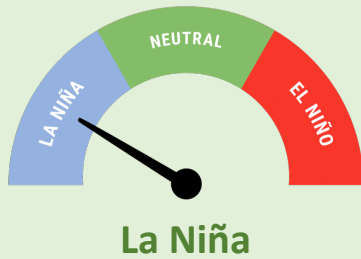


# Island Climate Update



**ENSO Watch**  
January 2023

**Recent**



Moderate La Niña conditions continued in the equatorial Pacific during December, but a weakening trend was noted.

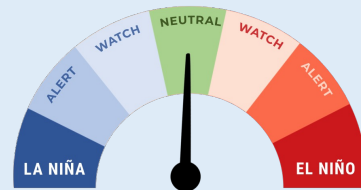
Both sea surface temperatures (SSTs) and the Southern Oscillation Index (SOI) were in the La Niña range.

Warmth in the equatorial Pacific sub-surface ocean spread eastward during December, signaling the start of La Niña's decay.

**65%** chance for **ENSO-neutral** conditions to develop during **January – March 2023**.

Chance for **ENSO Neutral** conditions during **April-June 2023**

**65%**



**Becoming neutral**

**Forecast**

## ENSO situation summary

The NINO3.4 Index anomaly (in the central equatorial Pacific) over the last month was  $-0.83^{\circ}\text{C}$  (climatology: 1991-2020), showing a slight warming trend compared to November.

The SOI was +1.7 during December and +1.3 over the October-December period (climatology: 1991-2020), both within the La Niña range.

Trade winds were stronger than normal during December, sustaining oceanic La Niña conditions.

