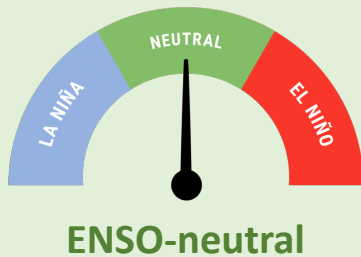


Island Climate Update



ENSO Watch
May 2023

Recent



ENSO-neutral conditions persisted during April.

The Southern Oscillation Index (SOI) remained within the neutral range.

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

70% chance for **El Niño** conditions to develop sometime during **May-July 2023**.

Chance for **El Niño** conditions persisting during August-October 2023

80%



Forecast

ENSO situation summary

The monthly NINO3.4 Index anomaly (in the central equatorial Pacific) at the beginning of May was 0.21°C, in the neutral range, but gradually warming.

The SOI was neutral (0.1) during April and +0.3 from February-April.

Trade winds once again relaxed during mid-to-late April, particularly in eastern parts of the equatorial Pacific, owing to a pulse of the Madden-Julian Oscillation (MJO). The result was continued warming of SSTs and higher than average sea surface heights in the east of the basin.

In the sub-surface equatorial Pacific, warming continued to occur, with the most dramatic warming occurring east of the dateline. Some areas warmed by 2°C, while subsurface temperatures in the east of the basin are now over 3 °C above average (+4°C from the

latest weekly value). This was due to a downwelling Kelvin wave continuing to progress eastwards and a strengthening of the coastal El Niño off Peru.

NIWA’s analysis indicates that El Niño has a 70-80% chance of developing during winter and continuing through spring. Meanwhile, ENSO-neutral conditions have a 30% chance of continuing through July.

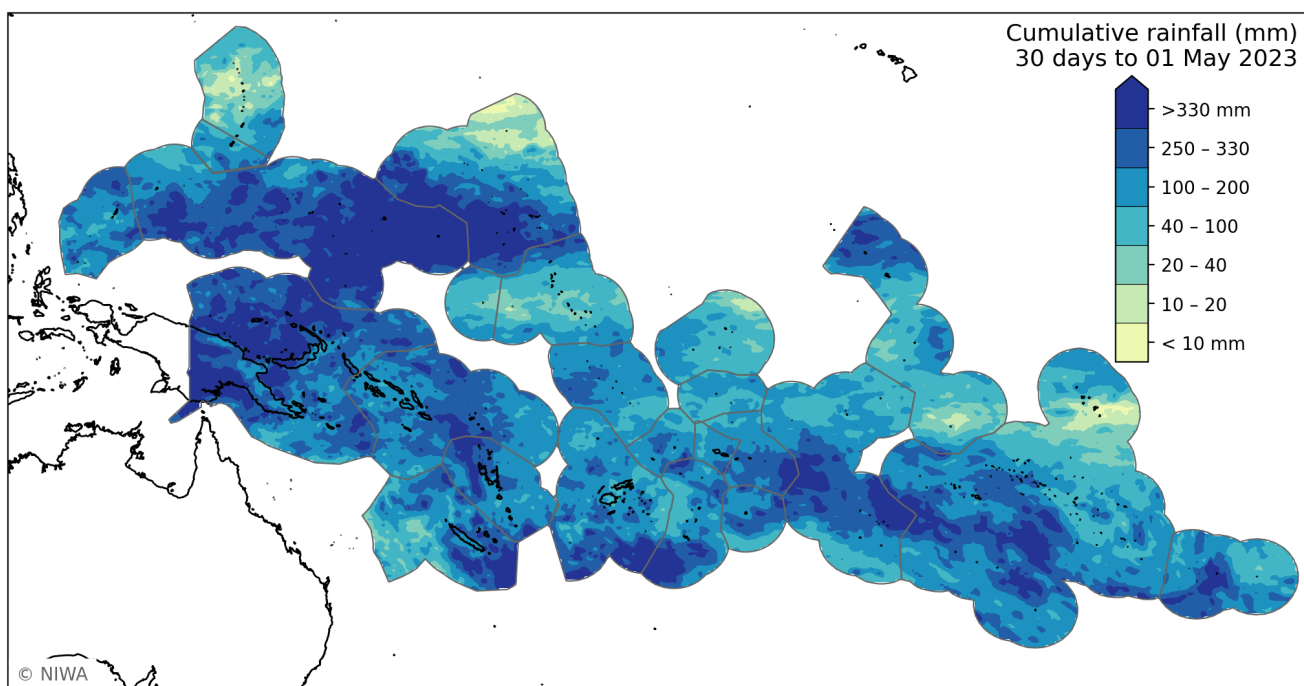
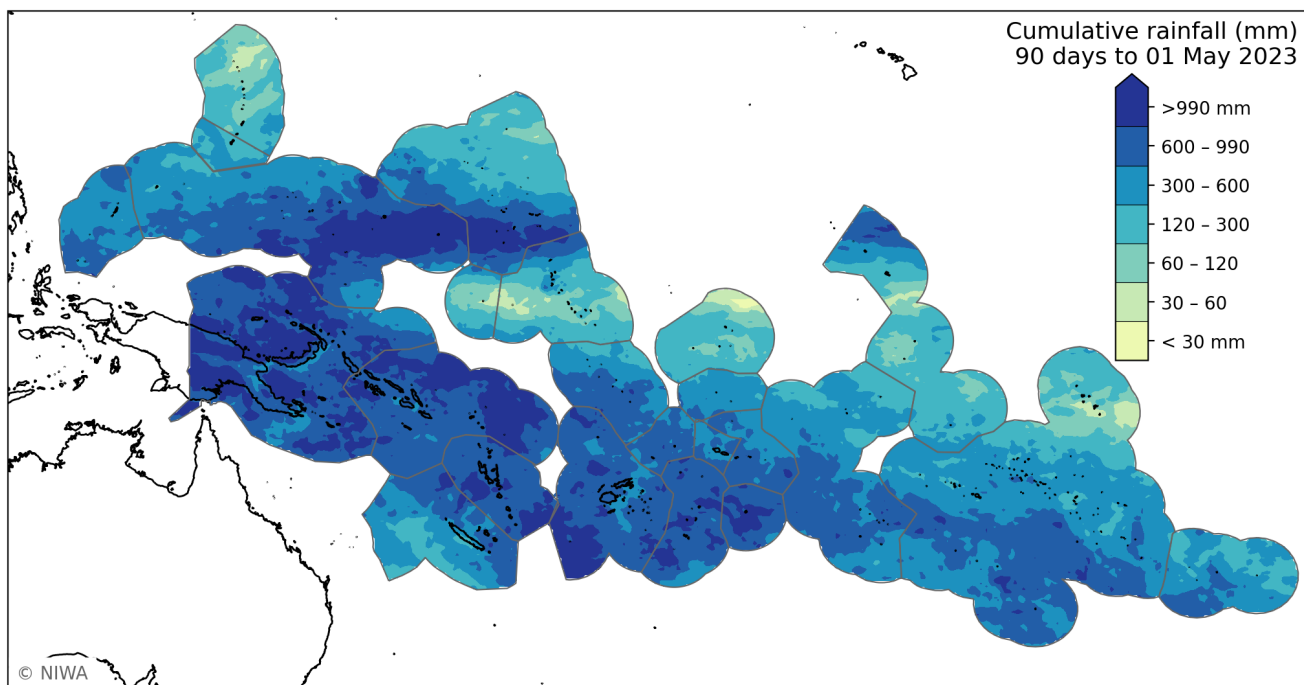
The changes observed to the equatorial Pacific during April, as described above, support a continued progression toward El Niño thresholds. Anomalous warmth is building in the surface and subsurface of the equatorial Pacific Ocean, there is a reduction of trade winds across the basin, and there is an expectation for these conditions to continue. An ‘El Niño Watch’ status remains in place.

