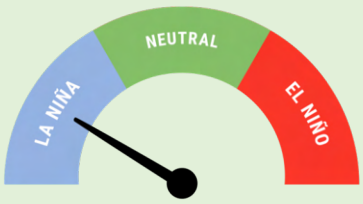
Island Climate Update

NIWA
Taihoro Nukurangi

ENSO Watch
March 2023

Recent



La Niña

La Niña is expected to transition to ENSO-neutral during March.

The Southern Oscillation Index (SOI) was in the La Niña range during February, while equatorial sea surface temperatures (SSTs) faded to near-neutral values.

February trade winds were stronger than normal in the equatorial Pacific, but reduced trades are predicted in March.

Forecast

95% chance for **ENSO-neutral** conditions to develop during **March-May 2023.**

Chance for **El Niño** conditions during **June-August 2023** **60%**

Neutral

ENSO situation summary

The monthly NINO3.4 Index anomaly (in the central equatorial Pacific) at the end of February was -0.47˚C, in neutral territory for the first time since July-August 2022.

The SOI was +0.9 during February and +1.2 over the December-February period, the latter still in the La Niña range.

Trade winds were stronger than normal during February in the equatorial Pacific, although significantly reduced trade winds and a westerly wind burst are predicted for March. This will cause sea surface temperatures to increase.

In the subsurface central equatorial Pacific, La Niña's decay continued during February. Sub-surface water temperatures were above average across the entire basin, with waters in the upper 100 m of the eastern equatorial Pacific becoming more anomalously warm as compared to January.

NIWA's analysis indicates that La Niña conditions will transition to ENSO-neutral during March-May, most likely during March (95% chance). During June-August, El Niño is favoured at around a 60% chance. The chance for El Niño remains around 60% from September-December 2023. The potential for El Niño conditions by the end of the year is also supported by trends in sub-surface ocean conditions and trade winds.

A pulse of the Madden-Julian Oscillation (MJO) was active over the Pacific Ocean during early March and will progress toward the Americas in the mid-month. This may be associated with additional tropical cyclone formation in the Southwest Pacific through mid-March.