However, In the subsurface central equatorial Pacific, substantial changes took place during December as warmth associated with the West Pacific Warm Pool shifted eastward. Cooler than average waters contracted toward the central part of the basin while warmer than average waters at depth pushed from the central to the east. This was reflective of a decaying La Niña. Any substantial

relaxation or reversal in trade winds over the next three months will move the system toward ENSO-neutral.

NIWA's analysis indicates that La Niña conditions are most likely to transition to ENSO-neutral during January-March, most likely later in the period (65% chance). During April-June, ENSO-neutral is favoured at a 65% chance. The chance for El Niño increases to around 65% from July-September 2023. The last time El Niño conditions occurred during that time of the year was in 2015.

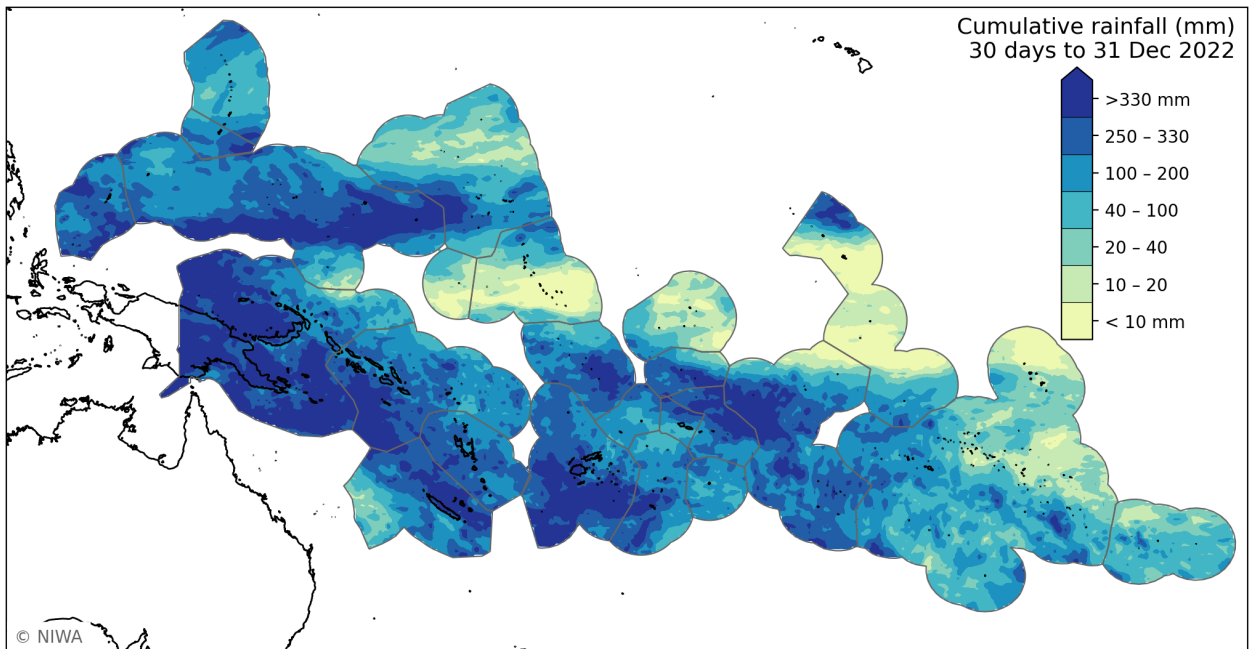
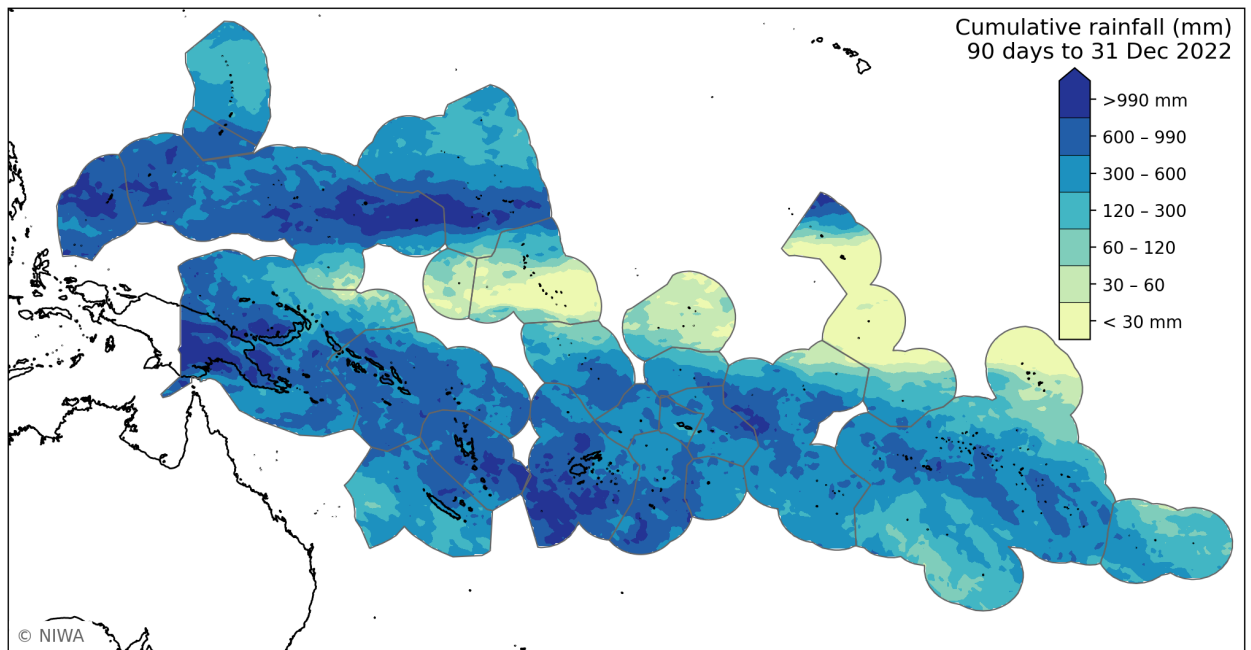
A pulse of the Madden-Julian Oscillation will move across the Pacific during January, coinciding with an increase in the odds for tropical cyclone activity during the 2<sup>nd</sup> and 3<sup>rd</sup> week of the month. This is a reminder for all to remain vigilant and keep up to date with your local meteorological service.