Regional situation summary (1 May 2023)

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

During February-April (top plot), less than 60 mm of rain fell in parts of the Northern Marianas and Marquesas. Over 990mm fell in parts of Melanesia, as well as parts of the Federated States of Micronesia (FSM) and Marshall Islands.

During April (bottom plot), less than 20 mm of rain fell in parts of Northern Marianas, Marshall Islands, Kiribati (Line Islands) and Marquesas. Over 330 mm fell across parts of Papua New Guinea (PNG), FSM, Marshall Islands, Solomon Islands, Vanuatu, New Caledonia, and parts of southern Polynesia.

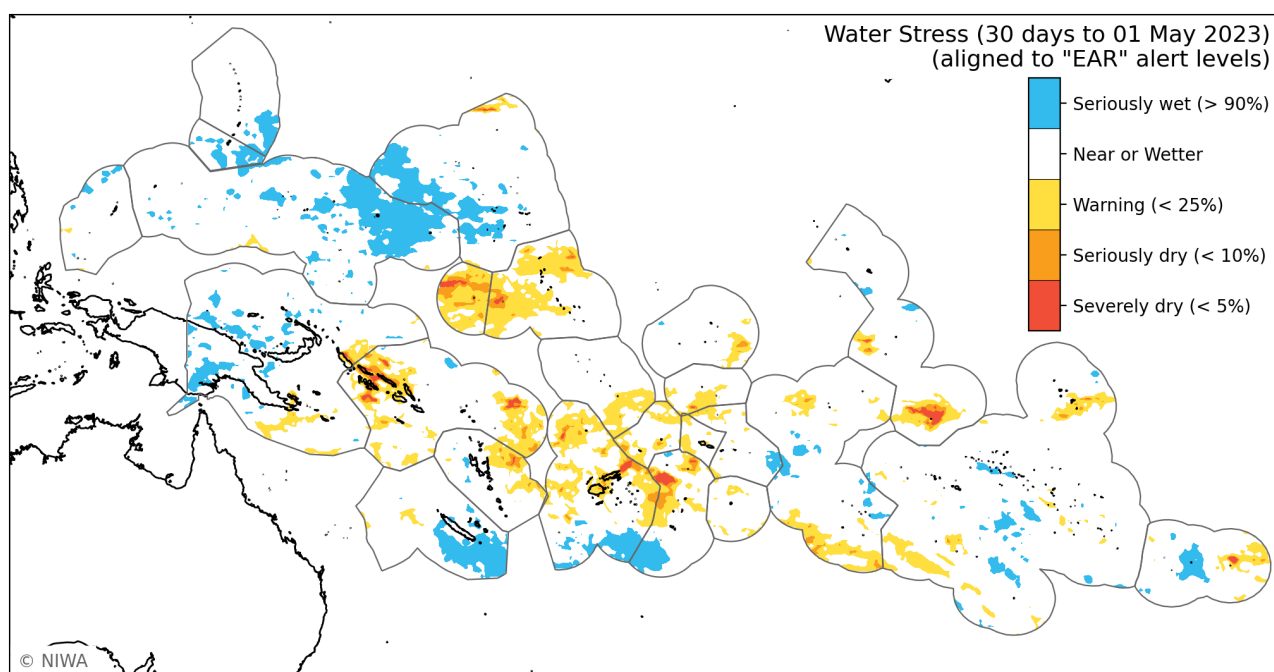
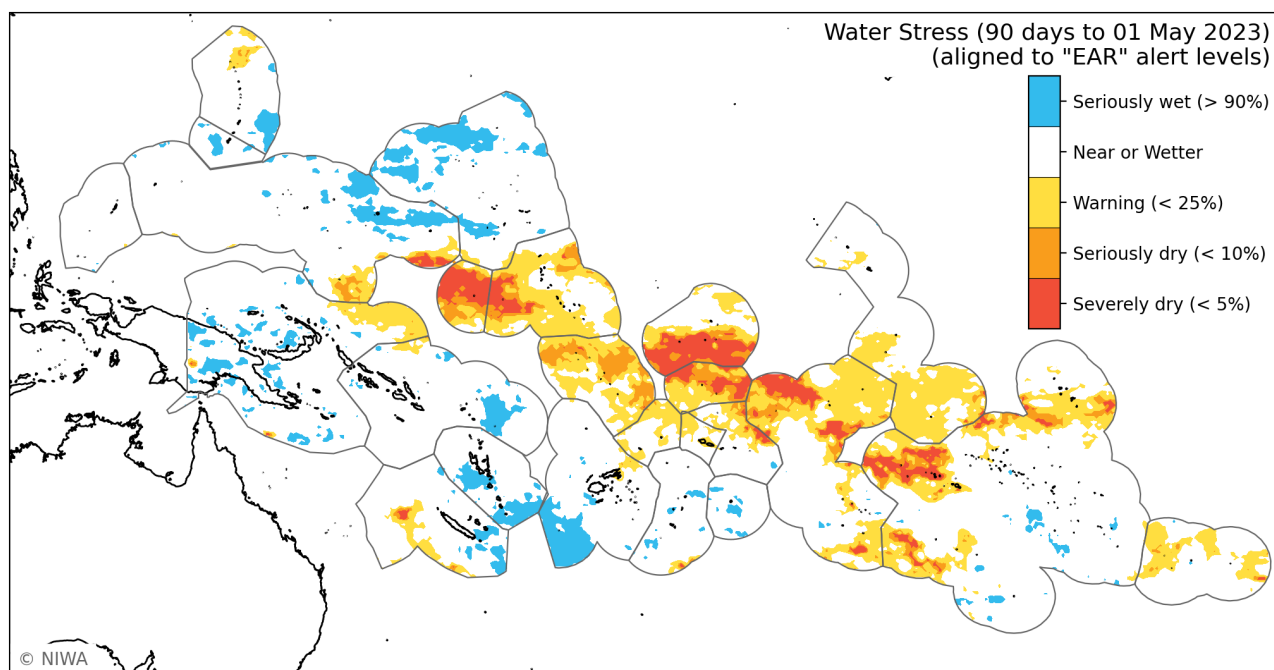


EAR regional situation summary (1 May 2023)

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

During February-April (top plot), severely or seriously dry conditions affected parts of Nauru, Kiribati (Gilbert and Phoenix Islands), Tuvalu, Tokelau, Cook Islands, Society Islands, Marquesas and Austral Islands.

During April (bottom plot), severely or seriously dry conditions occurred Nauru, parts of Solomon Islands, Kiribati (Gilbert and Line Islands) Fiji, Tonga and Pitcairn Islands.

