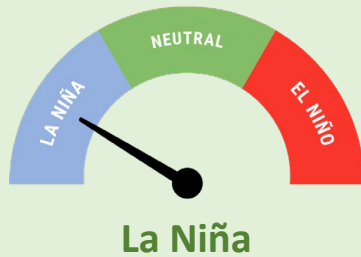


Island Climate Update



ENSO Watch
February 2023

Recent



La Niña conditions persisted in the equatorial Pacific during January but continued to gradually weaken.

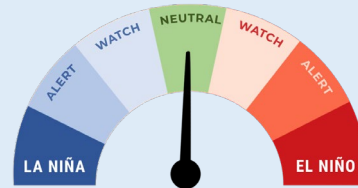
Both sea surface temperatures (SSTs) and the Southern Oscillation Index (SOI) were near the La Niña threshold.

January trade winds were stronger than normal in the central and western equatorial Pacific. This enabled the continuation of a central Pacific-focused La Niña.

80% chance for **ENSO-neutral** conditions to develop during **February – April 2023**.

Chance for **ENSO Neutral** conditions during **May-July 2023**

50%



Becoming neutral

Forecast

ENSO situation summary

The NINO3.4 Index anomaly (in the central equatorial Pacific) over the last month was -0.69°C , close to La Niña thresholds.

The SOI was $+1.0$ during January and $+1.0$ over the November-January period, both at the La Niña threshold.

Trade winds were stronger than normal during January in the central and western Pacific.