### Regional situation summary (1 January 2023)

Satellite-derived rainfall summaries for the last month and three months are shown below. Low rainfall continued to be experienced around the equator with higher amounts in Micronesia, Melanesia, and for island groups toward the sub-tropics.

During October-December (top plot), less than 60 mm of rainfall fell in parts of Nauru, Kiribati, and Marquesas. 300-600+ mm of rain fell in most other island groups.

During December (bottom plot), less than 20 mm of rainfall fell in parts of Nauru, Kiribati, and parts of French Polynesia. Over 330 mm of rain fell in many island groups across Micronesia and Melanesia. Compared to November, December was wetter in many island groups, except for the Marshall Islands, the Tuamotu Archipelago, and the Society Islands.

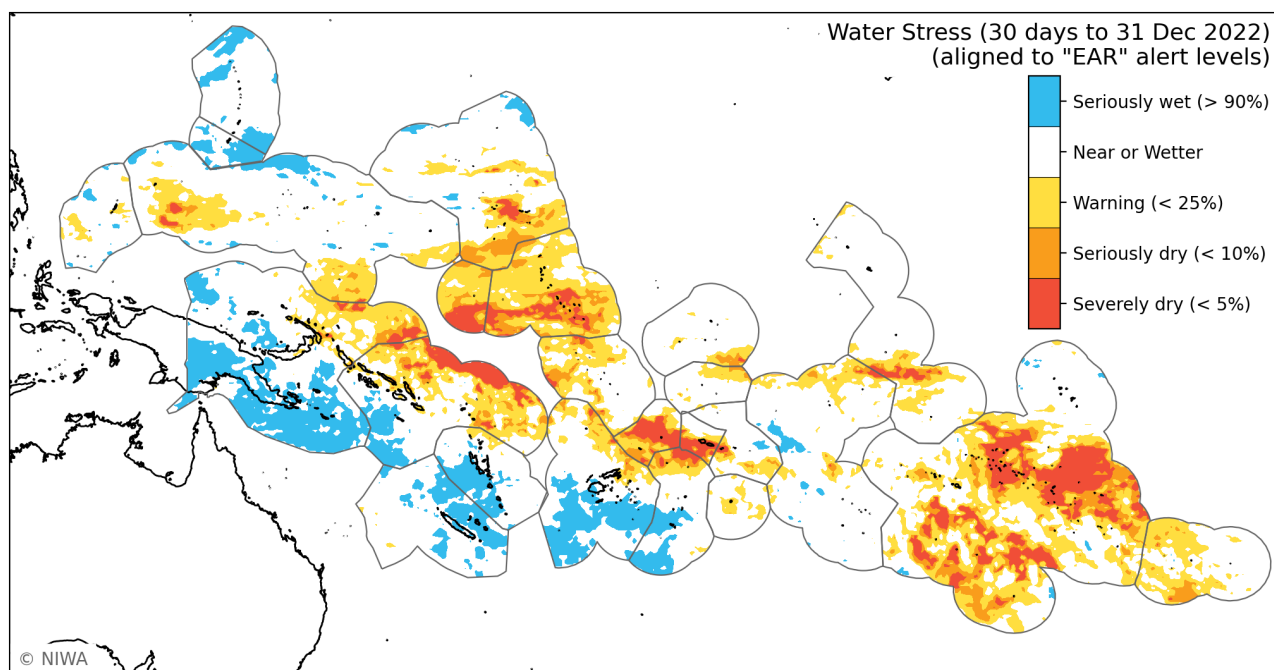
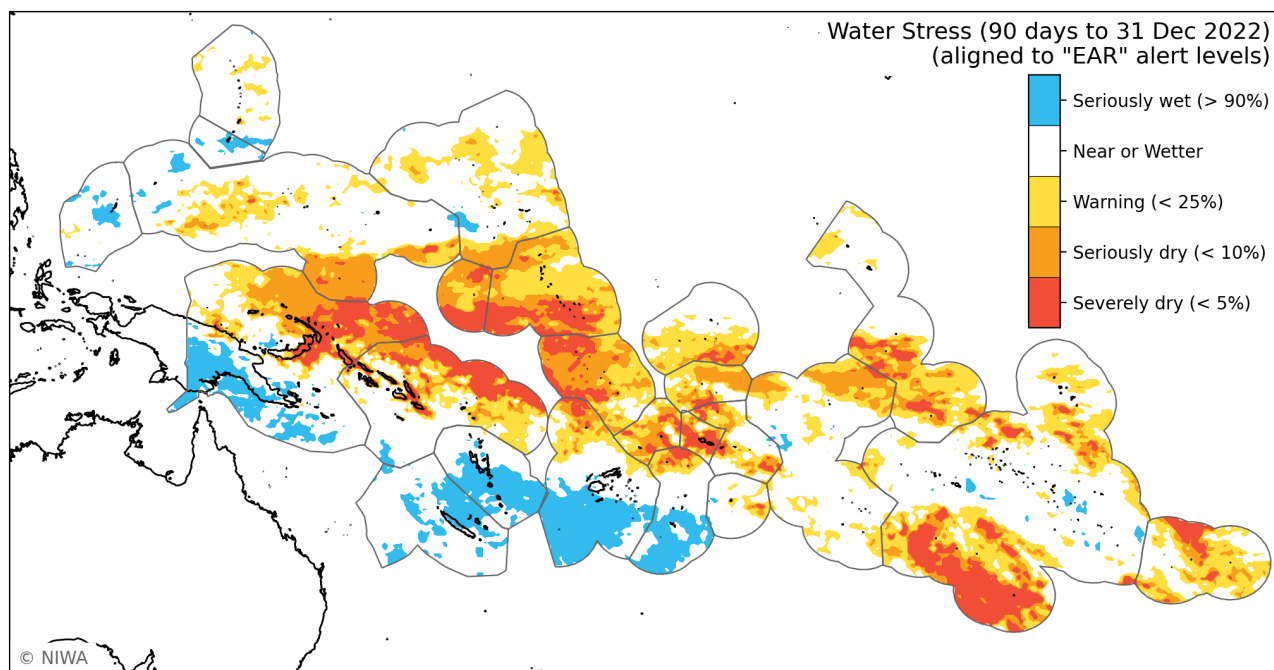


### EAR regional situation summary (1 January 2023)

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 southern Federated States of Micronesia (FSM), northern Papua New Guinea (PNG), Solomon Islands, Nauru, Kiribati (Gilbert and southern Line Islands), Tuvalu, Tokelau, Wallis & Futuna, Samoa, American Samoa, far Northern Cooks, Society Islands, and Pitcairn Islands.

During December (bottom plot), severely or seriously dry conditions occurred in parts of the southern Marshalls, Nauru, Gilberts, Samoa, American Samoa, Society Islands, and Tuamotu.