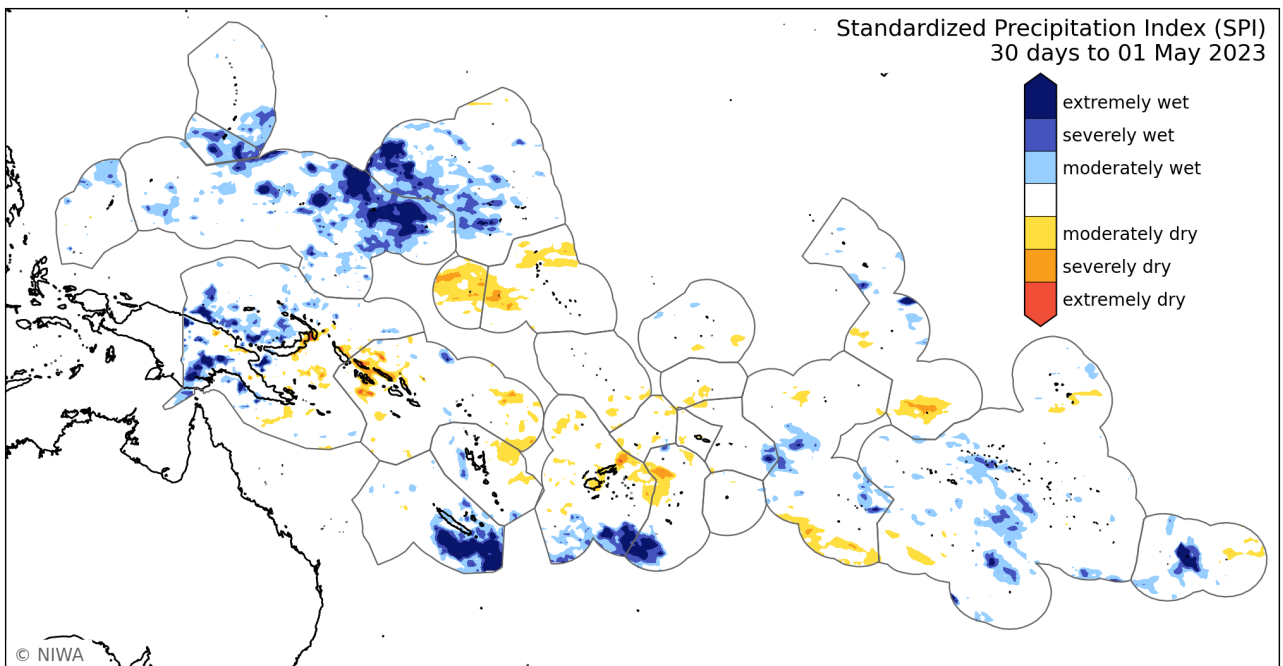
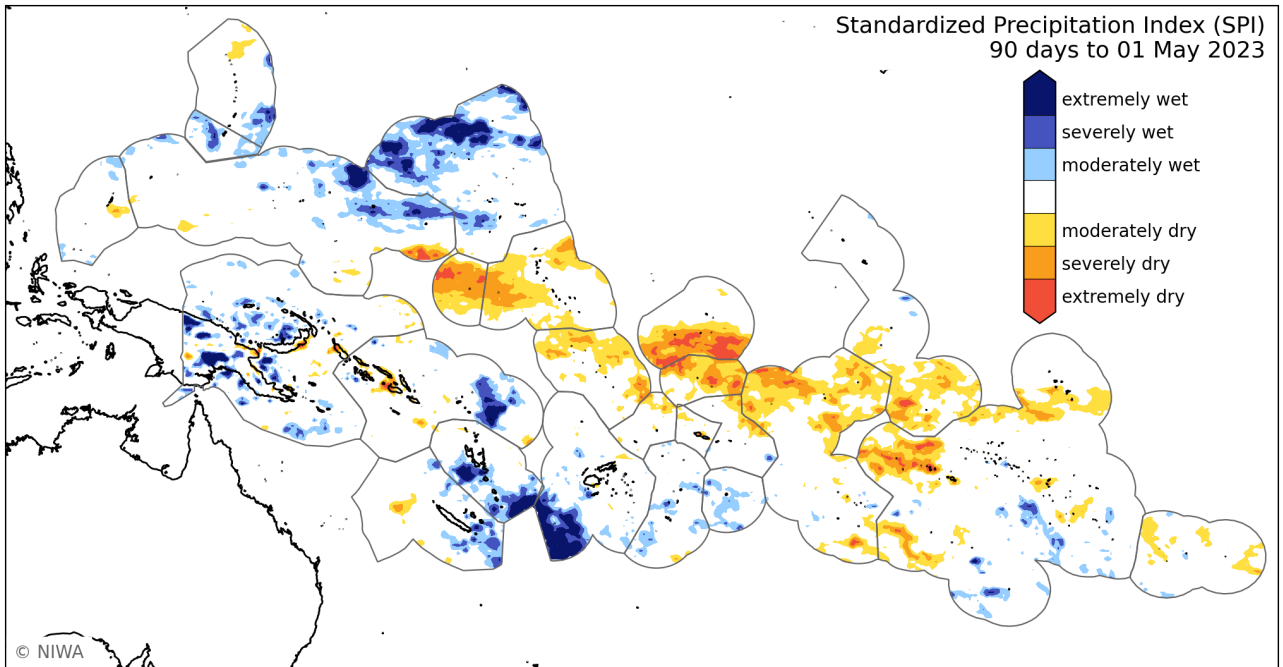


SPI Regional situation summary (1 May 2023)

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

During February-April (top plot), extremely or severely dry conditions occurred in parts of Nauru, Kiribati (Gilbert, Phoenix and Line Islands), Tokelau, Northern Cook Islands, Society Islands and Marquesas.

During April (bottom plot), severely dry conditions occurred in parts of eastern PNG, Solomon Islands, Kiribati (Gilbert and Line Islands) and Fiji. Extremely dry conditions were observed only in the Solomon Islands. Meanwhile, extremely wet conditions occurred in parts of FSM, PNG, the Marshal Islands and Vanuatu.