In the subsurface central equatorial Pacific, warmer than average water has developed in the far eastern equatorial Pacific around 50 m depth. A remnant cool water anomaly was located near the surface in the central Pacific, which will likely allow a La Niña-like ocean signature to persist for another month or two. 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 will most likely transition to ENSO-neutral during February-April, most likely by the end of March (80% chance). During May-July, ENSO-neutral is favoured at around a 50% chance. The chance for El Niño increases to around 55% from August-October 2023. The last time El Niño conditions occurred during winter and spring was in 2015.

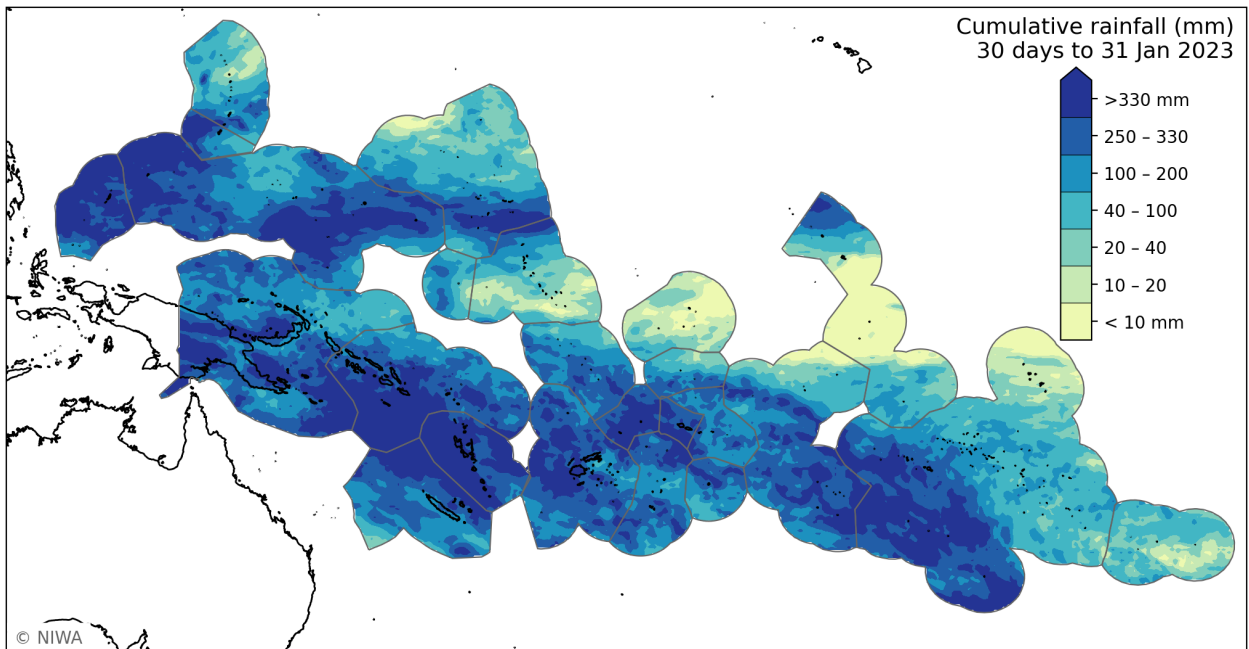
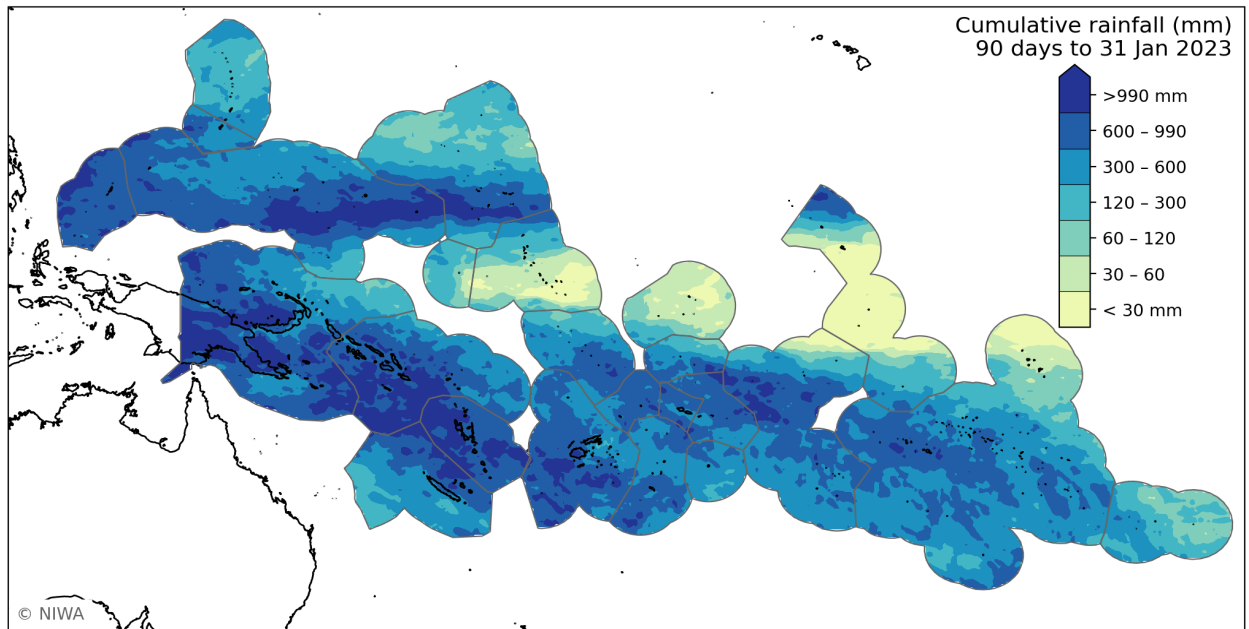
A pulse of the Madden-Julian Oscillation (MJO) will move from the Maritime Continent into the Pacific Ocean region during the first half of February. These MJO pulses will increase the potential for tropical cyclone (TC) formation during this period, with a TC expected to form imminently in the Coral Sea. Keep up-to-date with forecasts from your local met service.

