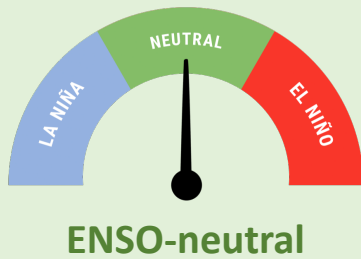


# Island Climate Update



**ENSO Watch**  
June 2023

Recent



ENSO-neutral conditions continued during May, but oceanic and atmospheric indicators trended closer to El Niño.

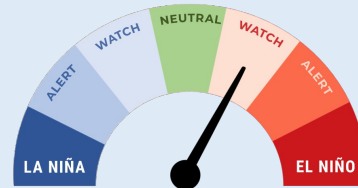
The Southern Oscillation Index (SOI) was -1.7, the lowest value since January 2016.

Central Pacific sea surface temperatures (SSTs) trended toward the El Niño threshold during May.

**80%** chance for **El Niño** conditions to develop sometime during **June-August 2023**.

Chance for **El Niño** conditions developing or persisting during September-November **2023**

**90%**



**El Niño Watch**

Forecast

## ENSO situation summary

The monthly NINO3.4 Index anomaly (in the central equatorial Pacific) at the end of May was 0.49°C, an increase of nearly 0.3°C from April and trending toward NIWA’s El Niño threshold of 0.7°C.

The SOI was negative (-1.7) during May, the lowest value since January 2016 (during the last major El Niño event). This suggests that the atmosphere was beginning to respond to the warming seas.

May trade winds were close to normal in the central equatorial Pacific, but a relaxation of trades in early and late June will enable further warming of sea surface temperatures.