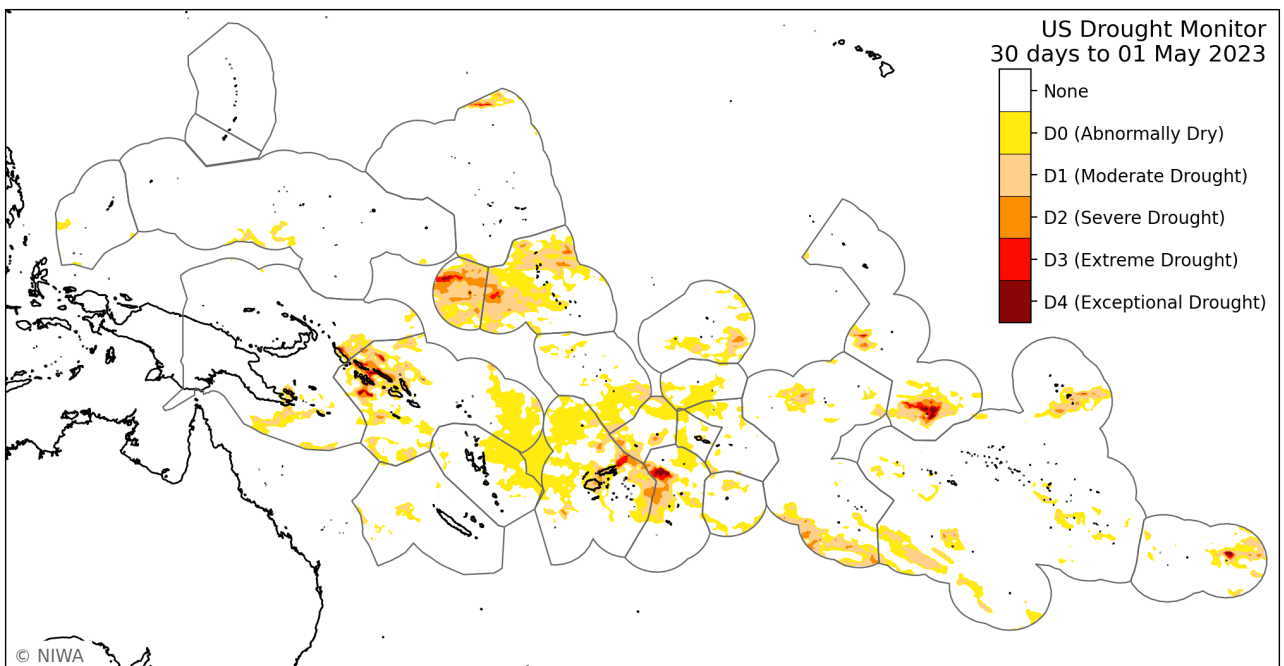
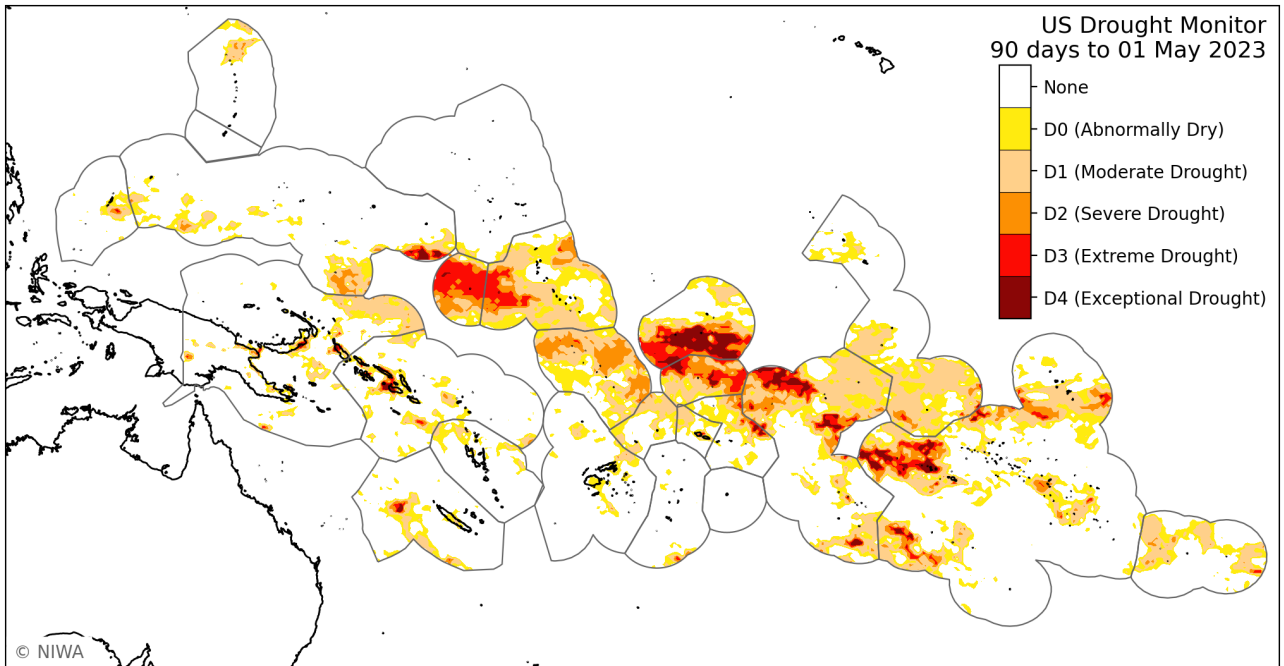


USDM Regional situation summary (1 May 2023)

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

During February-April (top plot), extreme or exceptional drought occurred in parts of FSM, Nauru, Kiribati (Gilbert and Phoenix Islands), Solomon Islands, Tokelau, Cook Islands, Society Islands, Austral Islands and Marquesas. Exceptional and extreme drought conditions significantly contracted across the Cook Islands.