Island Climate Update

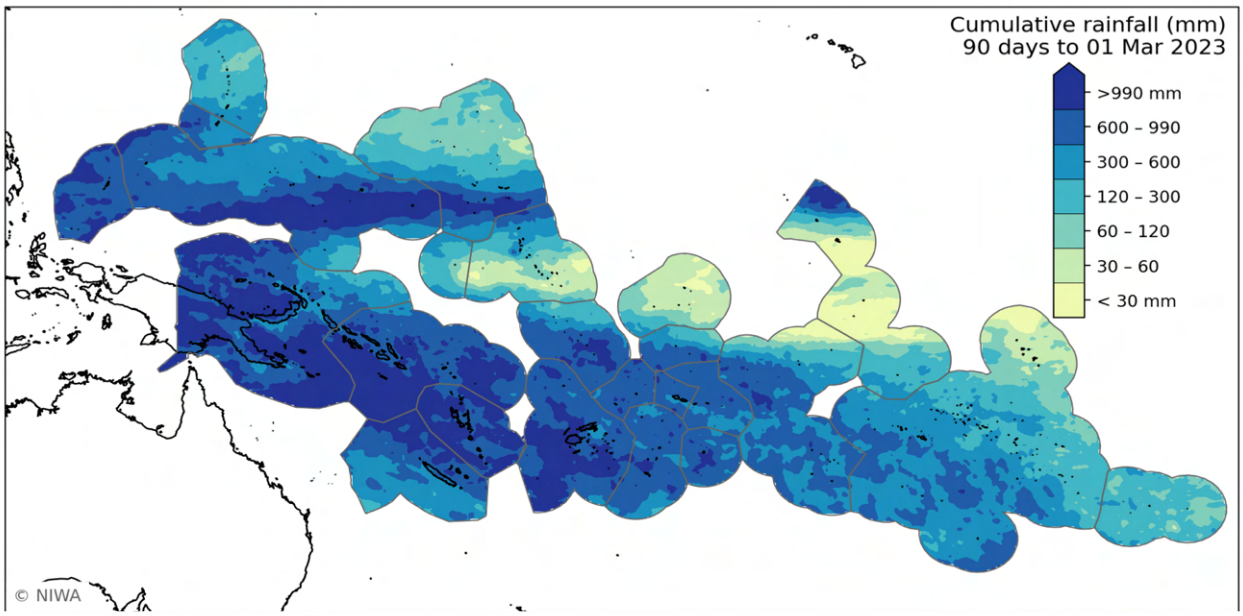
Rainfall Watch

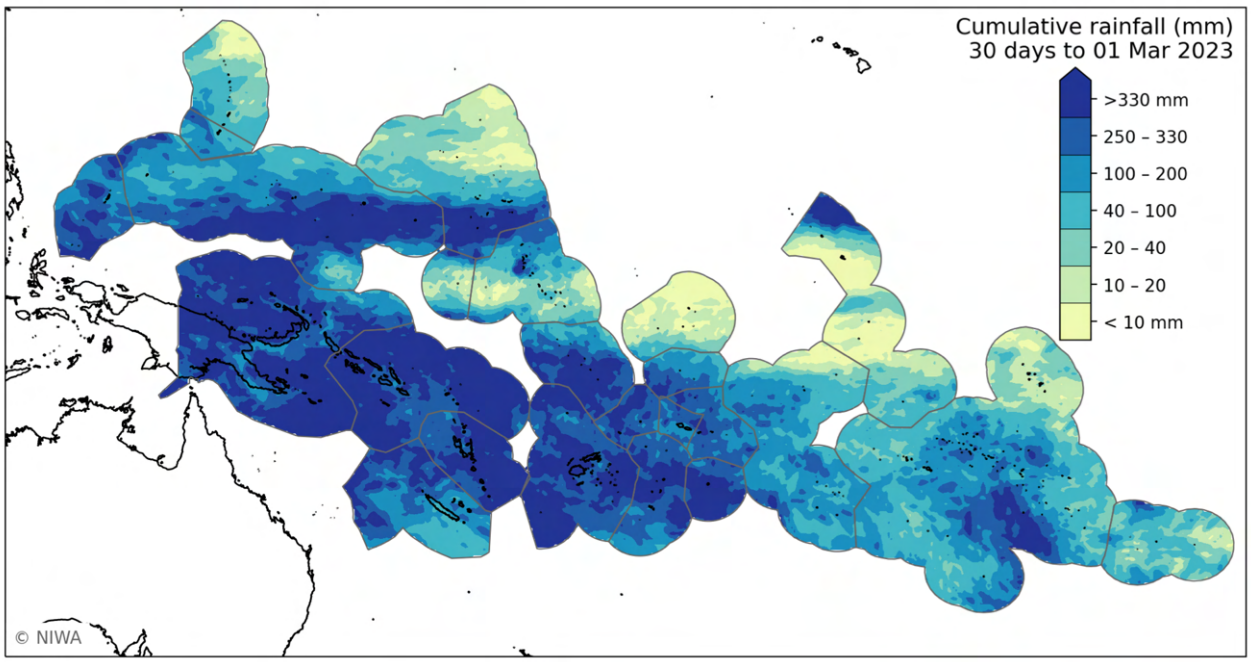
Regional situation summary (1 March 2023)

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 the Marquesas, with higher rainfall amounts in Micronesia, Melanesia, and for island groups toward the sub-tropics.

During December-February (top plot), less than 60 mm of rainfall fell in much of Kiribati and the Marquesas. 300-600 mm or more of rain fell in most of Micronesia, Melanesia, and island groups toward the sub-tropics.

During February (bottom plot), less than 20 mm of rainfall fell in parts of the Northern Marianas, eastern Marshall Islands, Nauru, the Phoenix Islands, the central Line Islands, and parts of the Marquesas. Over 330 mm of rain fell in many island groups across Micronesia and Melanesia, along with Tuvalu, Wallis & Futuna, American Samoa, Tonga, and Niue. Compared to January, February was drier in the Northern Marianas, eastern Marshall Islands, southern Cook Islands, and Austral Islands.