In the sub-surface equatorial Pacific, the most unusually warm water consolidated in the east with anomalies reaching in excess of 4°C. In the central part of the basin, anomalies of 2-4°C were common. Pulses of the Madden-Julian Oscillation (MJO) during the month and season ahead will allow the warm water to migrate toward the surface.

**It should be noted that the persistence of warmth in the West Pacific Warm Pool may allow La Niña-like patterns to occur from time-to-time over the next month or two, lengthening the transition window from La Niña toward El Niño.**

NIWA’s analysis indicates that oceanic and atmospheric indicators have trended closer to El Niño thresholds. For now, NIWA remains at El Niño Watch. However, key indicators point to a transition to El Niño “Alert” around August and then an event shortly thereafter.

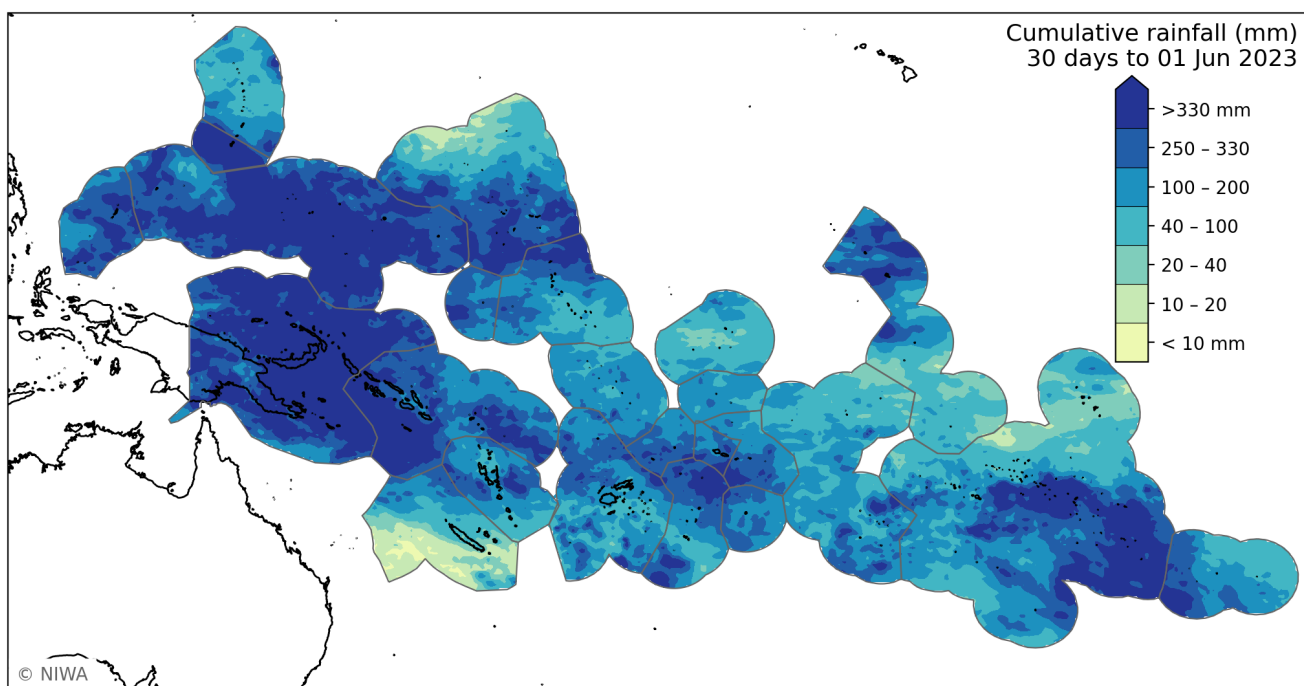
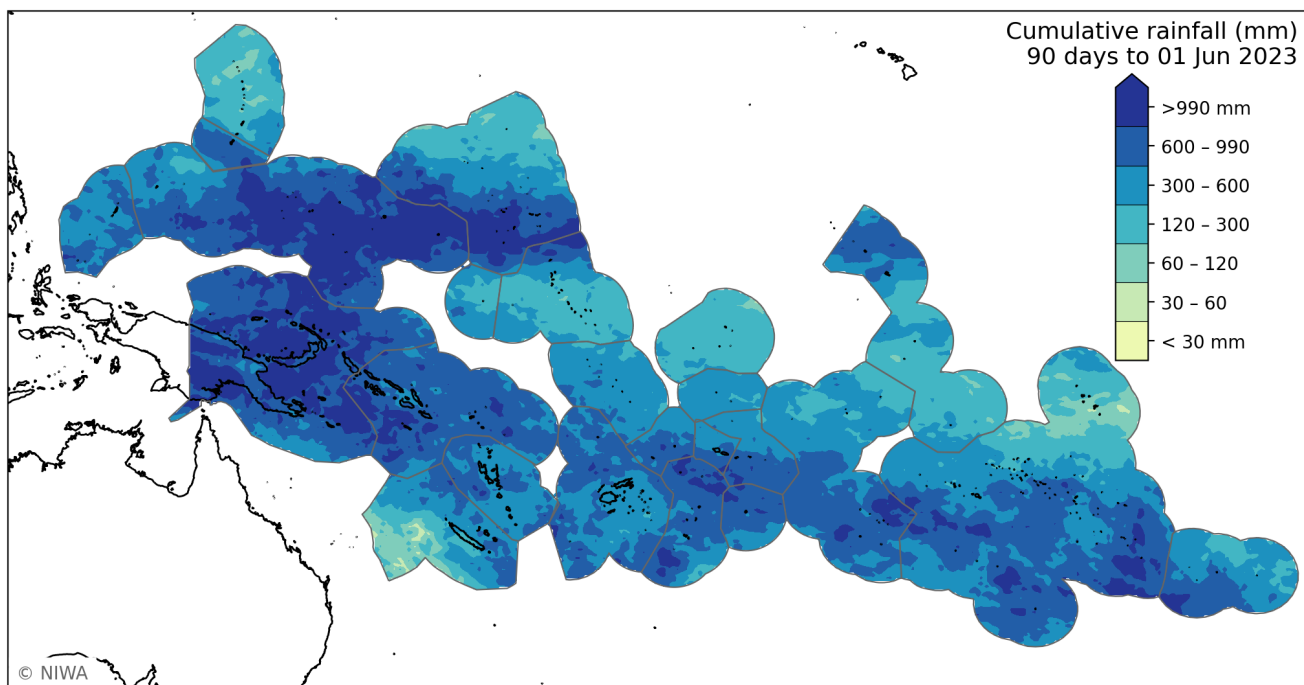
Overall, El Niño has a 90% chance of developing by the August-October period with air and sea temperatures, rainfall, and sea level anomalies tending in an El Niño-like direction during the season ahead.