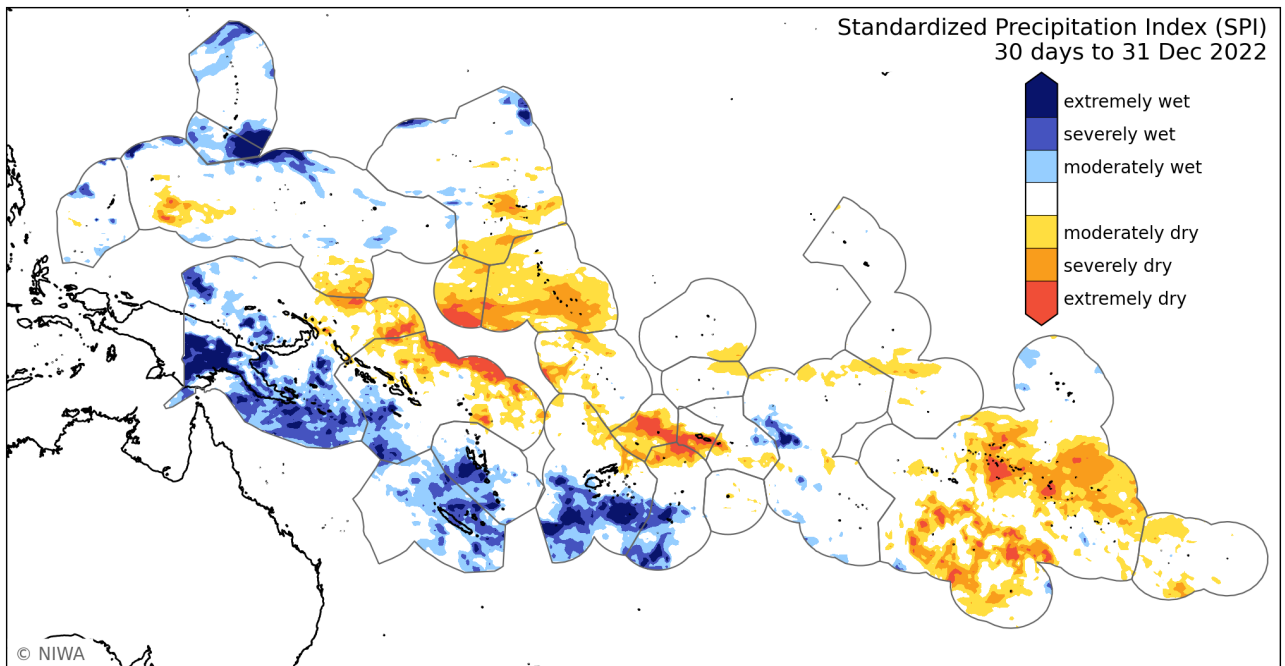
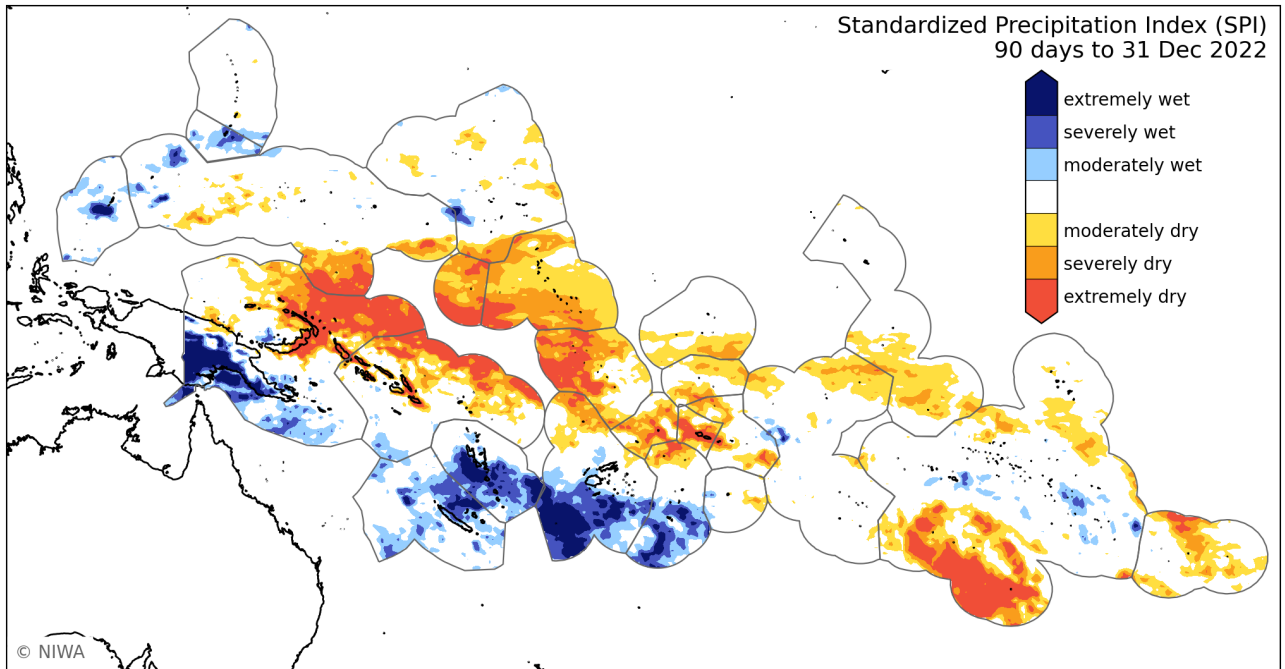


### SPI Regional situation summary (1 January 2023)

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 southern FSM, northern PNG, parts of Solomon Islands, Nauru, Kiribati (Gilbert Islands), Tuvalu, Wallis & Futuna, Samoa, American Samoa, and Society Islands.

During December (bottom plot), extremely or severely dry conditions occurred in parts of Marshall Islands, Nauru, Kiribati (Gilbert Islands), Wallis & Futuna, Samoa, American Samoa, Society Islands, and Tuamotu.