Island Climate Update

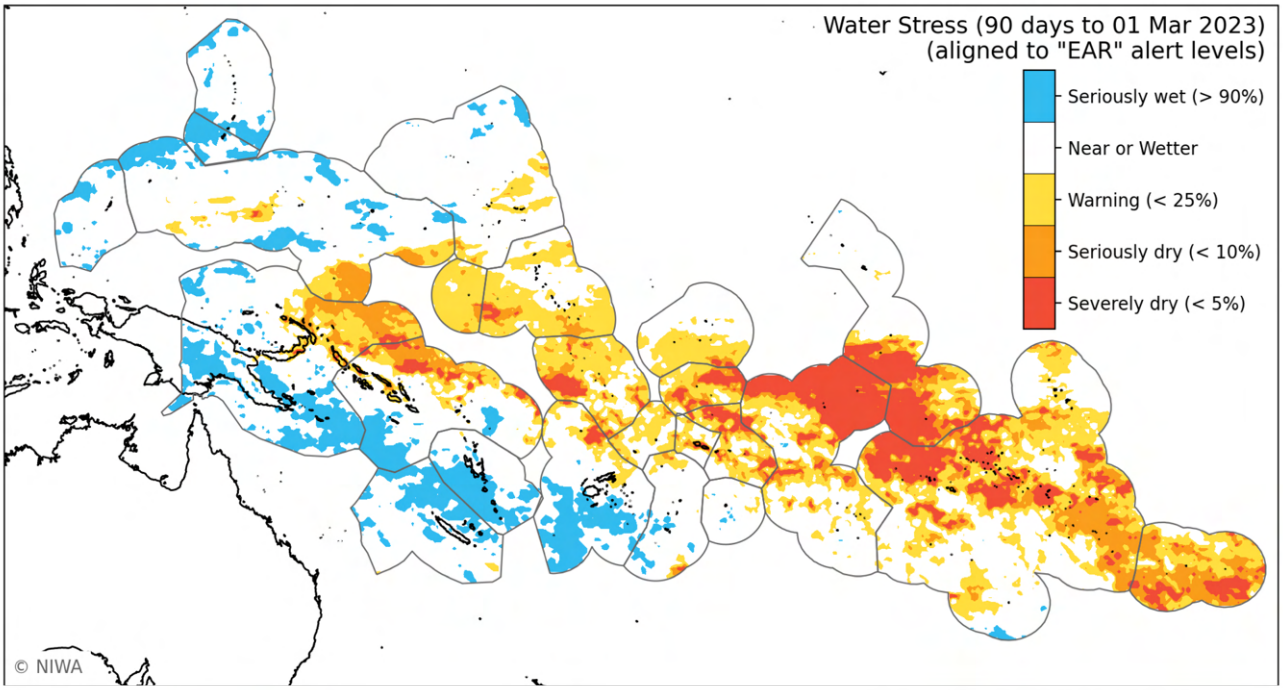
Water Stress Watch

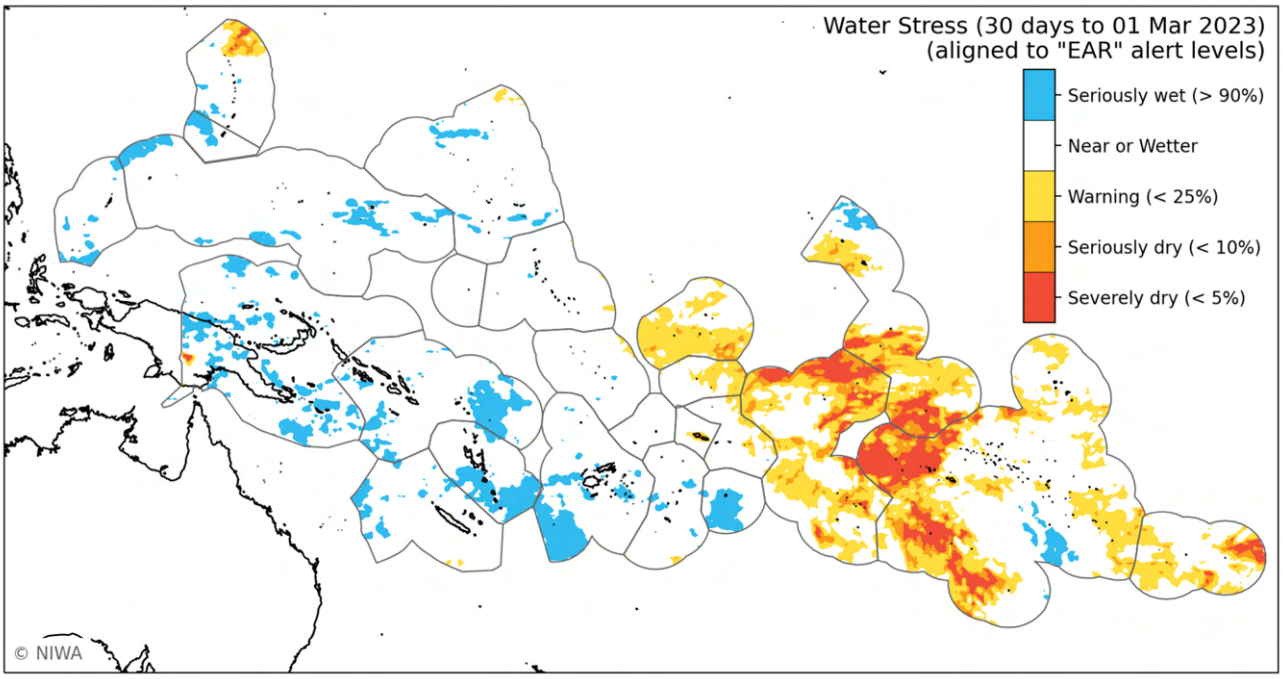
EAR regional situation summary (1 March 2023)

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

During December-February (top plot), severely or seriously dry conditions affected parts of southern Federated States of Micronesia (FSM), northern Papua New Guinea (PNG), Kiribati (Gilbert and southern Line Islands), Tuvalu, Tokelau, Samoa, American Samoa, northern Cook Islands, Society Islands, Tuamotu Archipelago, and Pitcairn Islands.

During February (bottom plot), severely or seriously dry conditions occurred in parts of the Northern and Southern Cook Islands, southern Line Islands, Society Islands, and Austral Islands.