### Regional situation summary (1 June 2023)

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

During March-May (top plot), less than 60 mm of rain fell in parts of Northern Marianas and Marquesas. Over 990 mm fell across parts of Federated States of Micronesia (FSM), southern Marshall Islands, Papua New Guinea (PNG), Solomon Islands, and pockets of southeastern Polynesia.

During May (bottom plot), less than 40 mm of rain fell in parts of New Caledonia, Gilbert Islands, and Marquesas. Over 330 mm fell across swathes of Micronesia, western Melanesia, and southeastern Polynesia.

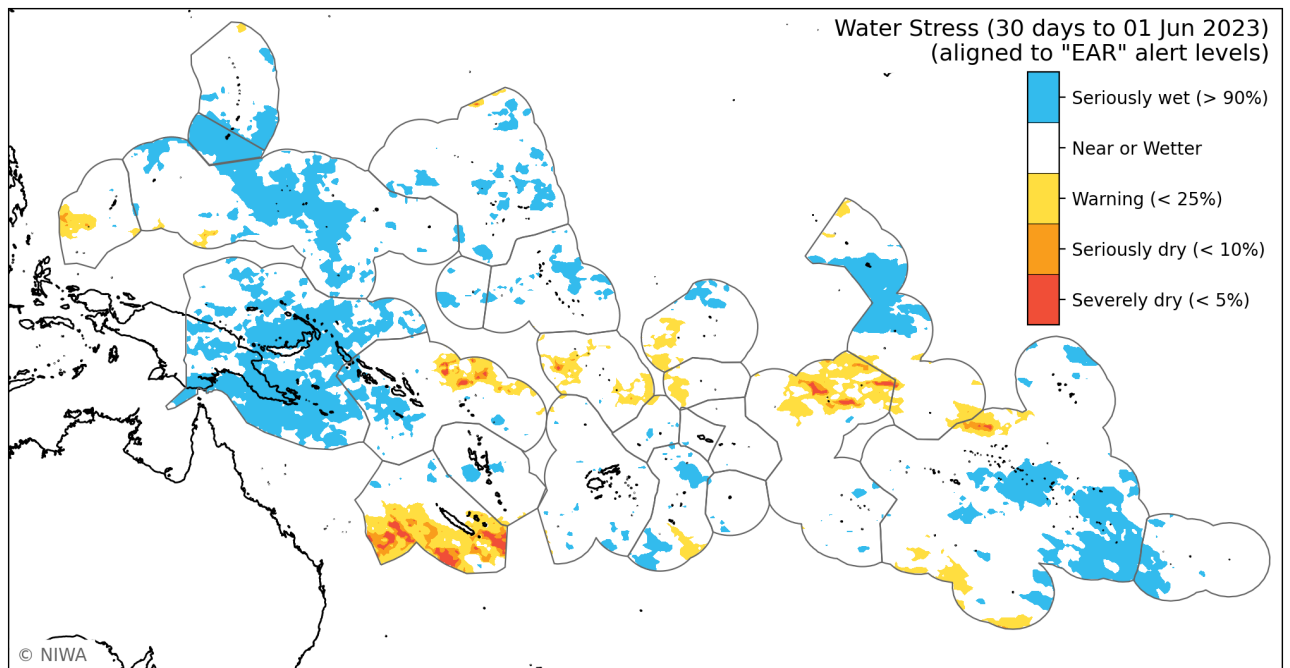
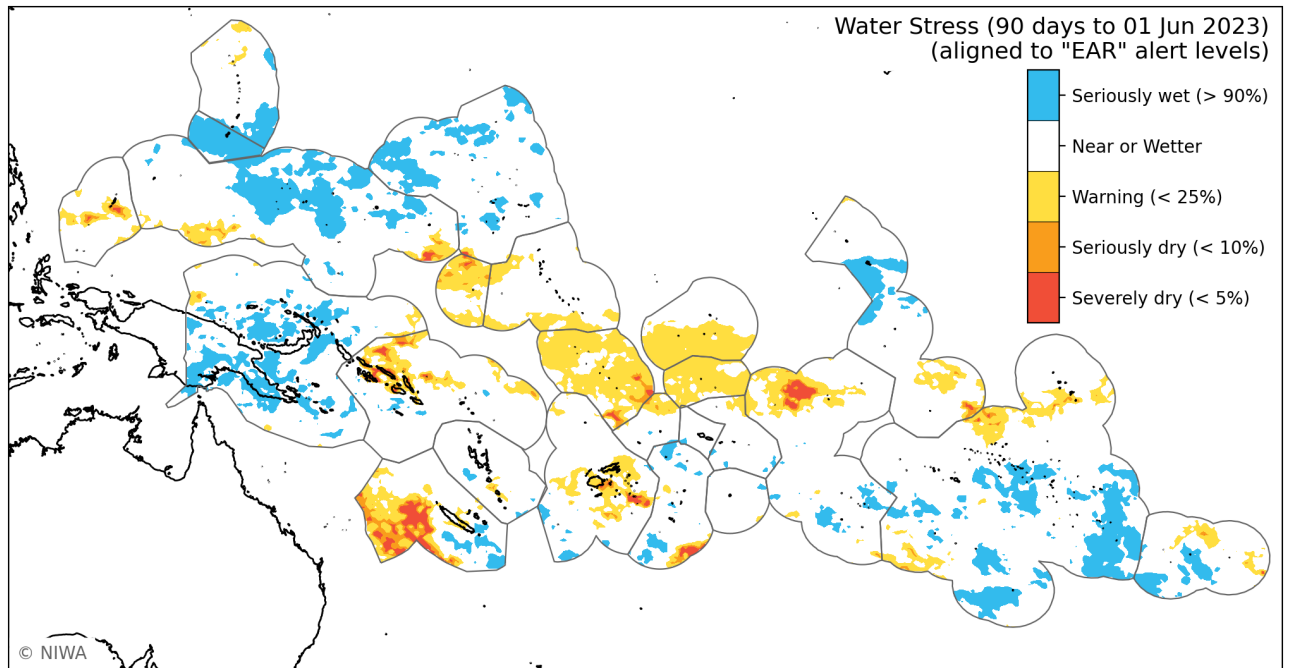


### EAR regional situation summary (1 June 2023)

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

During March-May (top plot), severely or seriously dry conditions affected parts of Palau, Solomon Islands, Fiji, and Marquesas.

During May (bottom plot), severely or seriously dry conditions affected parts of Palau, New Caledonia, and Northern Cook Islands.