Regional situation summary (1 February 2023)

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

During November-January (top plot), less than 60 mm of rainfall fell in much of Nauru, Kiribati, and northern Marquesas. 300-600 mm or more of rain fell in most other island groups.

During January (bottom plot), less than 20 mm of rainfall fell in the southern Gilbert Islands, the Phoenix Islands, the central Line Islands, and parts of Marquesas. Over 330 mm of rain fell in many island groups across Micronesia, Melanesia, and island groups toward the sub-tropics. Compared to December, January was wetter in many island groups, except for the Northern Marianas, much of Kiribati, and Marquesas.

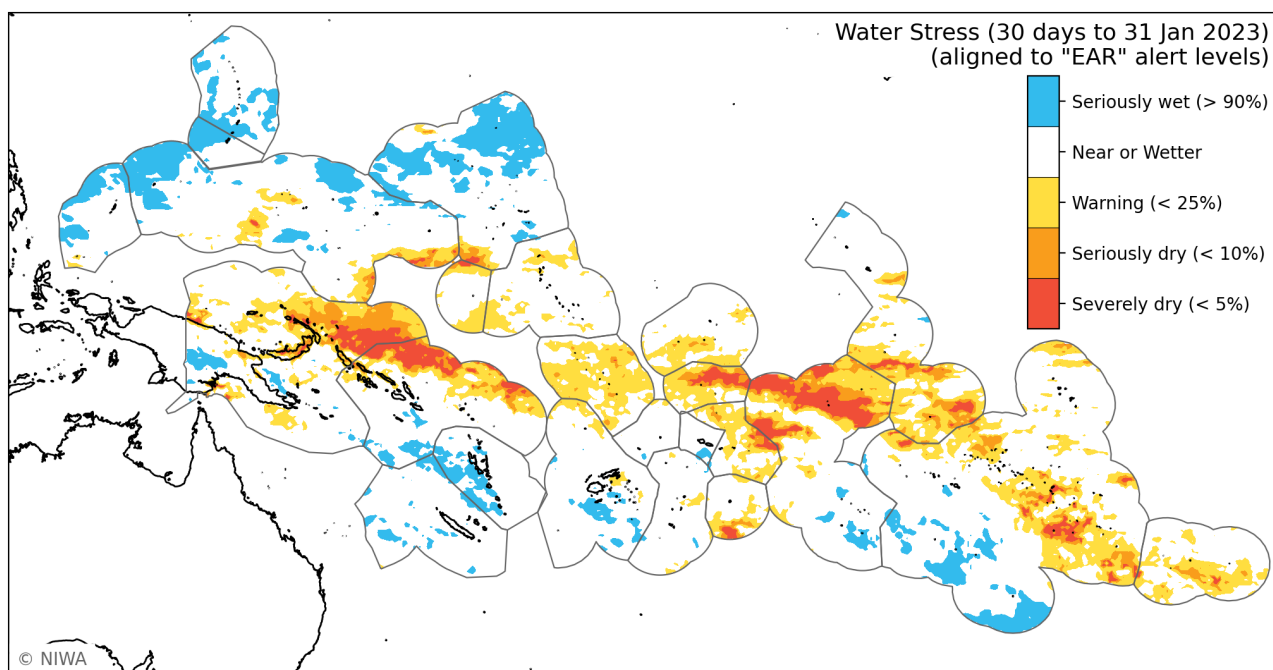
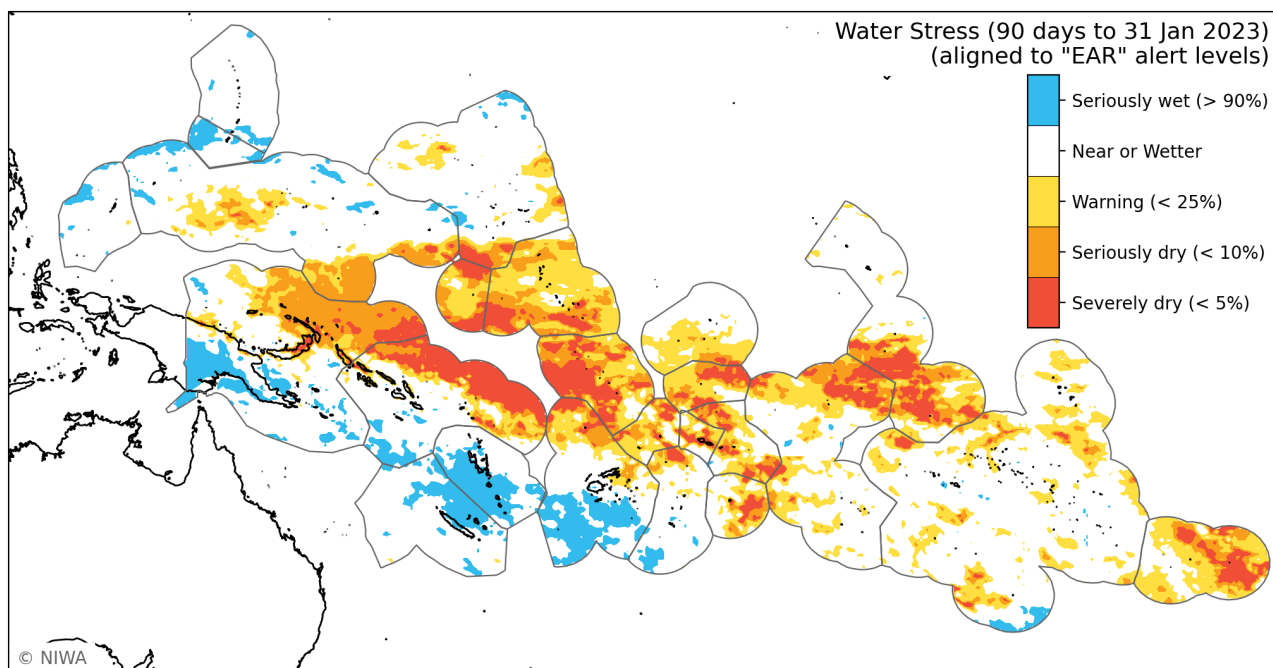