Island Climate Update

Water Stress Watch

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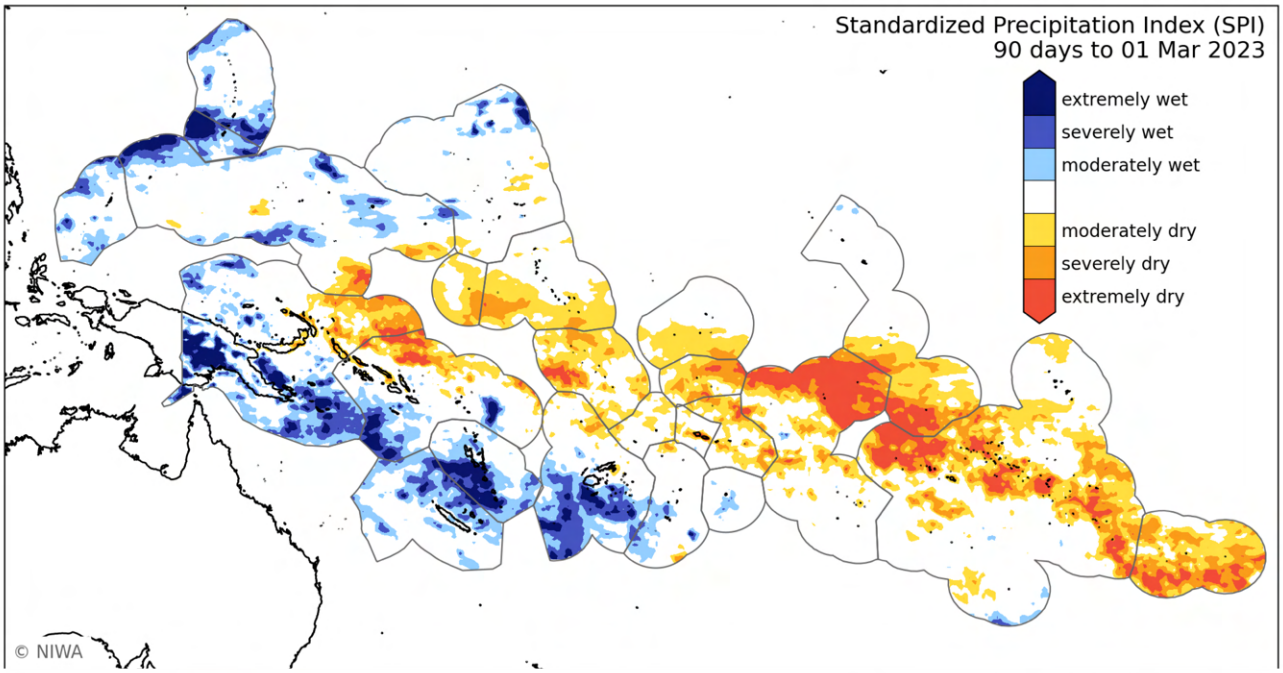
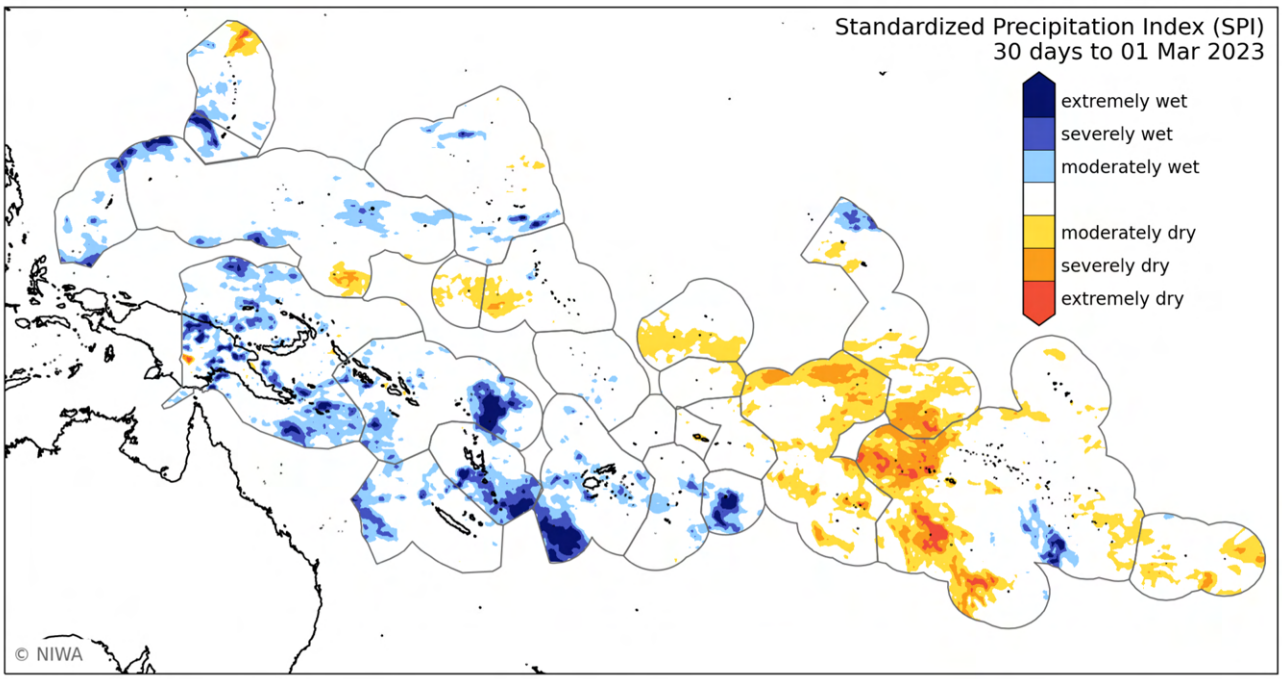
SPI Regional situation summary (1 March 2023)

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

During December-February (top plot), extremely or severely dry conditions occurred in northern PNG, northern Solomon Islands, Tuvalu, Tokelau, Samoa, American Samoa, Northern Cooks, southern Line Islands, Society Islands, Tuamotu Archipelago, and Pitcairn Islands.

During February (bottom plot), extremely or severely dry conditions occurred in parts of the Northern and Southern Cooks, southern Line Islands, Society Islands, and Austral Islands.