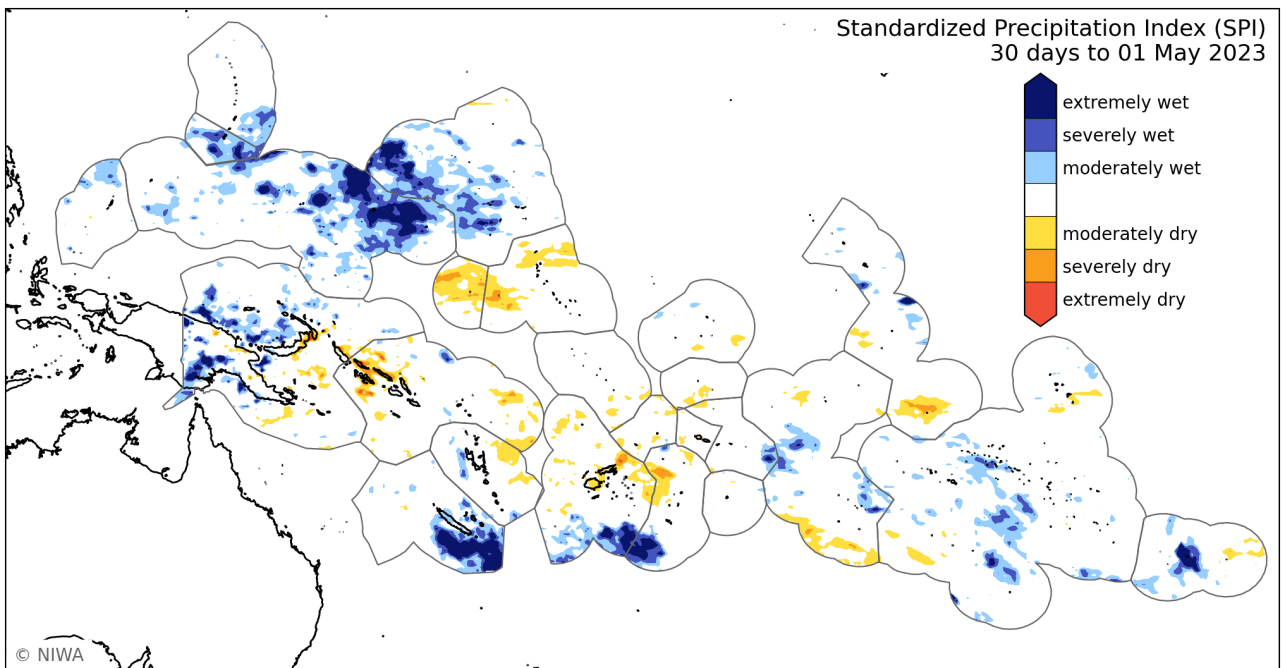
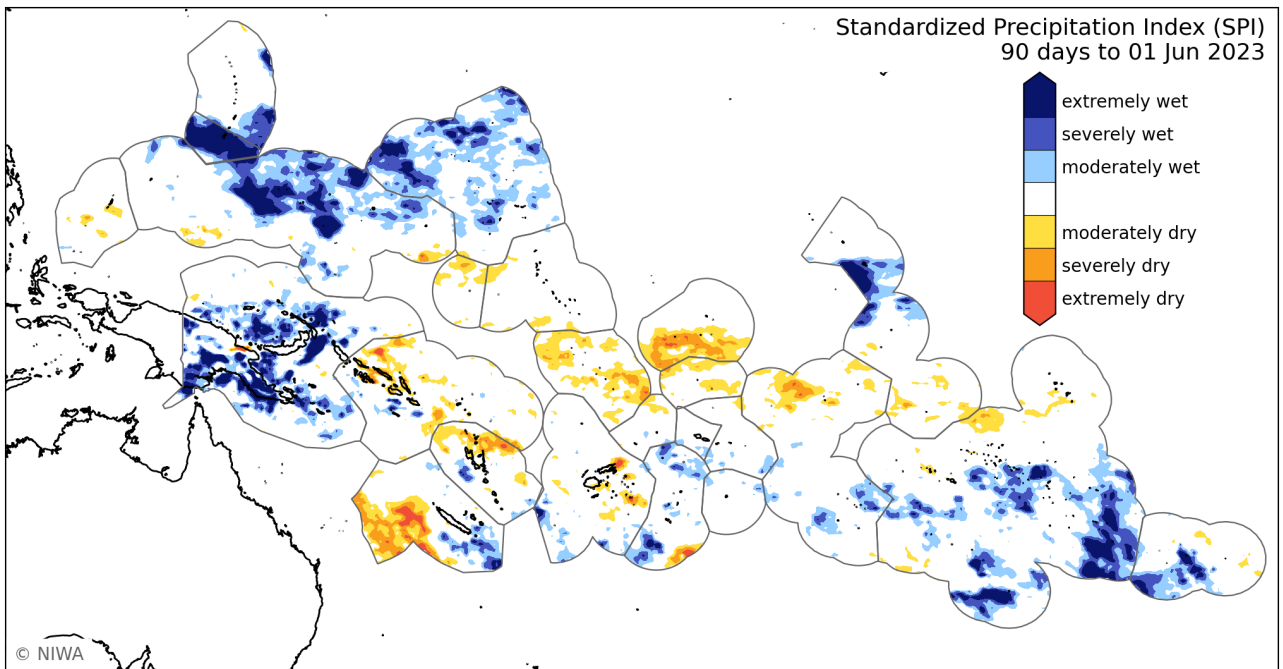


### SPI Regional situation summary (1 June 2023)

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

During March-May (top plot), extremely or severely dry conditions occurred in parts of Solomon Islands, Vanuatu, Fiji, and Phoenix Islands.

During May (bottom plot), extremely or severely dry conditions occurred in parts of the Solomon Islands and southern Line Islands. Meanwhile, it was extremely wet in parts of Guam, FSM, PNG, and Tuamotu Archipelago.