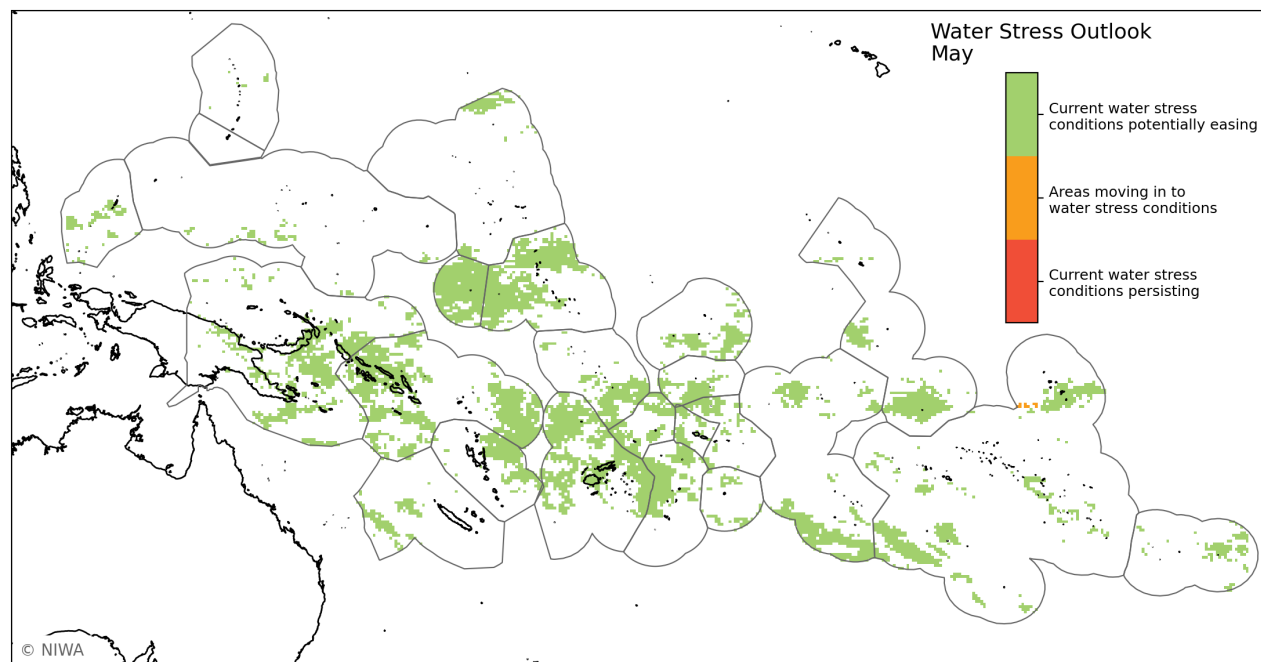
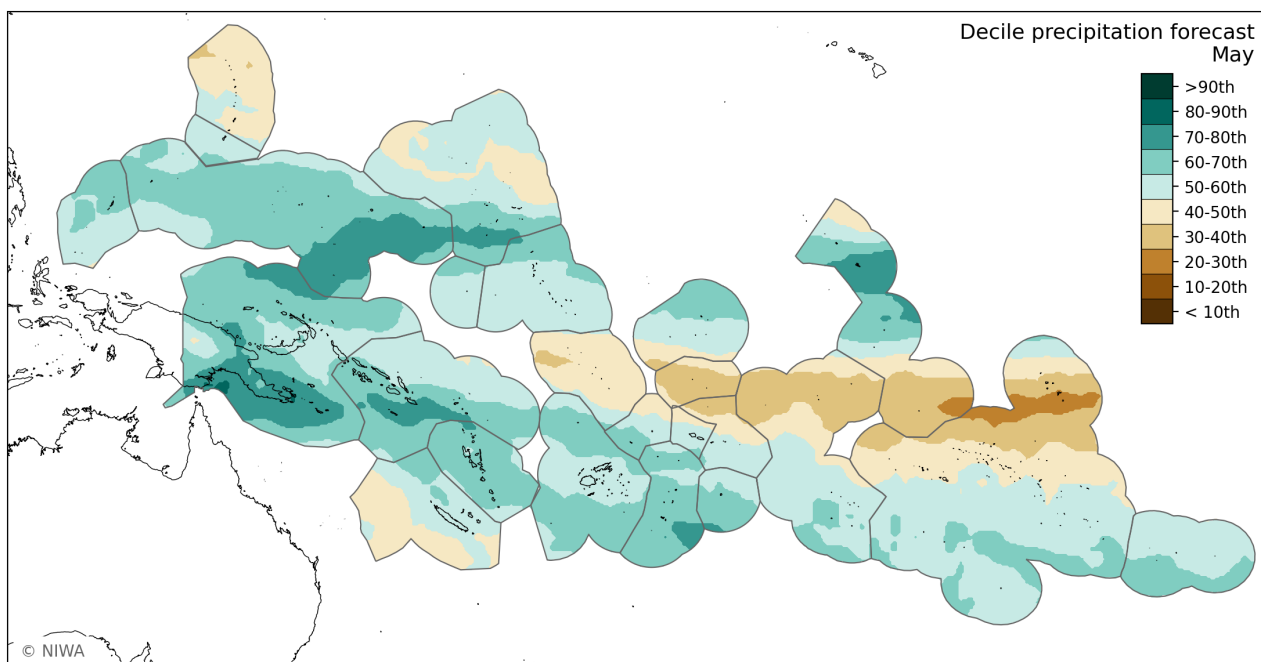
During April (bottom plot), extreme or exceptional drought occurred in parts of Solomon Islands, Nauru, Kiribati (Gilbert and Line Islands), Fiji, Tonga and Pitcairn Islands.



May 2023 forecast summary

During May, while drier than normal conditions may occur in island groups near the equator, the signal for dryness continues to wane compared to than previous months. This includes parts of Northern Marianas, Tuvalu, Tokelau, Northern Cook Islands, Kiribati (Line Islands), the Tuamotu Archipelago and Marquesas.

