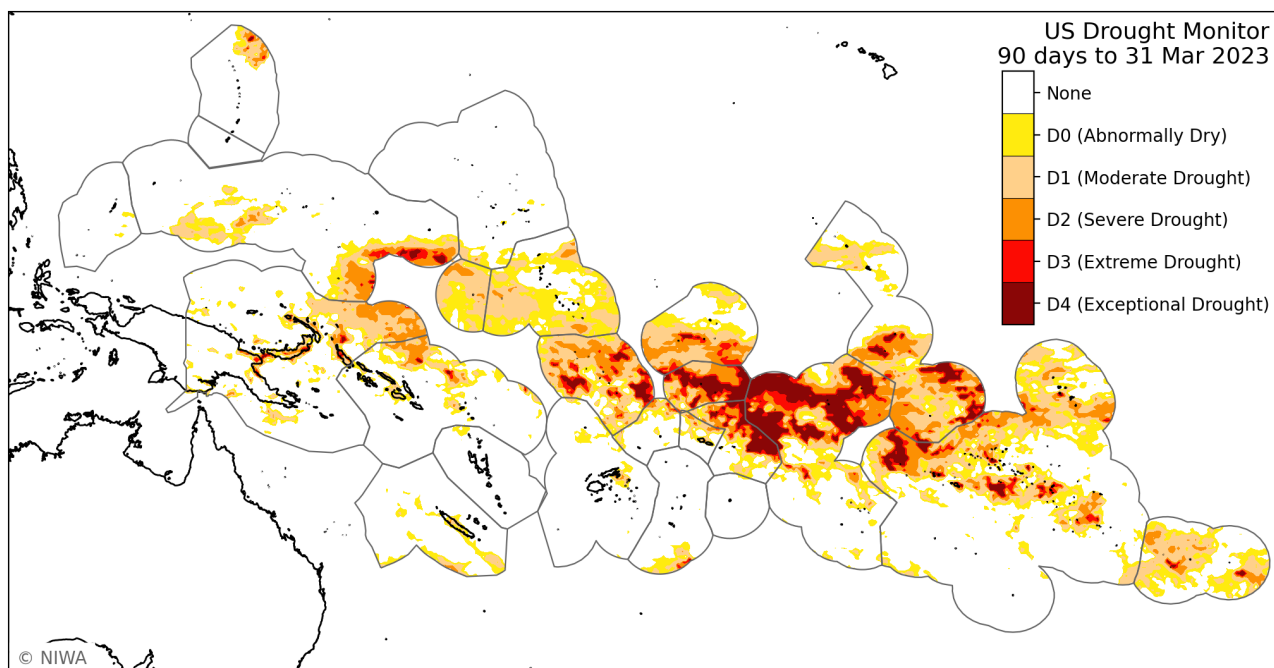


USDM Regional situation summary (1 April 2023)

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

During January-March (top plot), extreme or exceptional drought occurred in parts of southern FSM, northern PNG, New Caledonia, Kiribati (Phoenix and southern Line Islands), Tuvalu, Tokelau, Samoa, American Samoa, Cook Islands, Society Islands, Tuamotu Archipelago, Marquesas, and Pitcairn Islands.

During March (bottom plot), extreme or exceptional drought occurred in Palau, southern FSM, northern PNG, Solomon Islands, New Caledonia, Nauru, Kiribati, Tuvalu, and Tuamotu Archipelago.