Island Climate Update

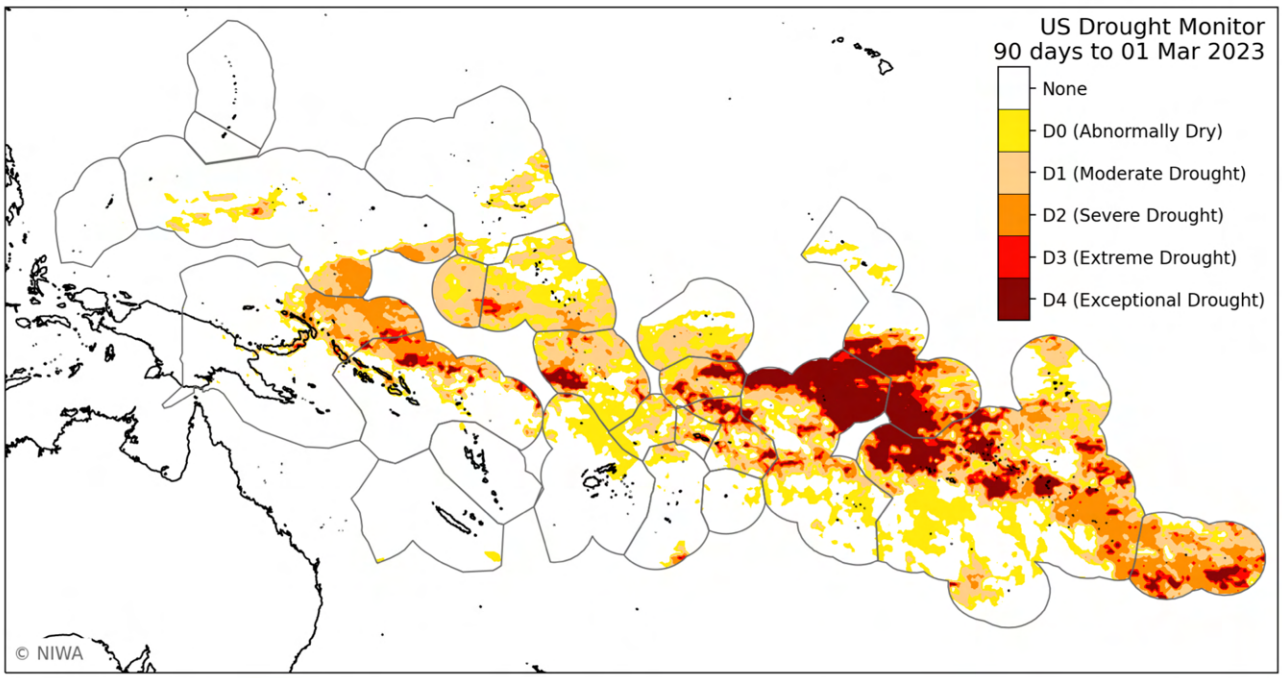
Water Stress Watch

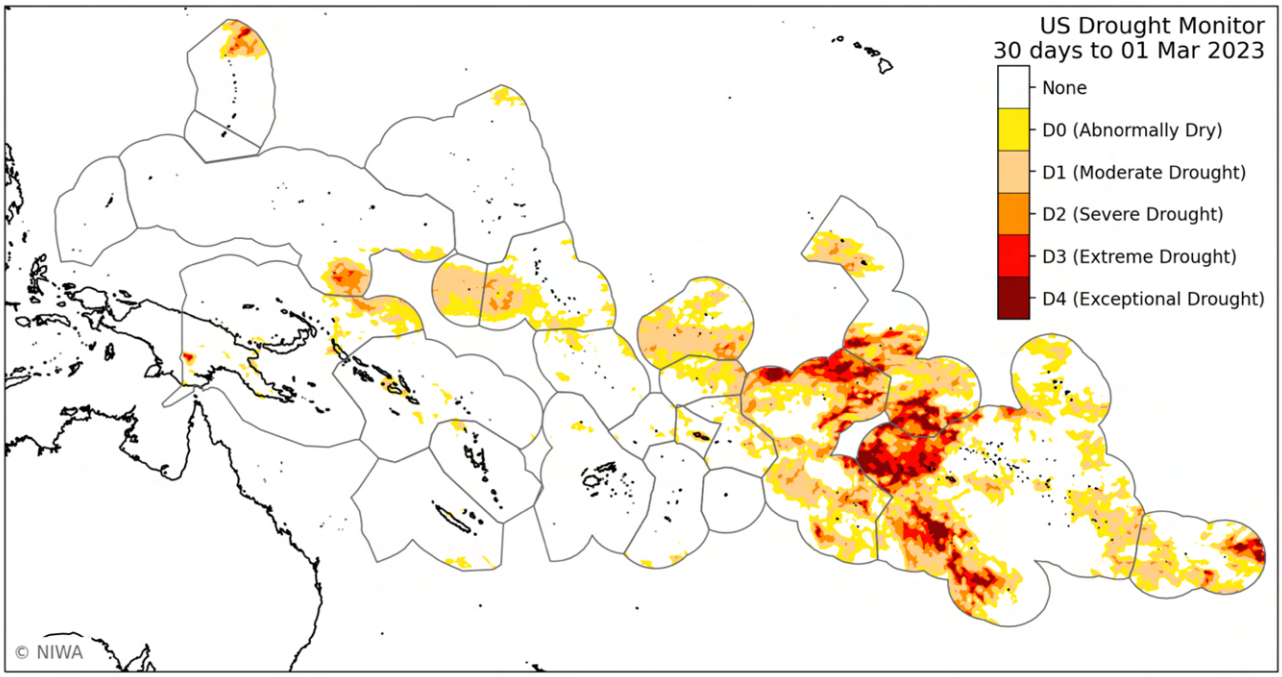
USDM Regional situation summary (1 March 2023)

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

During December-February (top plot), extreme or exceptional drought occurred in parts of northern PNG, Solomon Islands, Tuvalu, Tokelau, Samoa, American Samoa, Northern Cooks, southern Line Islands, Society Islands, Tuamotu Archipelago, and Pitcairn Islands.

During February (bottom plot), extreme or exceptional drought occurred in parts of the Northern and Southern Cooks, southern Line Islands, Society Islands, Austral Islands, and eastern Pitcairn Islands.