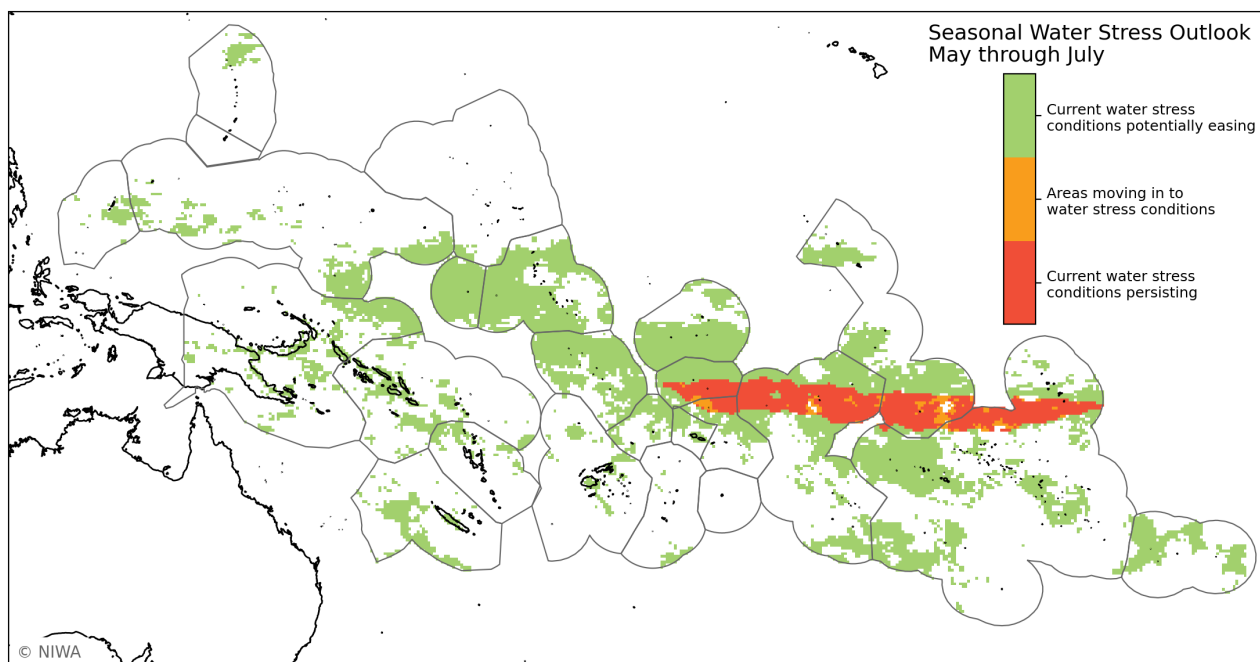
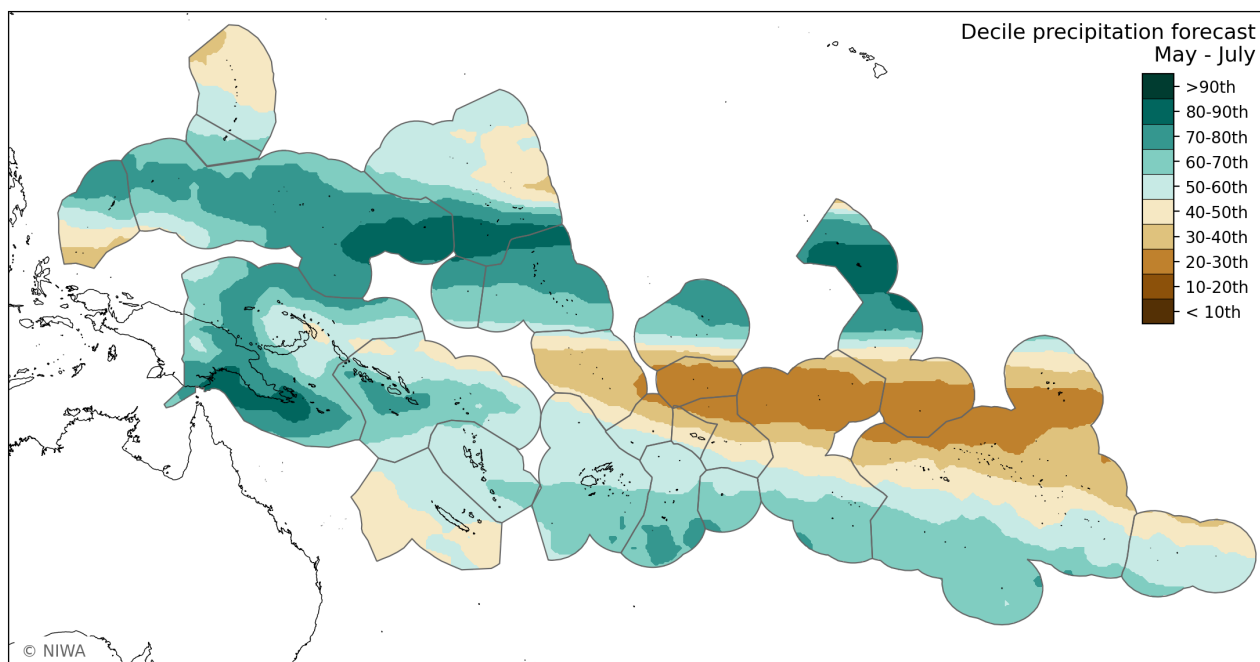
Compared to April, water stress continues to ease. This includes parts of Palau, PNG, Solomon Islands, Nauru, Vanuatu, Kiribati (Gilbert, Phoenix and Line Islands), Tuvalu, Fiji, Wallis & Futuna, Tonga, American Samoa, Tokelau, Cook Islands, Austral Islands, the Tuamotu Archipelago, Marquesas and Pitcairn Islands.



May – July 2023 forecast summary

During May-July, drier than normal conditions are most likely for island groups near the equator, continuing to be suggestive La Niña-like lag effect in rainfall patterns. However, compared to previous three-month periods, the dryness outlook is less pronounced. Areas that could be affected by the dryness includes parts of Palau, Tokelau, American Samoa, Northern Cook Islands, Kiribati (Line Islands, northern Tuamotu Archipelago, and Marquesas.

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, or no change in water stress conditions, are signaled elsewhere.