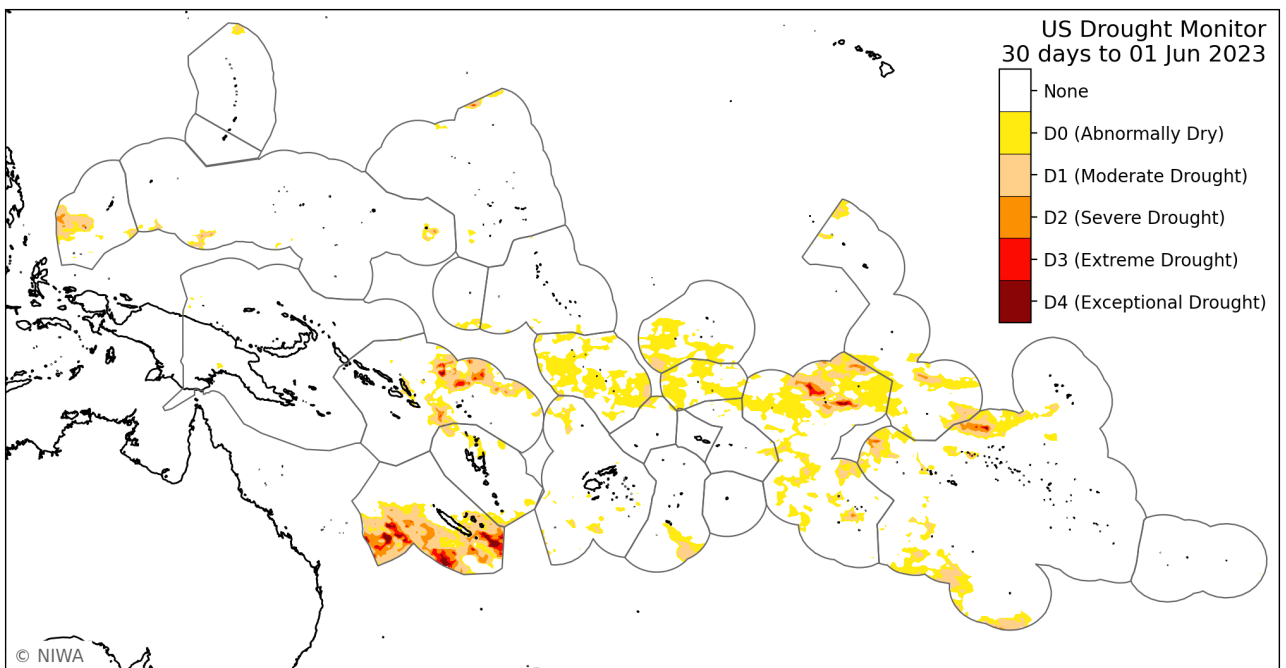
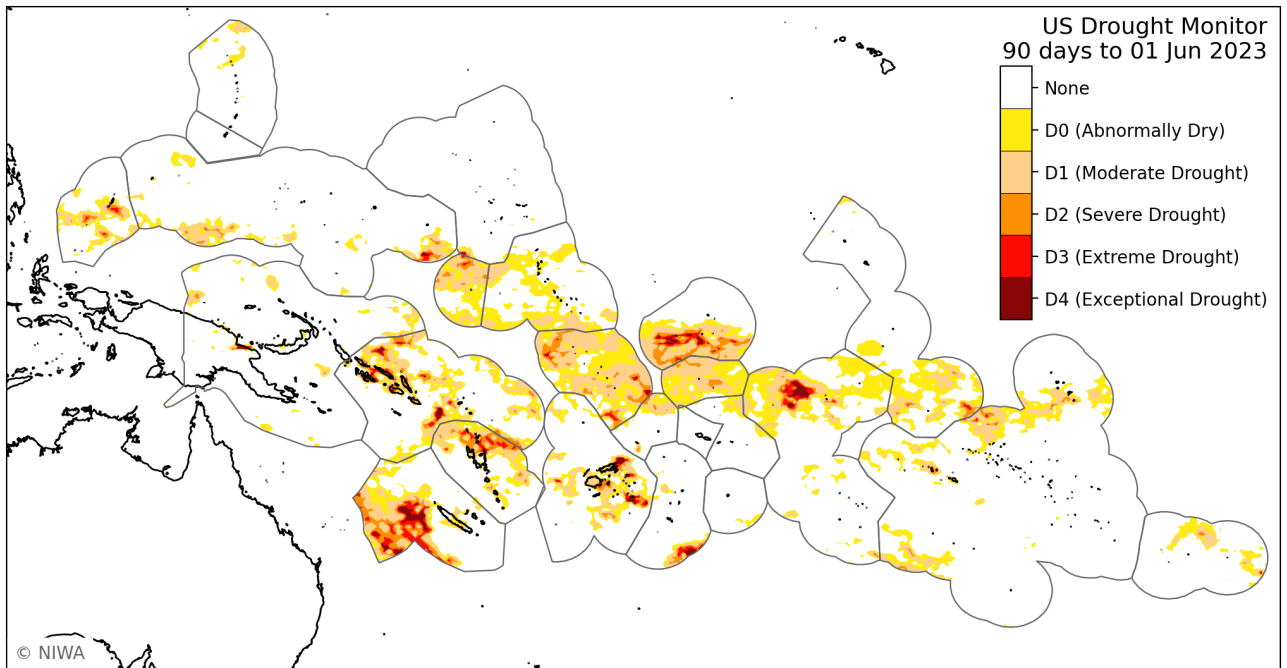


### USDM Regional situation summary (1 June 2023)

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

During March-May (top plot), extreme or exceptional drought occurred in parts Solomon Islands, Vanuatu, Fiji, Phoenix Islands, and Northern Cook Islands.

During May (bottom plot), extreme or exceptional drought occurred in parts of Northern Cook Islands.