Island Climate Update

Water Stress Outlook

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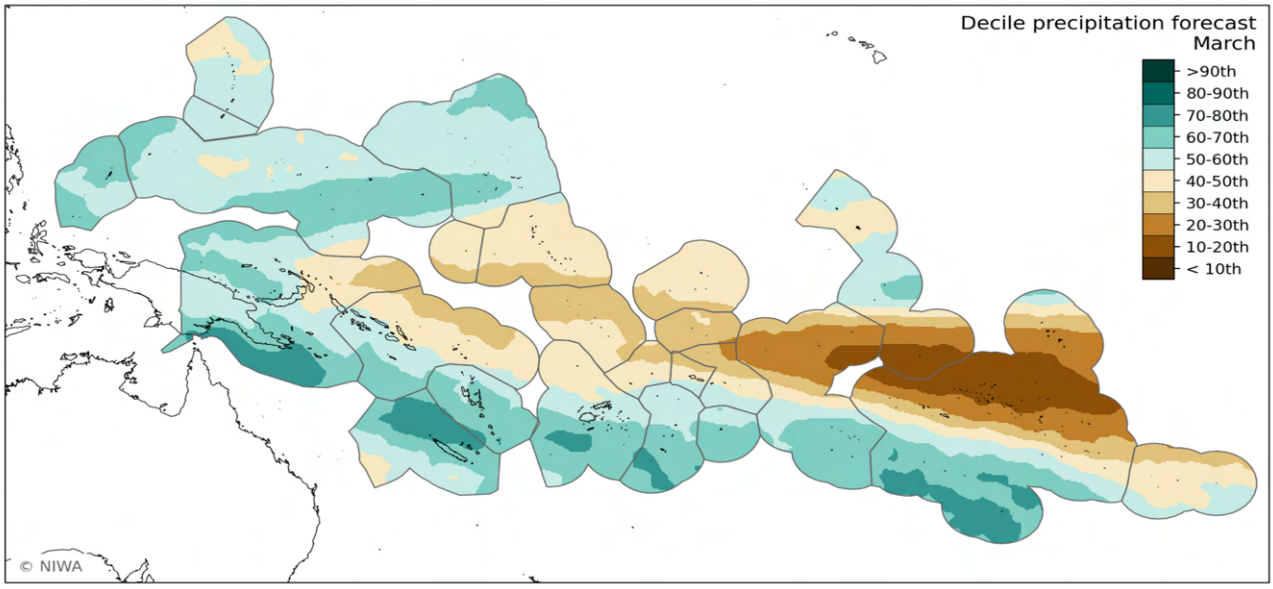
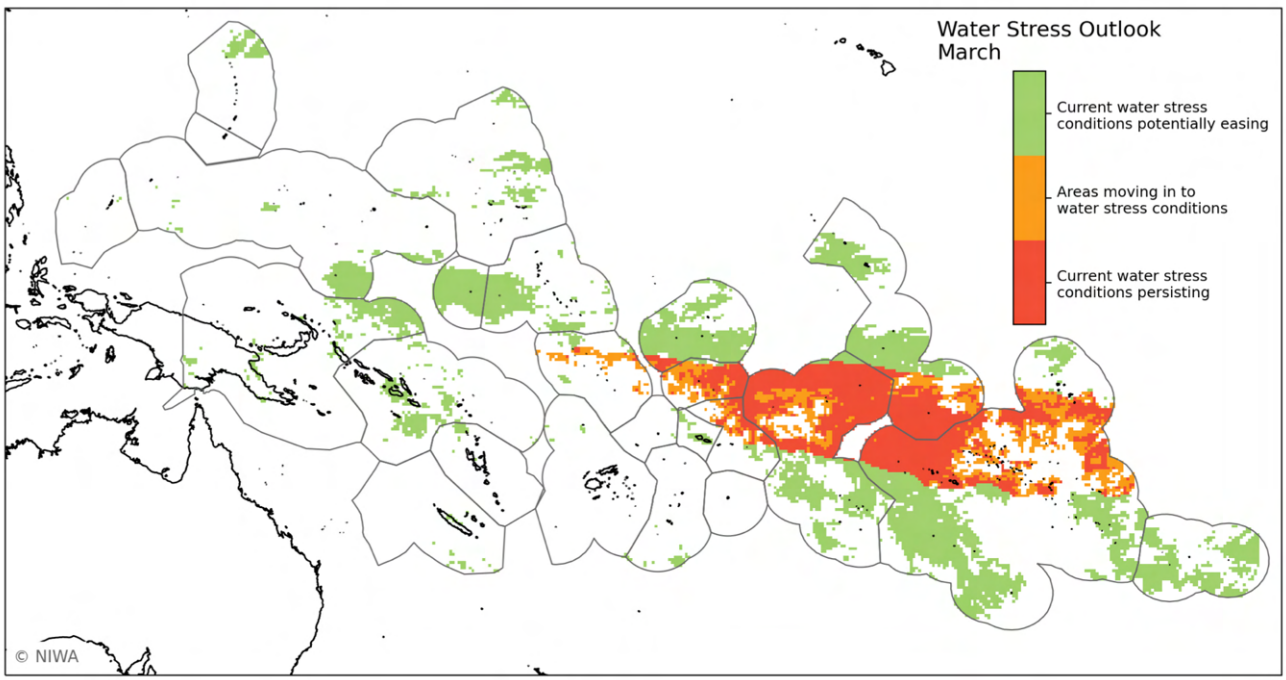
March 2023 forecast summary

During March, there continues to be a high chance for drier than normal conditions along and extending southeastward of the equator, especially for the eastern island groups. However, compared to last month, there is a decreased chance for dryness in northern PNG, northern Solomons, Nauru, Gilbert Islands, Tuvalu, Phoenix Islands, Tokelau, Wallis & Futuna, Samoa, American Samoa, northern Tonga, Niue, Southern Cooks, Austral Islands, and northern Line Islands.

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

Water stress may ease in southern FSM, Marshall Islands, Solomons, Nauru, Gilbert Islands, Phoenix Islands, central and northern Line Islands, Southern Cooks, Austral Islands, northern Marquesas, eastern Tuamotu, and Pitcairn Islands.