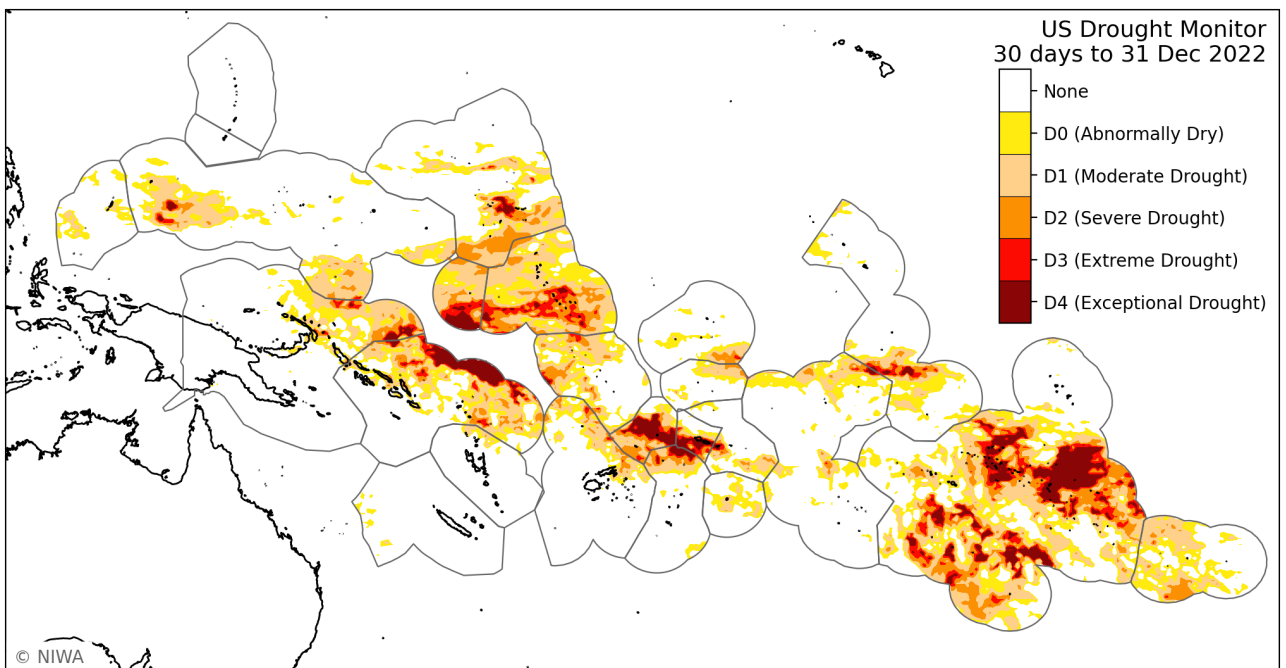
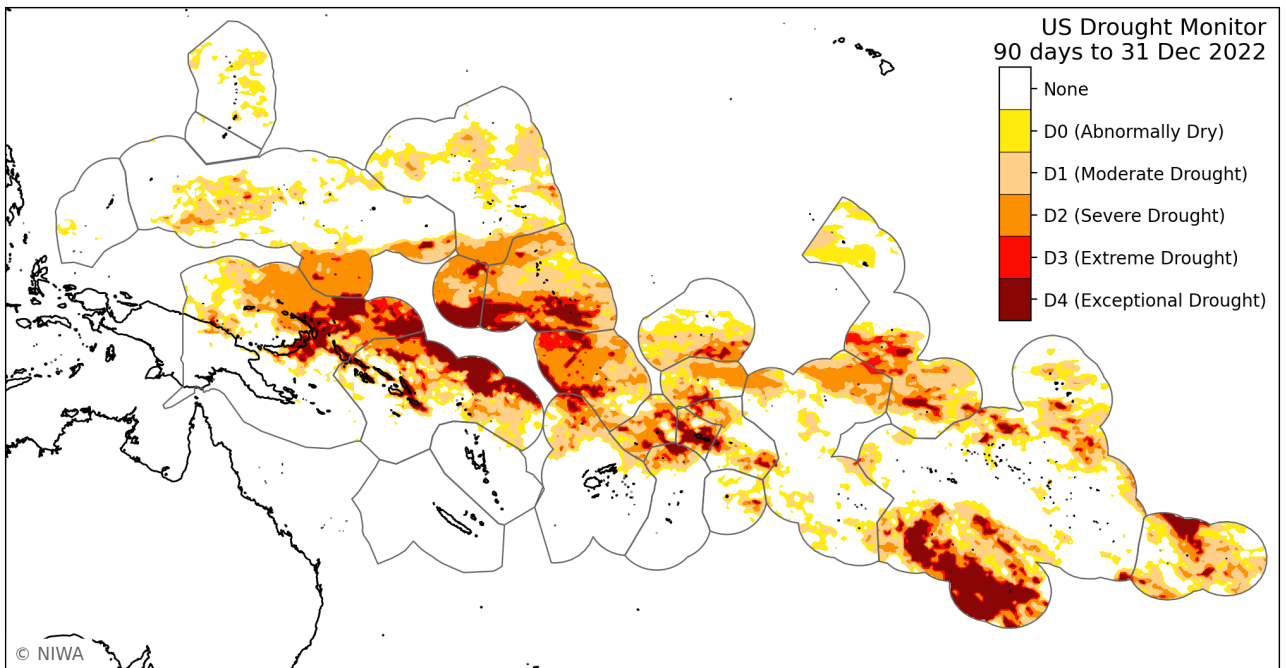


### USDM Regional situation summary (1 January 2023)

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

During October-December (top plot), extreme or exceptional drought occurred in parts of southern FSM, northern PNG, Solomon Islands, Nauru, Kiribati, Tuvalu, Wallis & Futuna, Samoa, American Samoa, and Society Islands.

During December (bottom plot), extreme or exceptional drought occurred in parts of the Marshalls, Nauru, Gilbert Islands, Wallis & Futuna, Samoa, American Samoa, Society Islands, and Tuamotu.