EAR regional situation summary (1 February 2023)

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

During November-January (top plot), severely or seriously dry conditions affected parts of southern Federated States of Micronesia (FSM), northern Papua New Guinea (PNG), Nauru, Kiribati (Gilbert and southern Line Islands), Tuvalu, Tokelau, Wallis & Futuna, Samoa, American Samoa, Niue, far northern Cooks, and Pitcairn Islands.

During January (bottom plot), severely or seriously dry conditions occurred in parts of northern PNG, Tokelau, Northern Cooks, southern Line Islands, and Tuamotu.

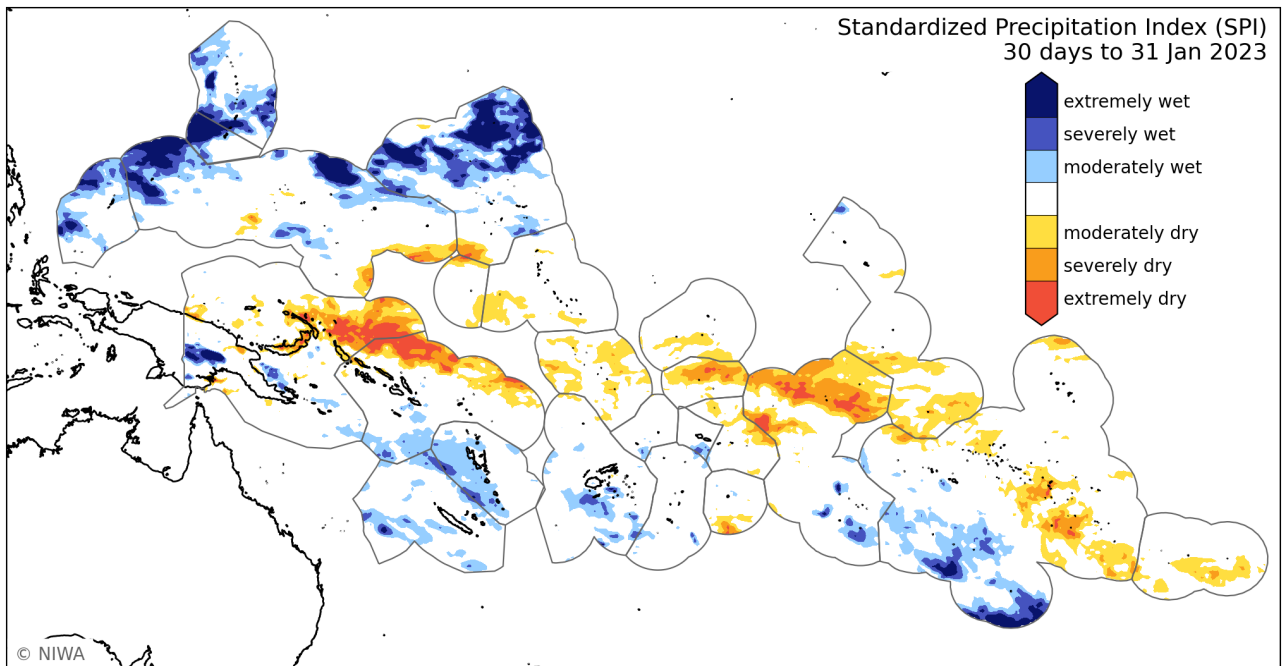
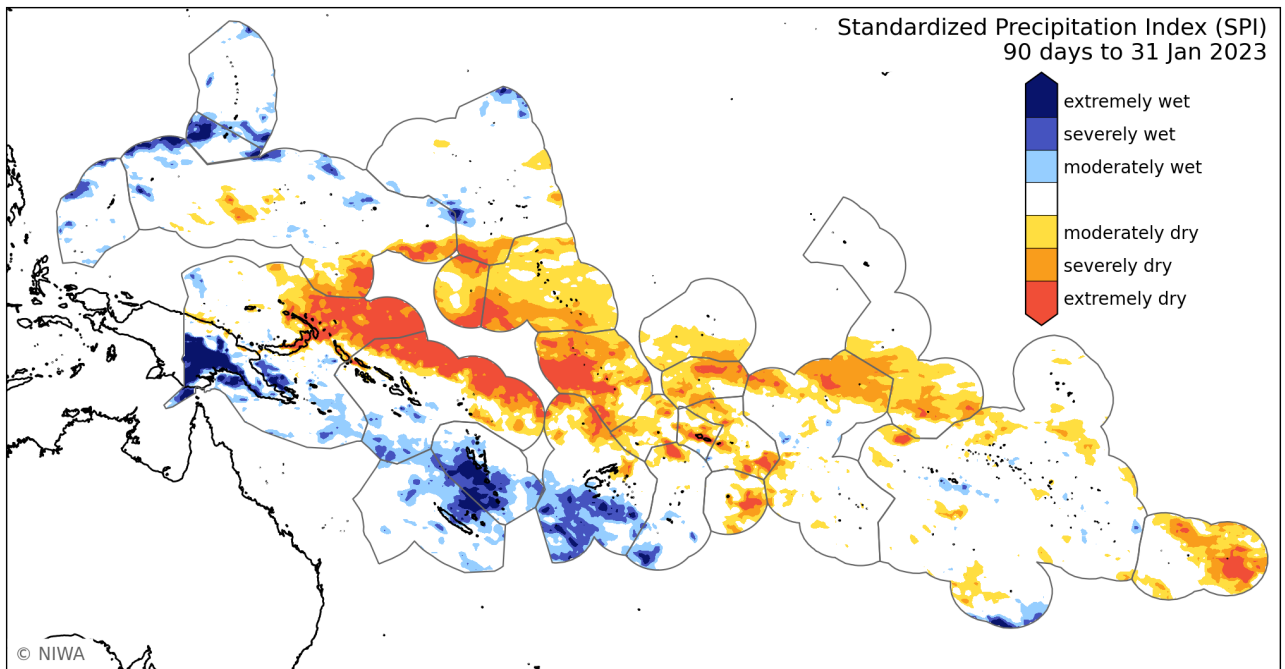


SPI Regional situation summary (1 February 2023)

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

During November-January (top plot), extremely or severely dry conditions occurred in northern PNG, Nauru, Kiribati (Gilbert and southern Line Islands), Tuvalu, Tokelau, Samoa, American Samoa, Niue, Northern Cooks, and Pitcairn Islands.

During January (bottom plot), extremely or severely dry conditions occurred in parts of northern PNG, Tokelau, Northern Cooks, and Tuamotu.