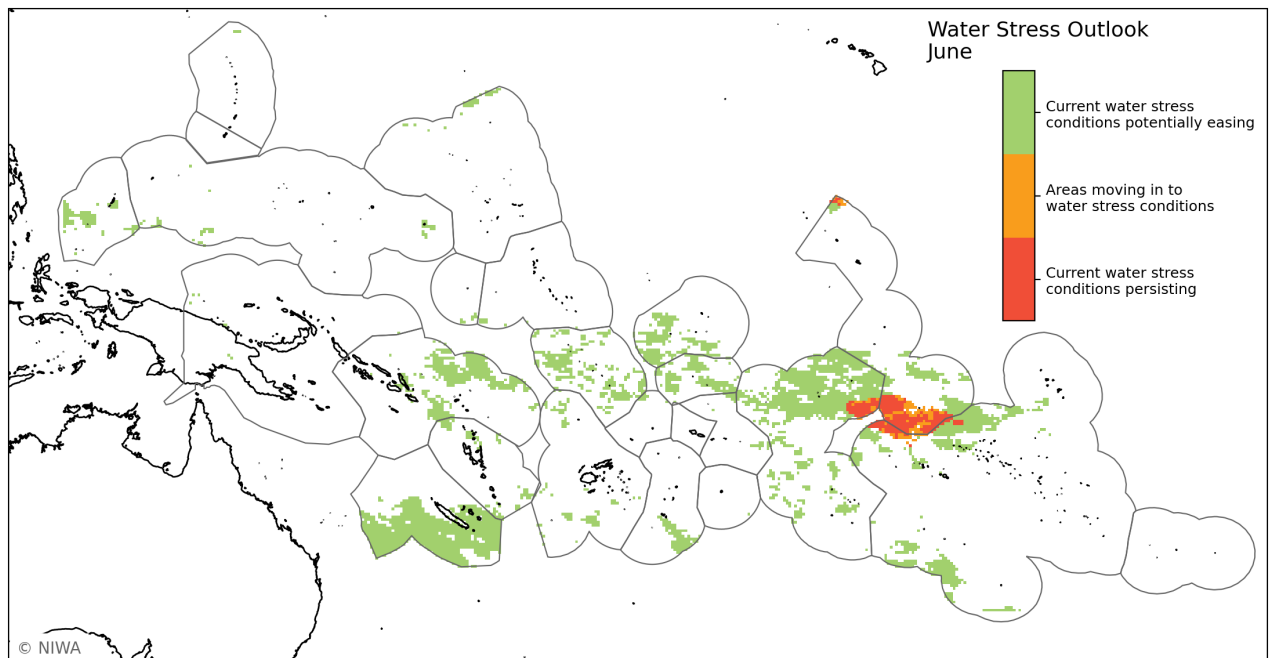
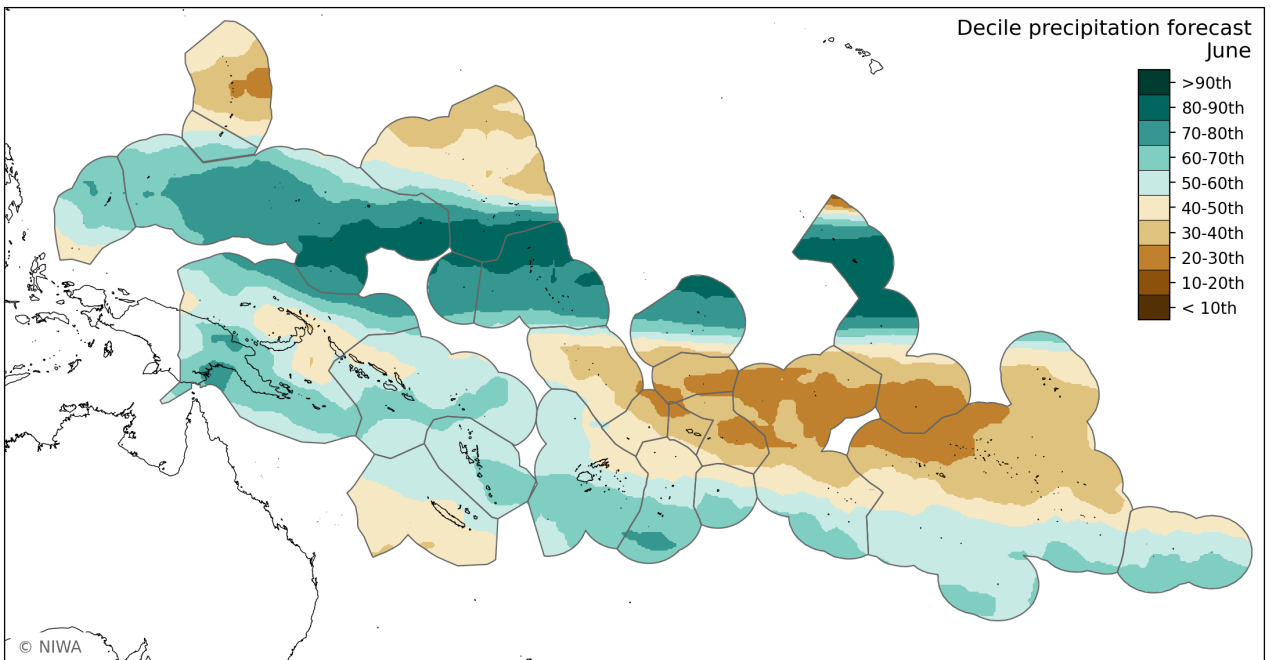
# Island Climate Update