Island Climate Update
Water Stress Outlook

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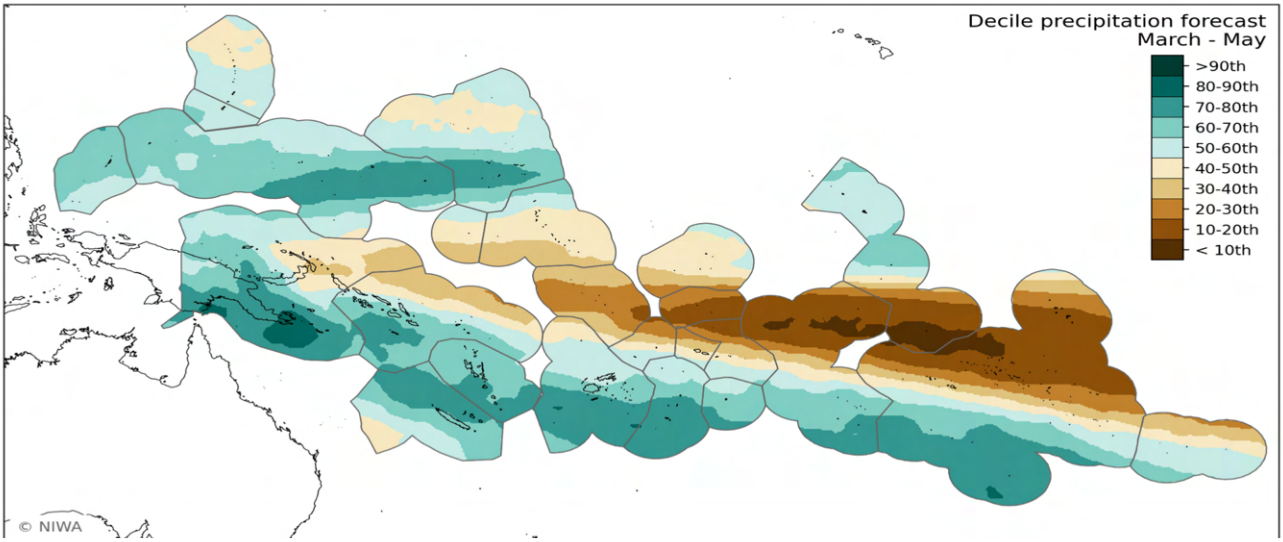
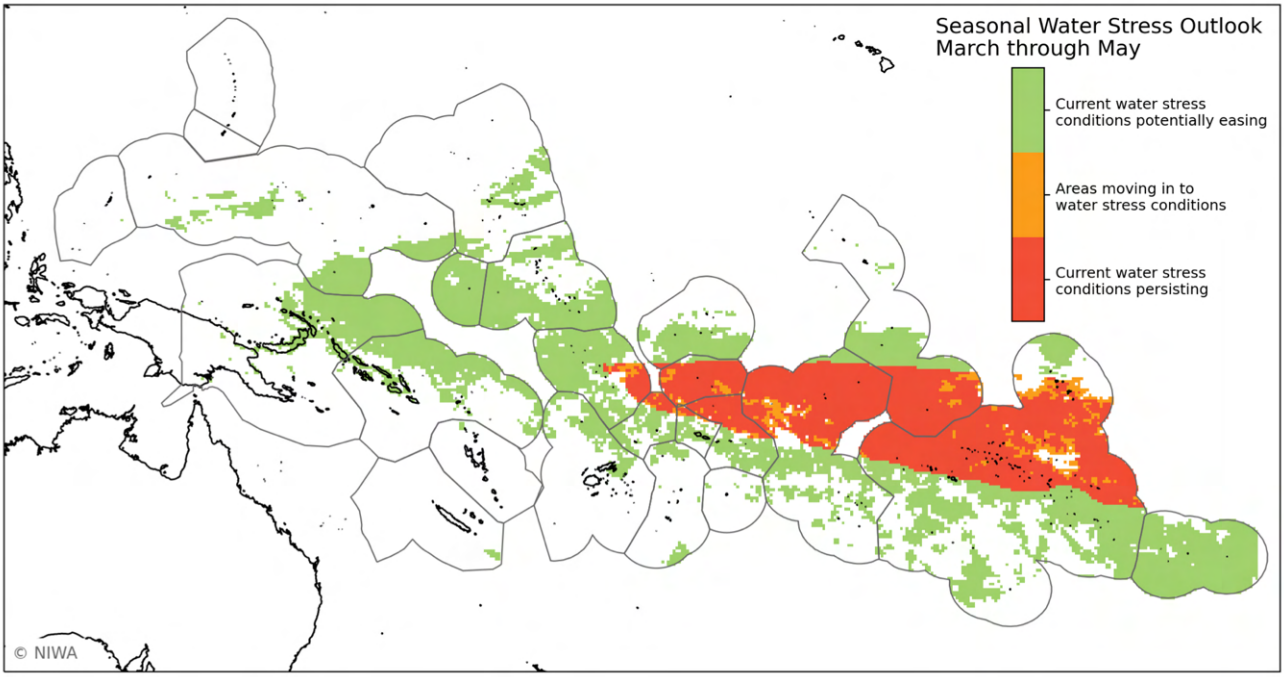
March – May 2023 forecast summary

During March-May, 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 generally similar to the one issued this time last month, although there is now a lower chance for dry conditions in western and northern PNG, southern FSM, southern Marshall Islands, Nauru, Gilbert Islands, Tuvalu, Phoenix Islands, Wallis & Futuna, Samoa, American Samoa, northern Tonga, northern and central Line Islands, and Pitcairn Islands. Meanwhile, there is an increased chance for dry conditions in the Northern Marianas and northern Marshall Islands.

Seasonal water stress is most likely to persist in a strip extending through Tokelau, American Samoa, Northern Cooks, southern Line Islands, Society Islands, Tuamotu, and Marquesas, but water stress shows signs of gradually easing elsewhere.

La Niña's influence on rainfall patterns will likely become less pronounced during the next three months as the system moves into ENSO-neutral conditions.