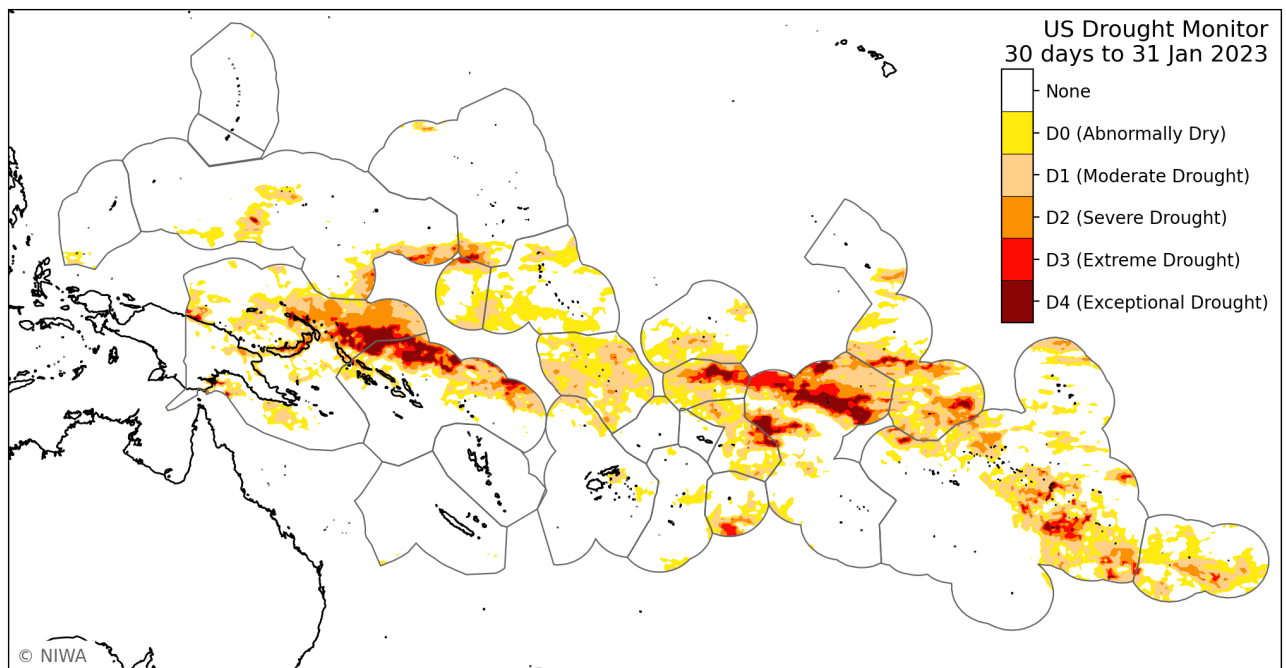
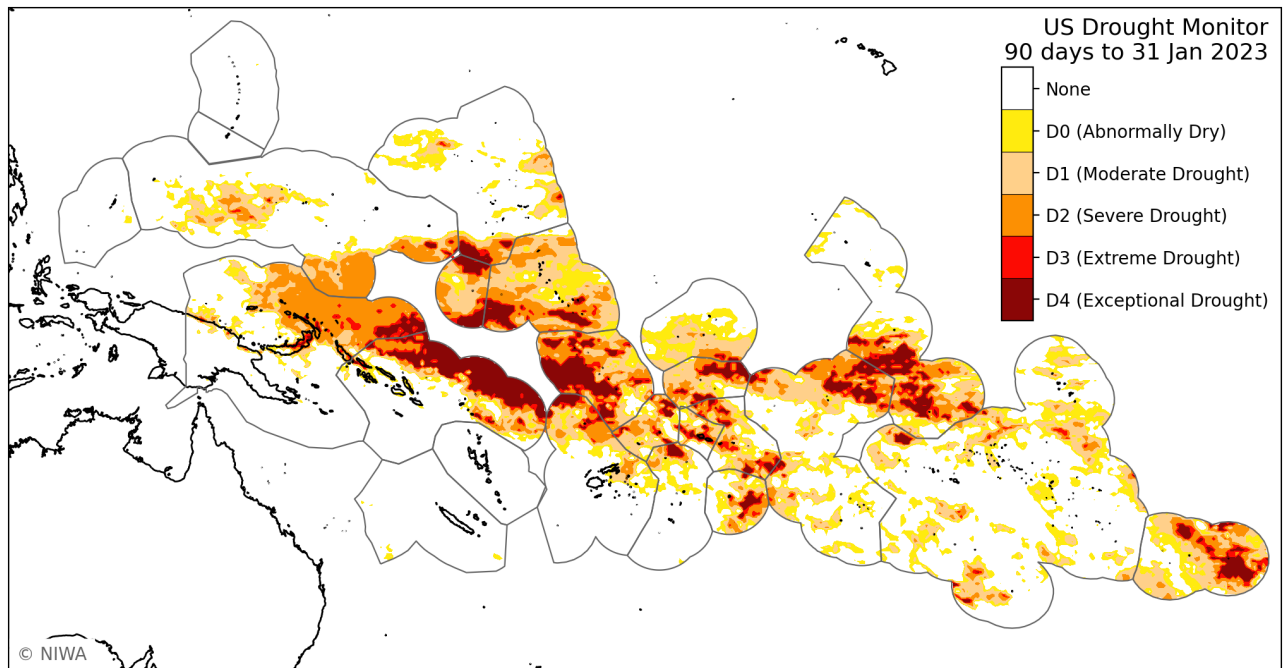


USDM Regional situation summary (1 February 2023)

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

During November-January (top plot), extreme or exceptional drought occurred in parts of southern FSM, northern PNG, eastern Solomon Islands, Nauru, Kiribati (Gilberts and southern Line Islands), Tuvalu, Tokelau, Wallis & Futuna, Samoa, American Samoa, Niue, Northern Cooks, and Pitcairn Islands.

During January (bottom plot), extreme or exceptional drought occurred in parts of northern PNG, Tokelau, Northern Cooks, southern Line Islands, and Tuamotu.