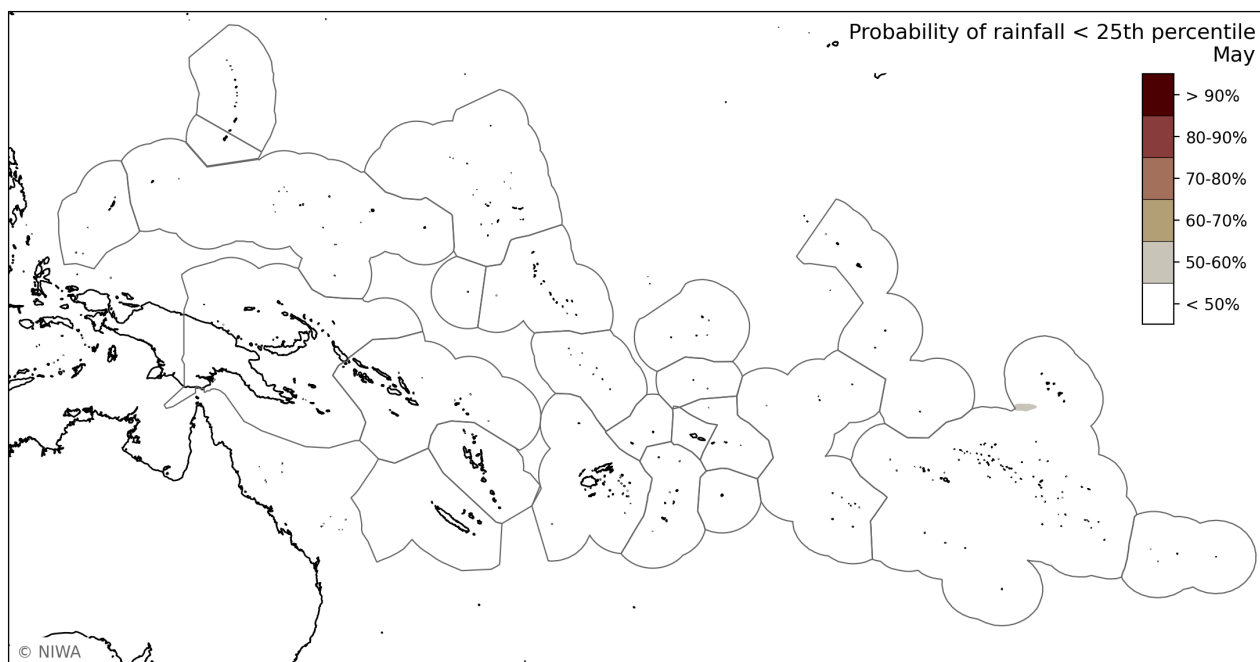
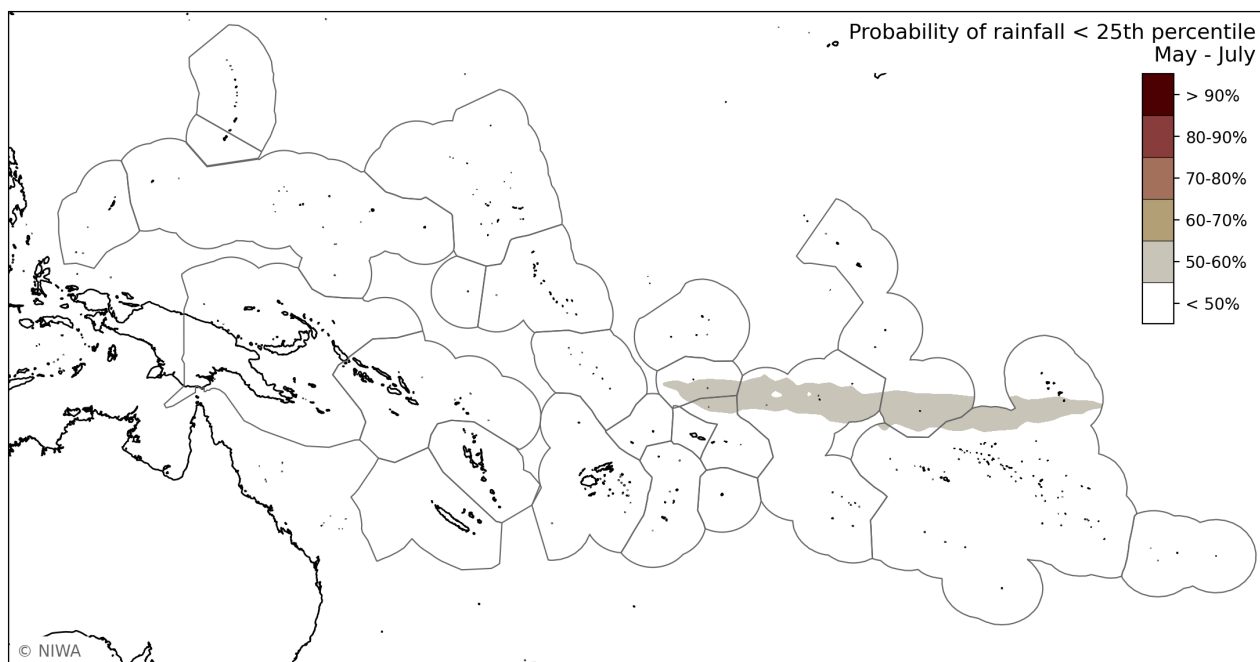
Probabilities of rainfall < 25th percentile

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

For May, there are no areas where cumulative rainfall being less than the 25th percentile is more than a 50% chance.

For May-July, very dry conditions are possible in Tokelau, Northern Cook Islands, southern Line Islands, and Tuamotu Archipelago. However, 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>



Additional regional and country-level resources are available online:

- 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.

WMO

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