Island Climate Update

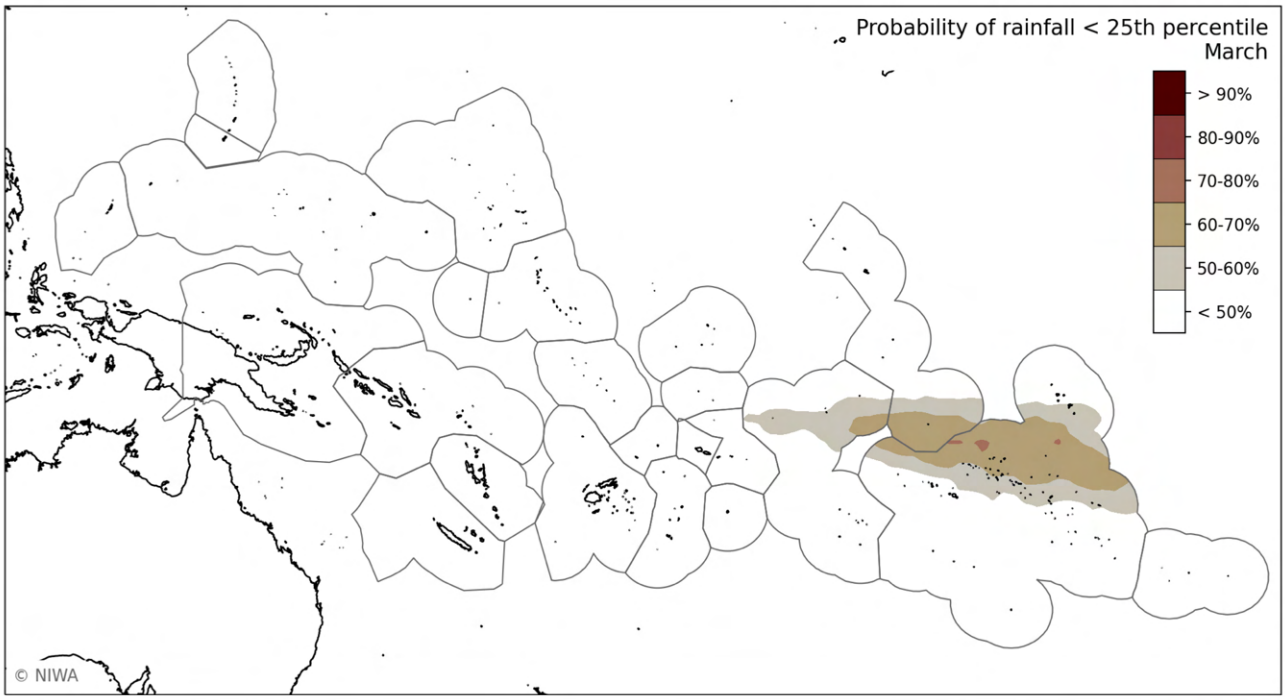
Water Stress Outlook

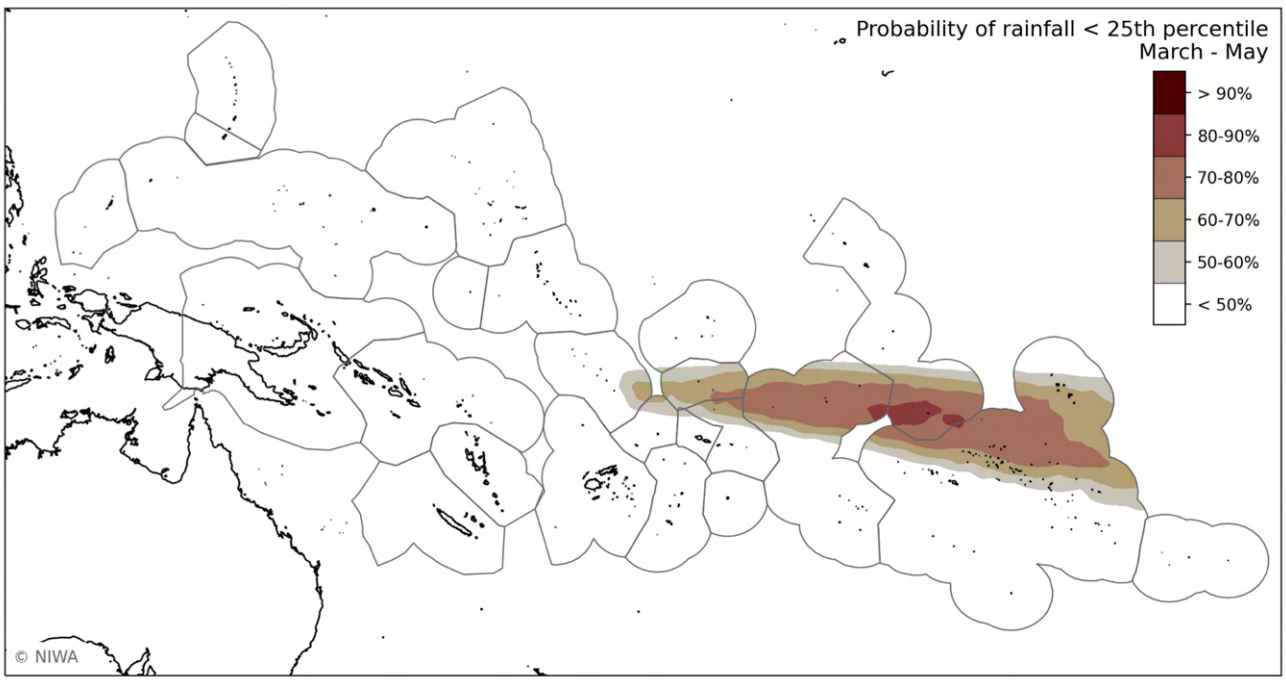
Probabilities of rainfall < 25th percentile

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

For March, the odds for dryness are highest in the southern Line Islands and Tuamotu. Elevated chances for dryness are also noted for the northern Cook Islands and southern Marquesas.

For March-May, very dry conditions are most likely in Tokelau, northern American Samoa, northern Cook Islands, southern Line Islands, southern Marquesas, and Tuamotu.





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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	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. 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%. The bottom plots bring together conditions over the past 3 months and forecast conditions over the next month: • 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. 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).
Online Resources	**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.

WMO

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.

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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