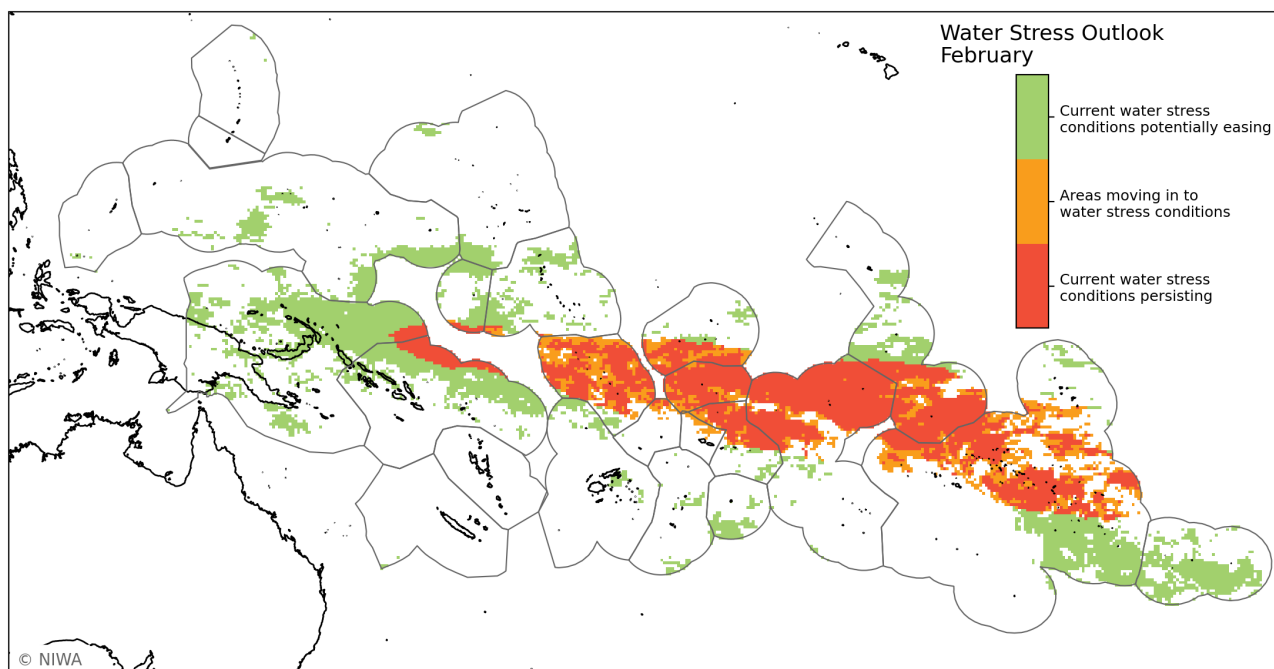
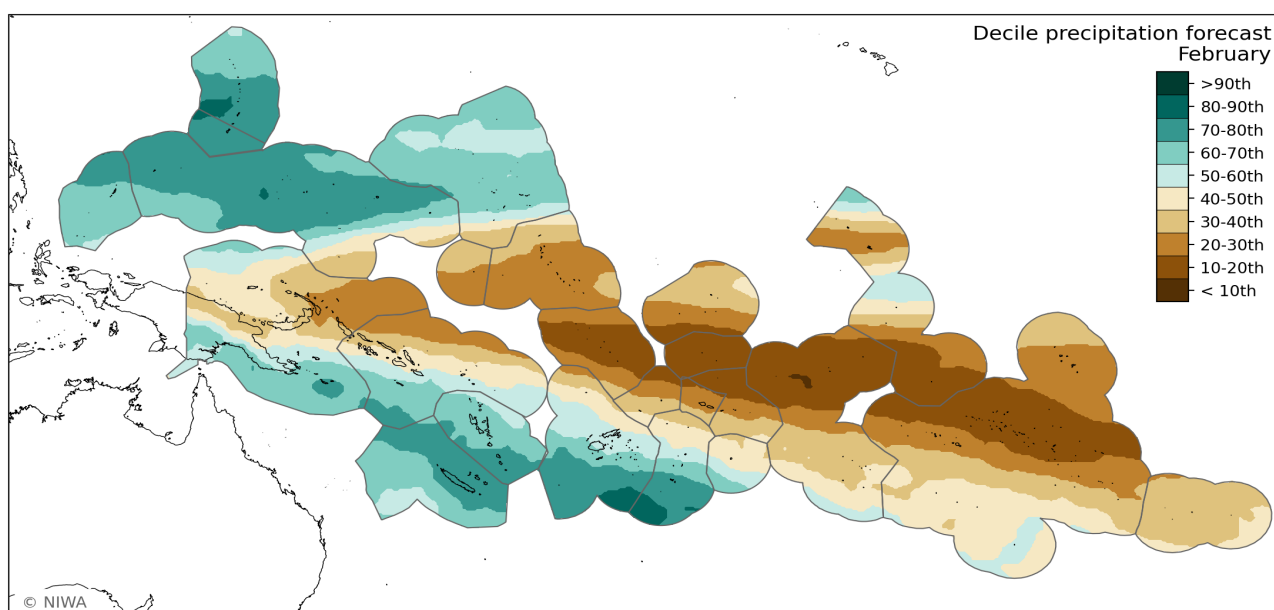


February 2023 forecast summary

During February, there continues to be a high chance for drier than normal conditions along and extending southeastward of the equator, including most island groups that have been experiencing significant dry conditions. Compared to last month, there is an increased chance for dryness in Tuvalu, Wallis & Futuna, Samoa, American Samoa, northern Tonga, Niue, Southern Cooks, and Austral Islands.

Water stress is forecast in Tuvalu, southern Phoenix Islands, Tokelau, American Samoa, Northern Cooks, southern Line Islands, and Tuamotu. Water stress may redevelop in additional parts of Tuvalu and Tuamotu.

Water stress may ease in northern PNG, northern Solomons, Nauru, the Gilberts, central Line Islands, southern Tuamotu, and Pitcairn Islands.