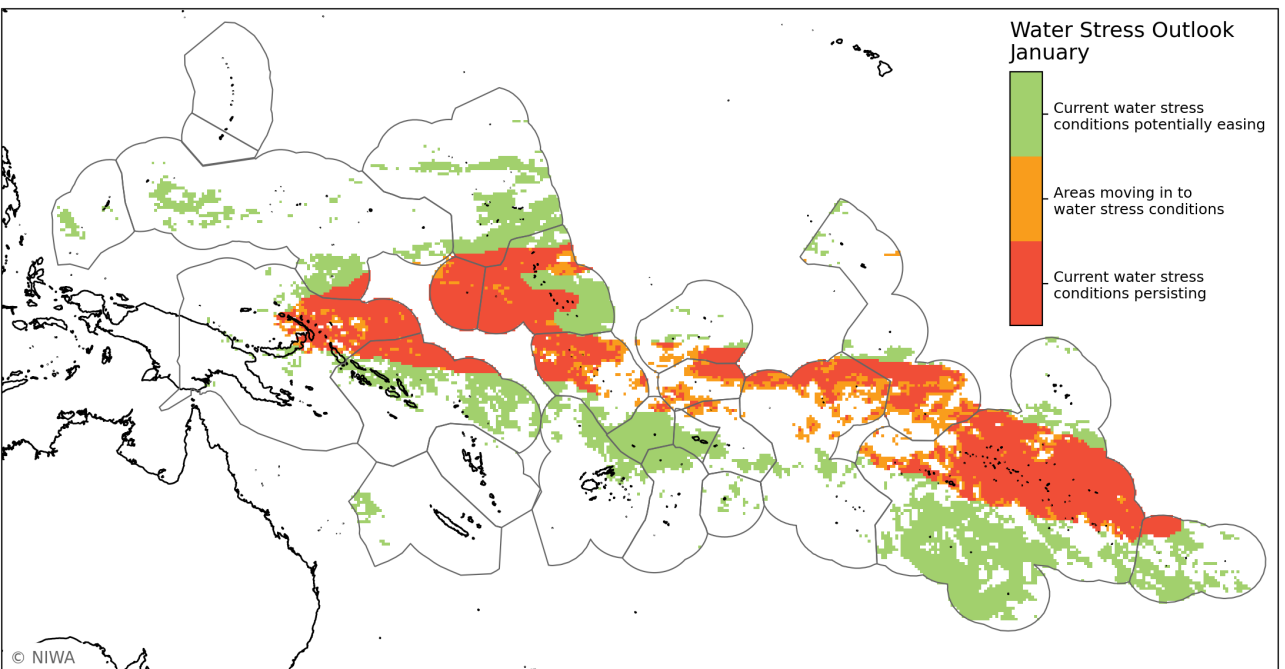
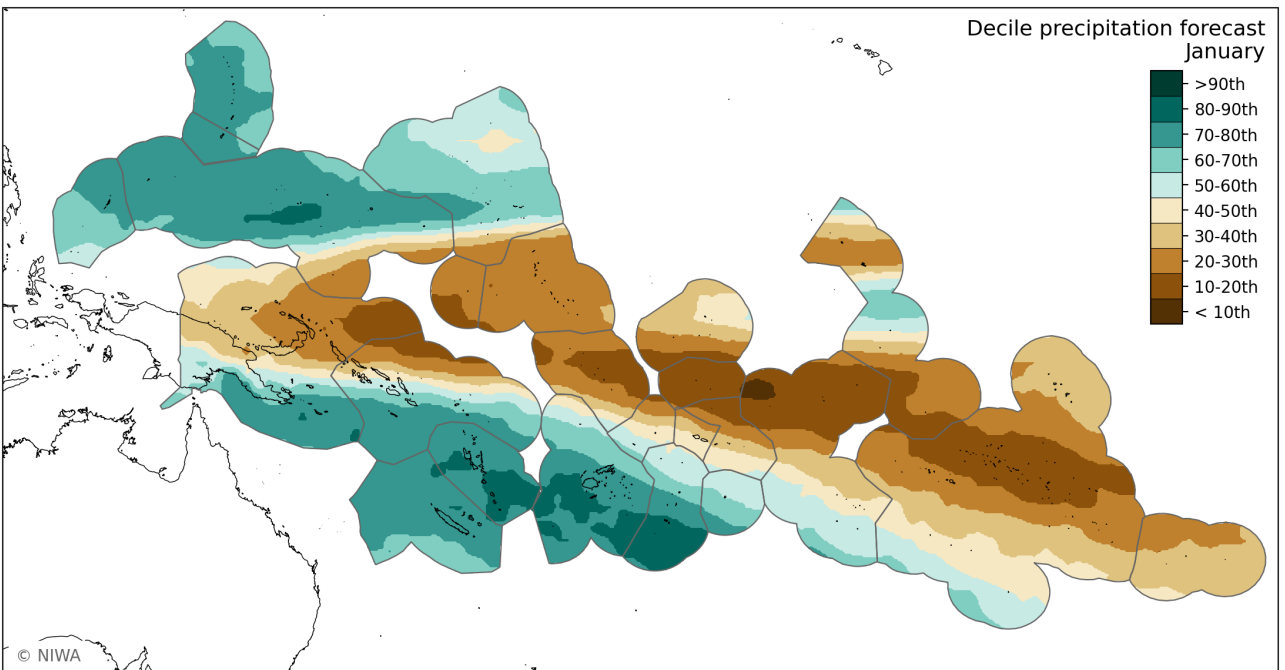


### January 2023 forecast summary

During January, there continues to be a high chance for drier than normal conditions along and extending southeastward of the equator, including most island groups that recently experienced dryness. Notably, this includes Samoa, American Samoa, and Tuamotu, which had low or very low rainfall during December.

Water stress is forecast to persist in far southern FSM, far northern PNG, Nauru, parts of Kiribati, and Tuamotu. Water stress may redevelop in parts of Tuvalu and the Northern Cook Islands.

Water stress may ease in the Marshall Islands, the Solomons, Society Islands, and the Pitcairn Islands.