## Water Stress Outlook



### June 2023 forecast summary

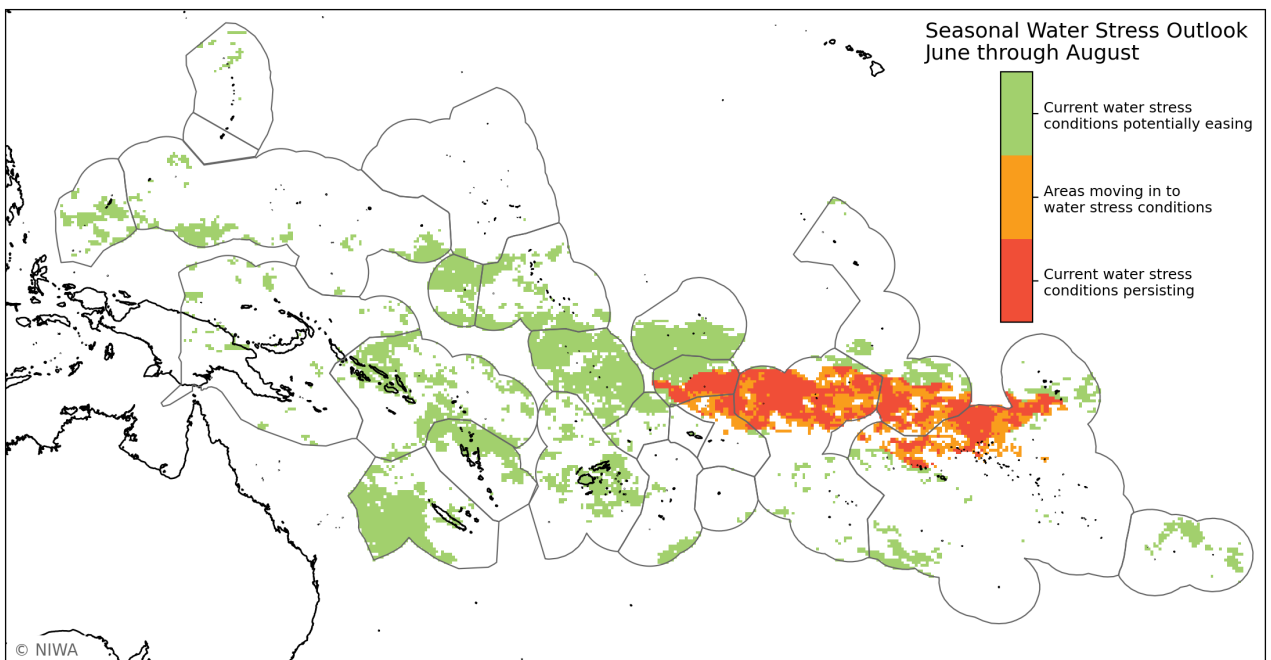
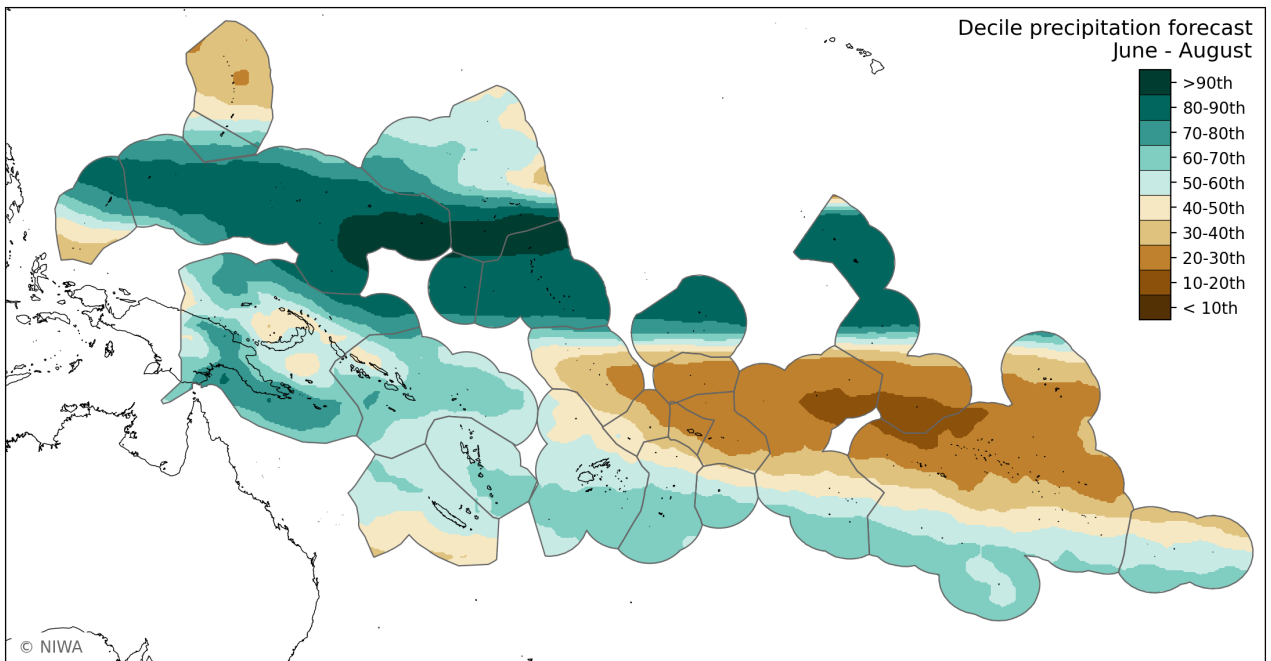
During June, a La Niña-like rainfall pattern is broadly signaled. Rainfall is shown to be below or well below normal from Tuvalu to Marquesas and Tuamotu Archipelago, including Tokelau, Wallis & Futuna, Samoa, American Samoa, Northern Cook Islands, southern Line Islands, and Society Islands. A dry signal also covers Northern Marianas, Marshall Islands, and parts of New Caledonia. On the other hand, very wet conditions are shown for PNG, FSM, southern Marshall Islands, Nauru, and Kiribati (Gilbert, Phoenix, and northern Line Islands).



### June – August 2023 forecast summary

During June-August, rainfall patterns are indicative of a La Niña-like lag effect. This includes below or well below normal rainfall from Tuvalu to Marquesas and the Tuamotu Archipelago as well as Northern Marianas, like the June outlook. Rainfall is predicted to be well above normal across Palau, FSM, southern Marshall Islands, parts of PNG, Nauru, and Kiribati (Gilbert, Phoenix, and northern Line Islands).

Water stress conditions may persist or develop in Tokelau, Northern Cook Islands, southern Line Islands, Society Islands, Marquesas, and Tuamotu Archipelago.