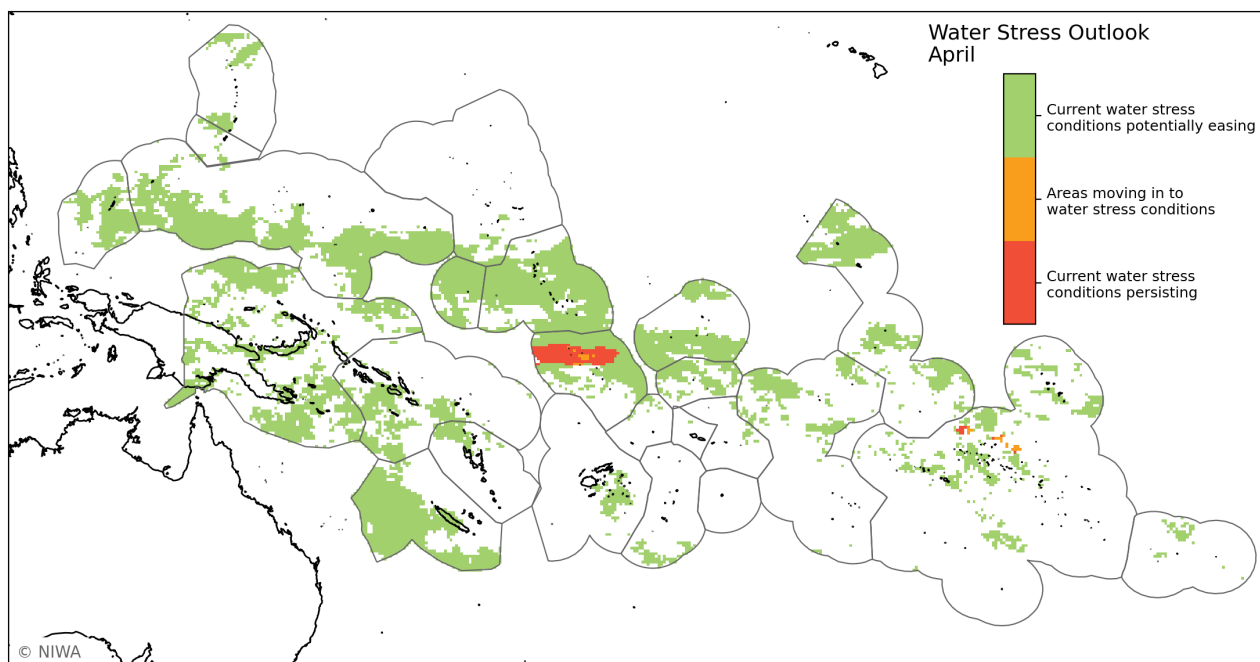
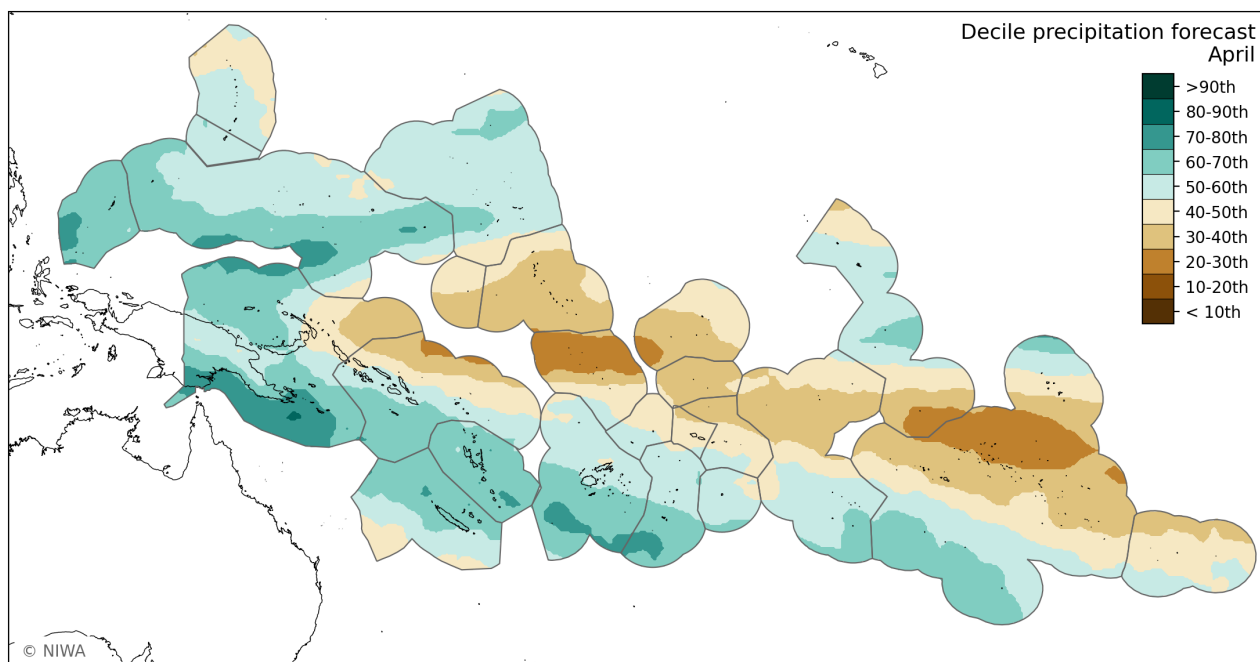


April 2023 forecast summary

During April, drier than normal conditions may occur in island groups near the equator, but the signal is not as strong as last month. This includes northern PNG, Nauru, Kiribati, Tuvalu, Tokelau, Kiribati, Wallis & Futuna, Samoa, American Samoa, Northern Cook Islands, Society Islands, Tuamotu Archipelago, Marquesas, and Pitcairn Islands.