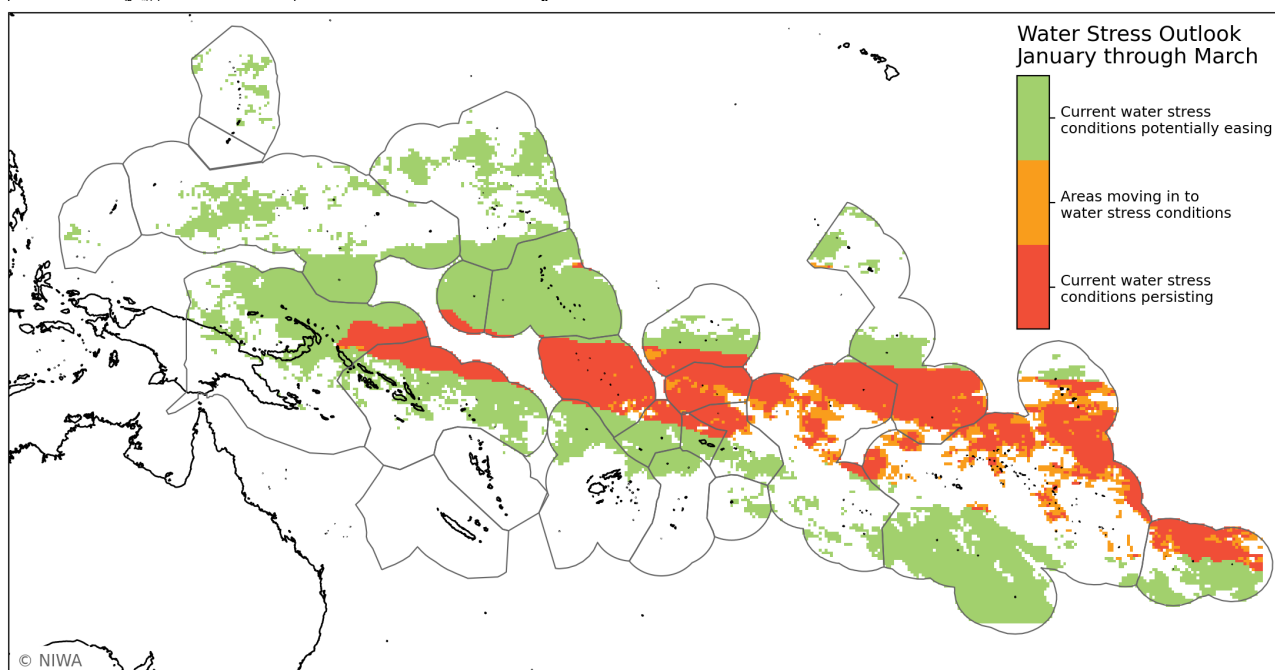
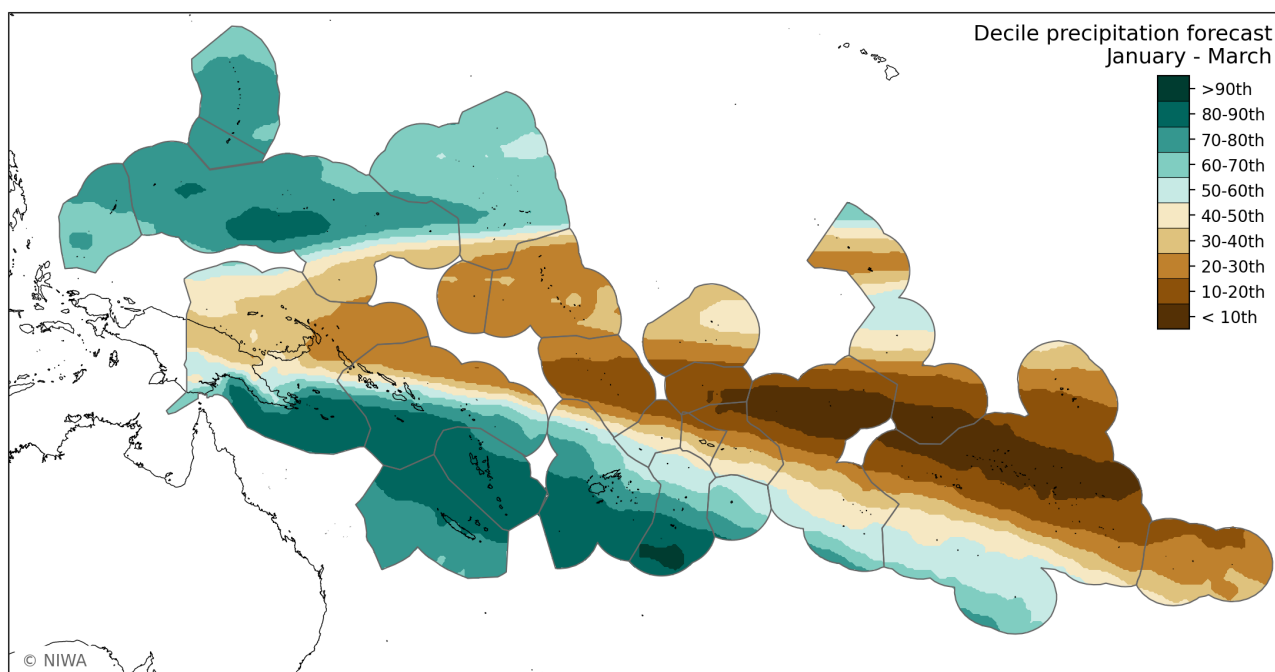


### January – March 2023 forecast summary

During January-March, there is a high chance for drier than normal conditions in island groups along and south-east of the equator. The three-month outlook looks very similar to the one issued this time last month, but the odds for dryness aren't quite as high for southern FSM, PNG, Solomons, Nauru, and parts of Kiribati.

Seasonal water stress is most likely to persist in a narrow strip near and extending south-east of the equator but shows signs of gradually easing elsewhere.

La Niña's influence on rainfall patterns will continue for a portion of this period but may become less pronounced toward March as the system moves toward ENSO-neutral.