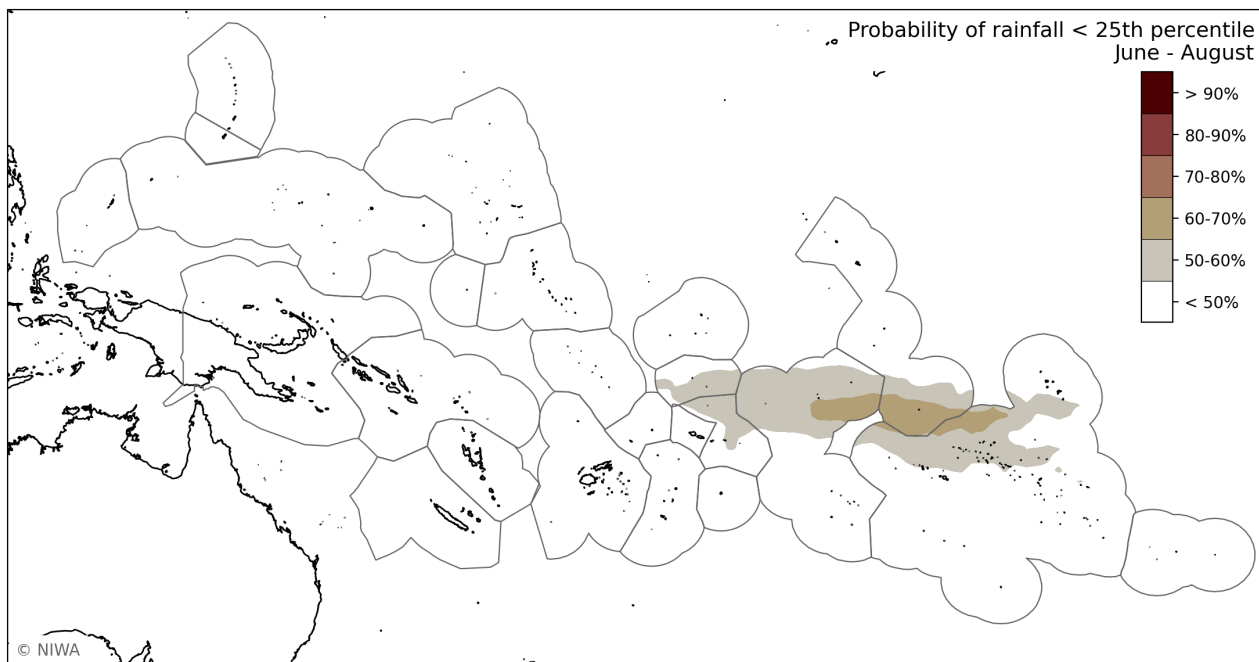
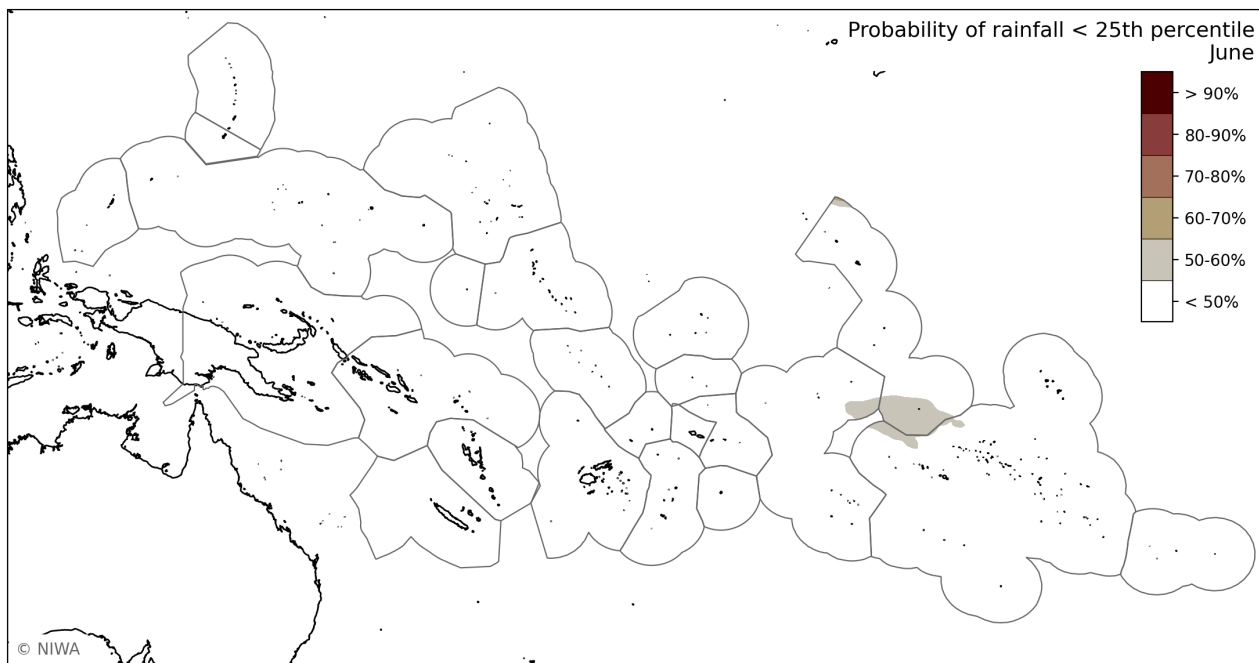


### Probabilities of rainfall < 25<sup>th</sup> percentile

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

For June, the highest chance for very dry conditions is confined to an area around Northern Cook Islands and southern Line Islands.

For June-August, very dry conditions may affect Tokelau, American Samoa, Northern Cook Islands, southern Line Islands, Society Islands, Marquesas, and 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
<b>Rainfall watch</b>	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).
<b>Water stress watch</b>	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.
<b>Water stress outlook</b>	<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"> <li>• Current water stress conditions potentially easing: Past 3 month accumulation less than 25<sup>th</sup> percentile. 1 month / seasonal accumulation forecast greater than 25<sup>th</sup> percentile.</li> <li>• Areas moving in to water stress: Past 3 month accumulation between the 40<sup>th</sup> and 25<sup>th</sup> percentile. 1 month / seasonal accumulation forecast less than 25<sup>th</sup> percentile.</li> <li>• Current water stress conditions persisting: Past 3 month accumulation less than 25<sup>th</sup> percentile. 1 month / seasonal accumulation forecast less than 25<sup>th</sup> percentile.</li> </ul> <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 15<sup>th</sup> of each month. Imagery and data to be made available soon.



**WMO**

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The Island Climate Update bulletin and associated video and products are prepared as soon as possible at the start of each month. Delays in data availability occasionally arise. While every effort is made to verify the data, NIWA does not guarantee the accuracy and reliability of the analysis and forecast information presented and accepts no liability for any losses incurred through the use of this bulletin and its contents.

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## Contact

[islandclimateupdate@comms.niwa.co.nz](mailto:islandclimateupdate@comms.niwa.co.nz)

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