Island Climate Update

Water Stress Outlook

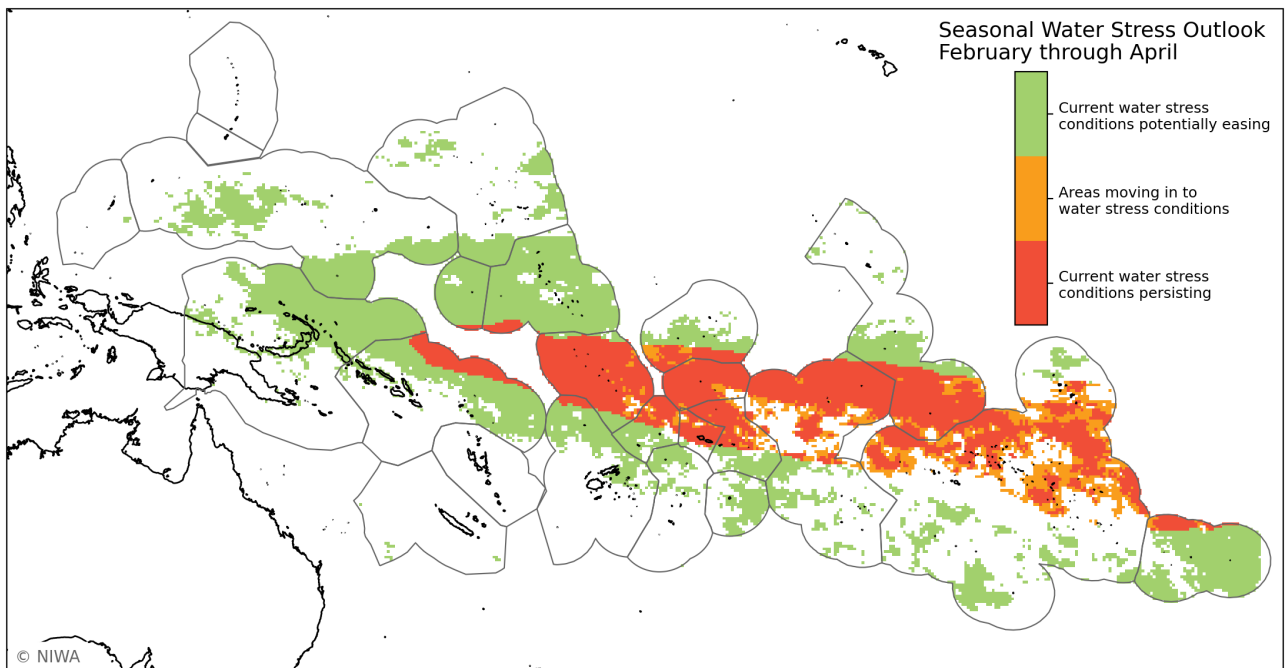
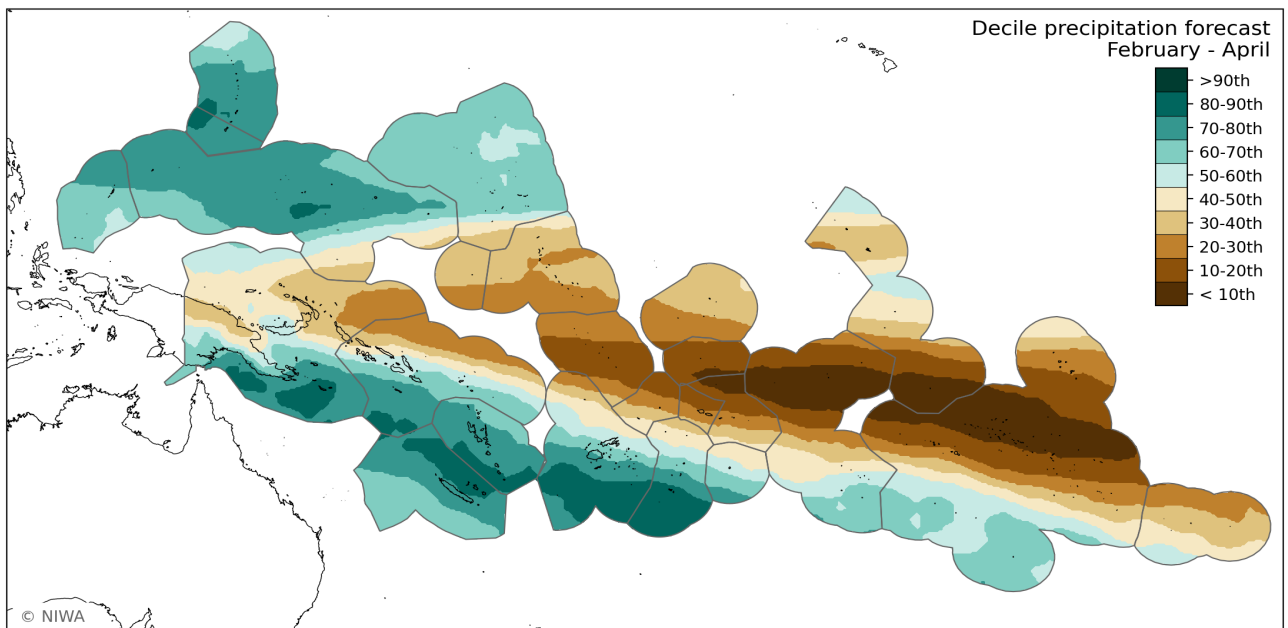


February – April 2023 forecast summary

During February-April, 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, although there is now a higher chance for dry conditions in Wallis & Futuna, Samoa, American Samoa, and northern Tonga.

Seasonal water stress is most likely to persist in a narrow strip extending through Tuvalu, Tokelau, Samoa, American Samoa, Northern Cooks, southern Line Islands, Tuamotu, and Marquesas, 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 as the system moves toward ENSO-neutral.