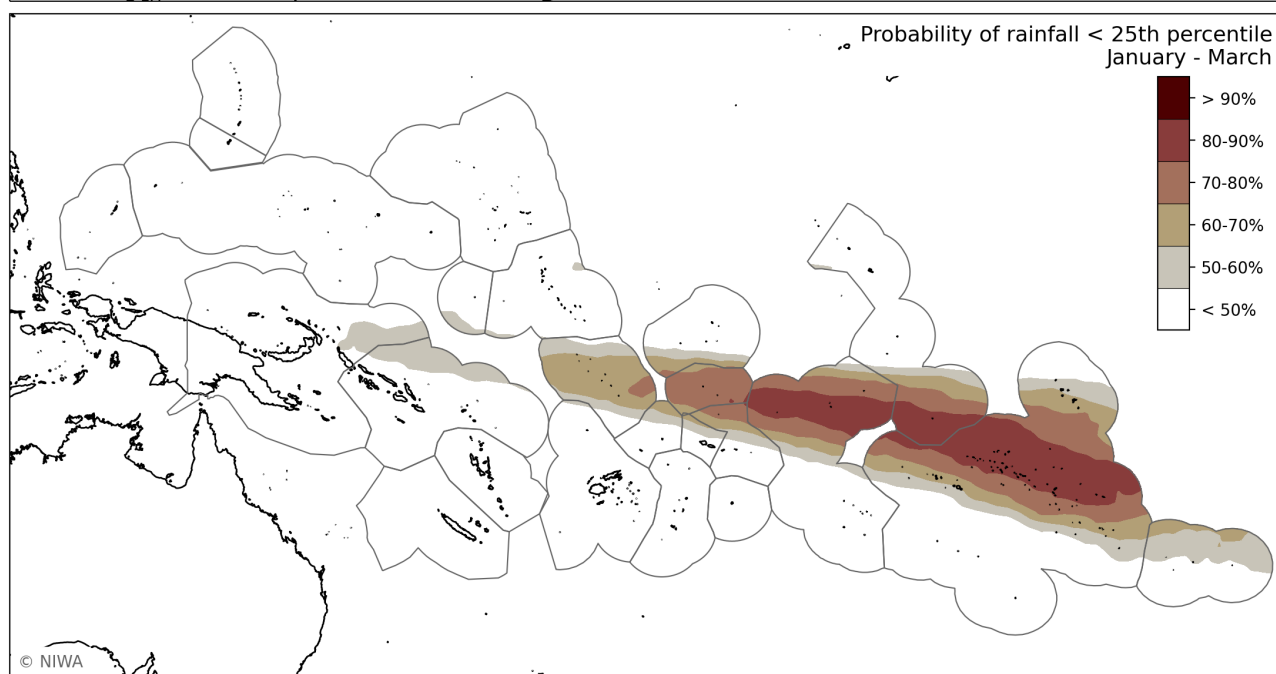
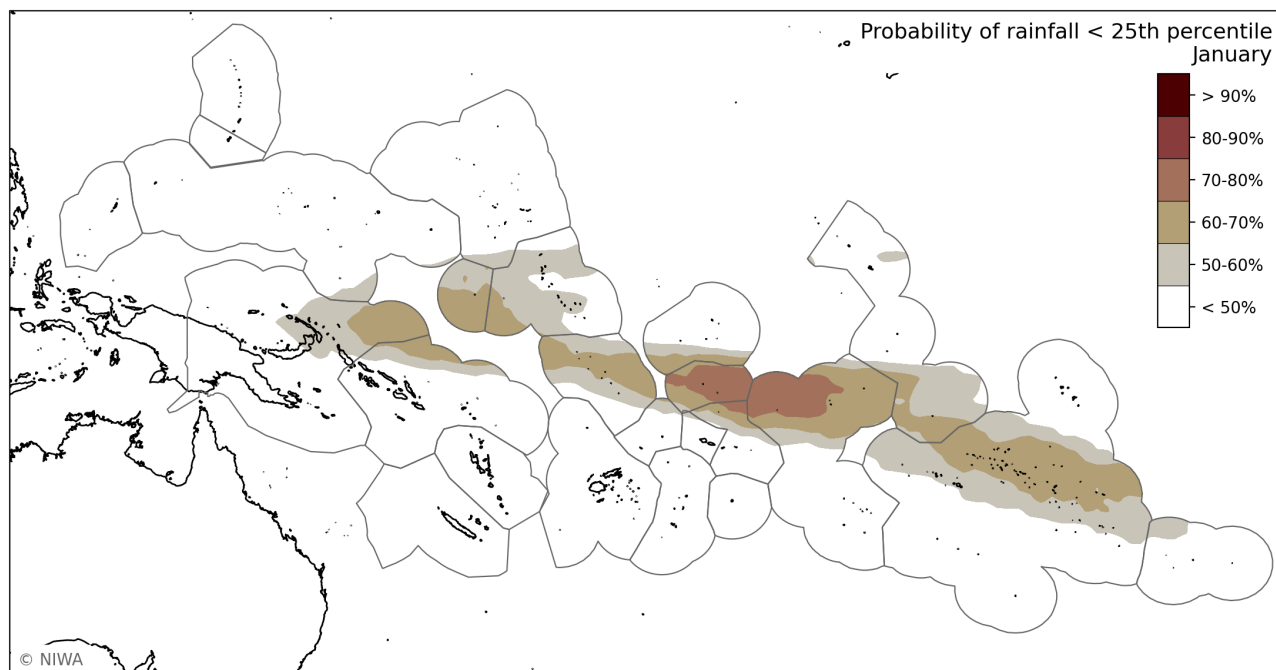


### Probabilities of rainfall < 25<sup>th</sup> percentile

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

For January, the odds for dryness are highest in Tokelau and the Northern Cook Islands. Elevated chances for dryness are also noted for northern PNG, Nauru, Kiribati, Tuvalu, and Tuamotu, but the odds aren't as high as last month.

For January-March, very dry conditions are most likely in Tuvalu, Tokelau, areas near Samoa and American Samoa, southern Line Islands, Marquesas, and Tuamotu.





# 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>
<p>Online Resources</p>	<p><b>Additional regional and country-level resources are available online:</b></p> <ul style="list-style-type: none"> <li>• Daily updated plots for 30, 60, 90, 180 and 365 day: accumulative rainfall, number of dry days, number of days since last rainfall &gt; 1 mm, EAR, SPI and USDM indices. <a href="#">Click here for the imagery and here for the underlying data.</a></li> <li>• 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.</li> </ul>



**WMO**

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