Compared to March, the signal for easing water stress conditions is more widespread. This includes parts of Palau, Northern Marianas, southern FSM, New Caledonia, Nauru, Kiribati, Fiji (eastern division), Tokelau, Northern Cook Islands, Society Islands, Tuamotu Archipelago, Marquesas, and Pitcairn Islands.

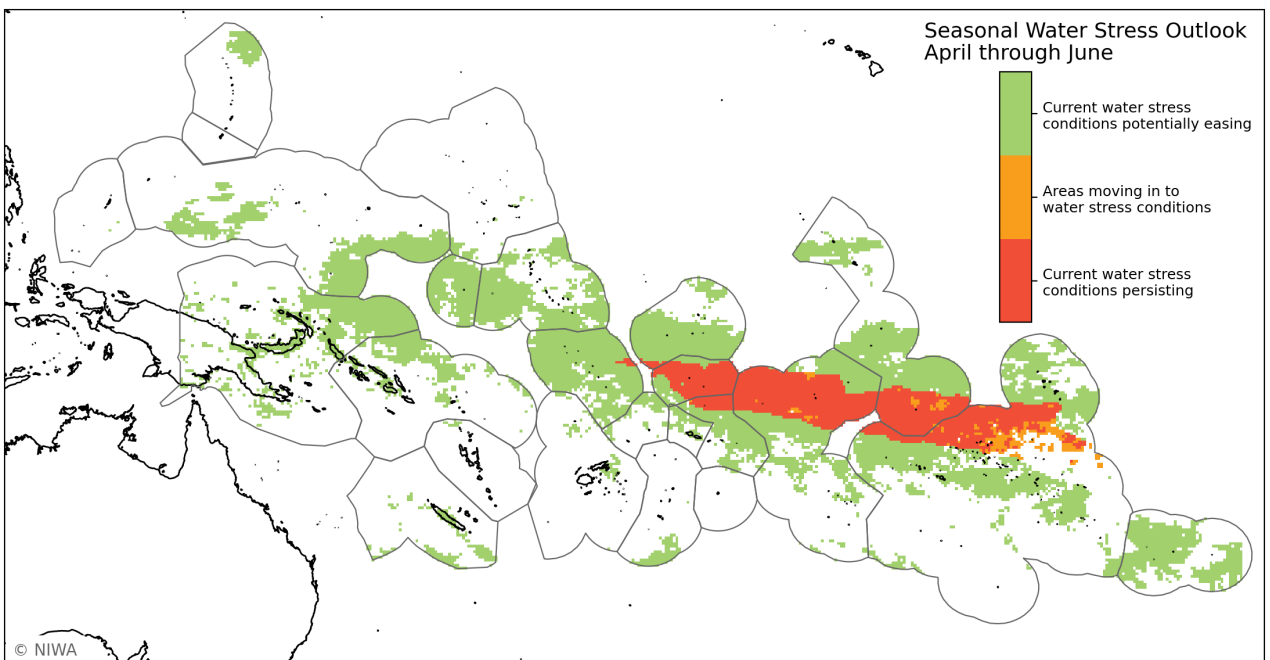
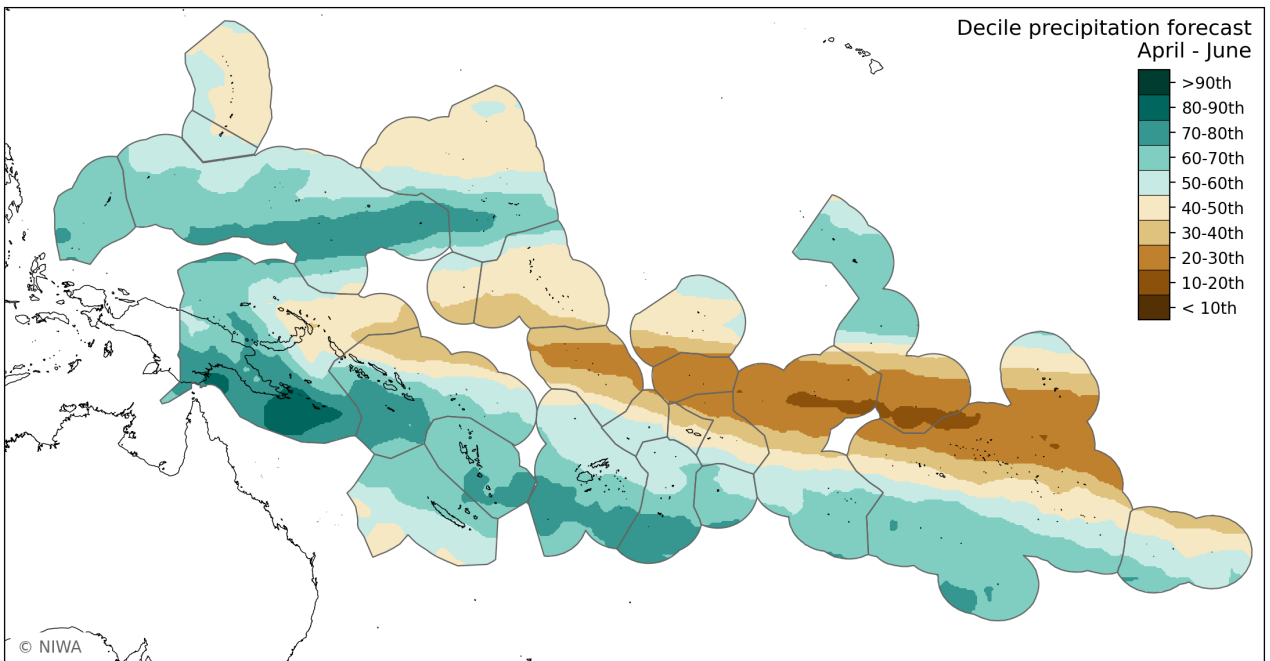
Water stress may persist or intensify in Tuvalu.