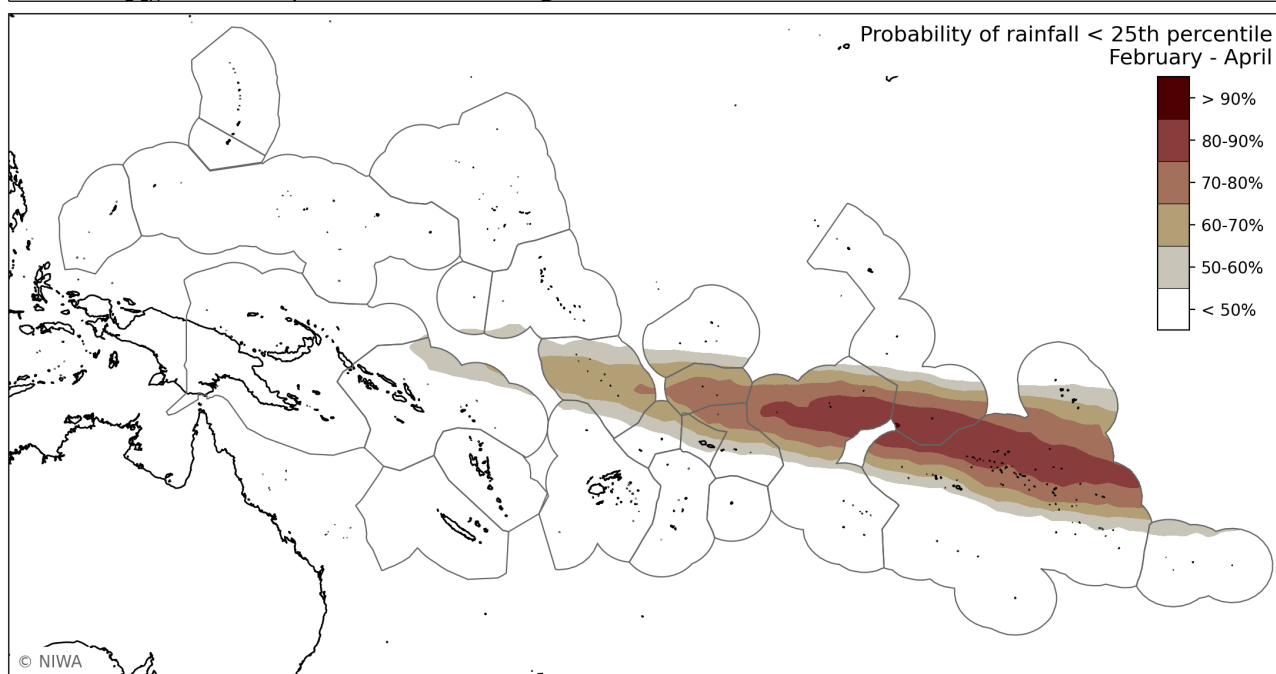
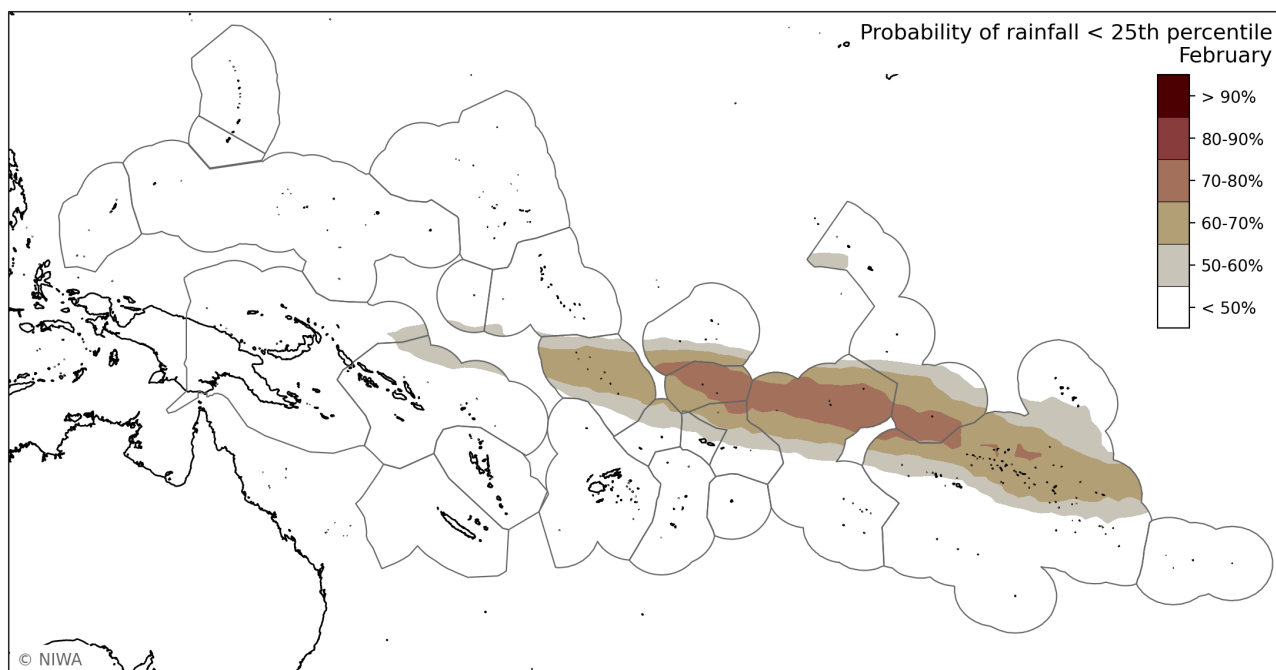


Probabilities of rainfall < 25th percentile

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

For February, the odds for dryness are highest in Tokelau, the northern Cook Islands, and southern Line Islands. Elevated chances for dryness are also noted for Tuvalu, near Samoa and American Samoa, and Tuamotu.

For February-April, very dry conditions are most likely in Tuvalu, Tokelau, Samoa, American Samoa, northern Cooks, southern Line Islands, southern Marquesas, Society Islands, 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
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.

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