April – June 2023 forecast summary

During April-June, drier than normal conditions are most likely for island groups near the equator, suggestive of a La Niña-like lag effect in rainfall patterns. This includes parts of northern PNG, Nauru, Kiribati, Tuvalu, Tokelau, Samoa, American Samoa, Northern Cook Islands, Society Islands, Tuamotu Archipelago, and Marquesas. **However, during periods of El Niño-like variability during the season, rainfall patterns may diverge significantly from what is shown here.**

Water stress conditions may persist in a narrow strip extending from Tokelau to Tuamotu Archipelago, inclusive of Northern Cook Islands and southern Line Islands. Easing water stress conditions are signaled elsewhere.



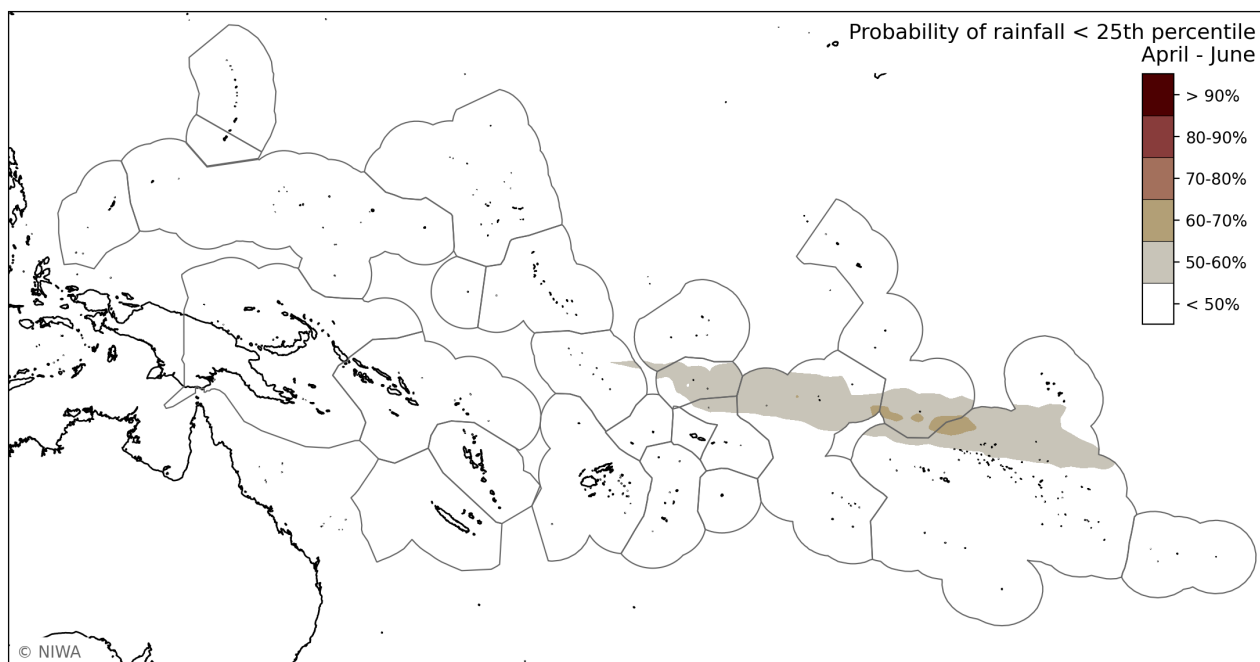
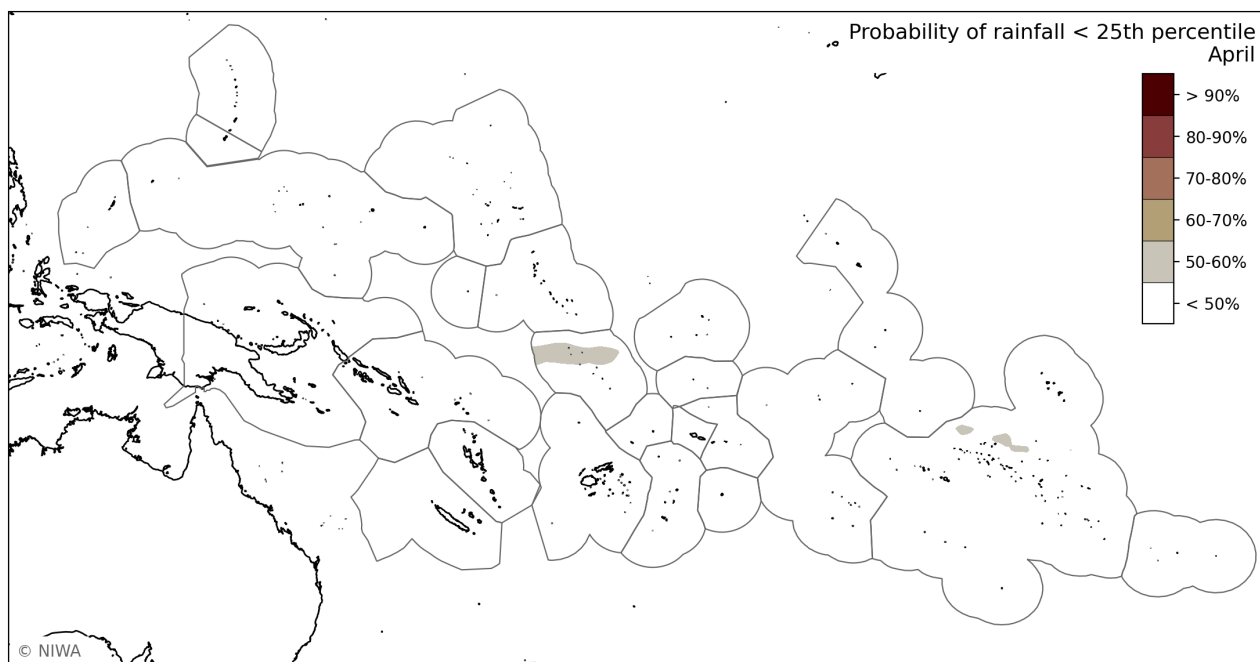
Probabilities of rainfall < 25th percentile

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

For April, the odds for dryness are highest in northern Tuvalu. There has been a notable decrease in the coverage of well below normal forecast rainfall compared to recent months.

For April-June, very dry conditions are possible in Tokelau, Northern Cook Islands, southern Line Islands, and Tuamotu Archipelago, but the odds for dryness have decreased compared to last month.

Rainfall patterns may become more variable as the expected transition from ENSO-neutral to El Niño occurs.






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>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.

Development and production of the ICU is supported by NIWA Strategic Science Investment Funding under contract PRAS2301.

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