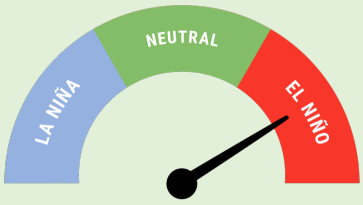
Island Climate Update

NIWA
Taihoro Nukurangi

ENSO Watch
April 2024

Recent



El Niño

El Niño is likely to ease to ENSO neutral by June.

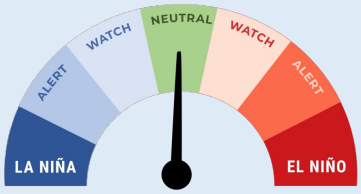
The Southern Oscillation Index (SOI) was -0.2 from January-March, in the neutral range.

Tropical Pacific Ocean sea surface temperatures (SSTs) were still within the range of El Niño during March.

Forecast

70% chance for **ENSO neutral** conditions to develop by **June 2024**

Chance for **La Niña** conditions developing during **July-September 2024** **60%**



ENSO neutral

ENSO situation summary

El Niño continued during March but continues to weaken. ENSO neutral conditions are favoured to develop by June 2024.

The monthly NINO3.4 Index anomaly (in the central equatorial Pacific) at the end of March was +1.24˚C, remaining within the El Niño range. Oceanic El Niño has weakened by about 0.55˚C since January.

The Southern Oscillation Index (SOI) was in the neutral range during March (+0.1) and January-March (-0.2).

Trade wind strength was well above normal near and west of the International Date Line during March. This generated an upwelling Kelvin Wave in the west-central equatorial Pacific, which should see cooler than average sub-surface ocean water move across the Pacific over the next two months.

Enhanced trade winds are forecast to continue near the International Date Line during April, which should result in additional oceanic cooling.

At the end of March, the subsurface equatorial Pacific was cooler than average across most of the basin below 100 m depth, with below average temperatures moving closer to the surface in the east during March. Notably, subsurface waters were 3˚C to 5˚C below average in the east, lending credence to the eventual development of La Niña later this year.

During March, convective forcing favoured the western Pacific with subsidence over the eastern Pacific and South America, a La Niña-like pattern. This was linked to a strong, early-month pulse of the Madden-Julian Oscillation (MJO) as well as a South Pacific Convergence Zone that was displaced well south-west of its climatological position. This delivered excessive rainfall to Vanuatu, Fiji, and parts of Tonga during the month. By late March, the pulse had propagated into the eastern Pacific, generating an El Niño-like response. Such variability is to be expected from an ocean-atmosphere system that is transitioning toward an ENSO-neutral state.

The tropical cyclone season continues through April. Activity looks unlikely through the first half of the month.

Island Climate Update

Rainfall Watch

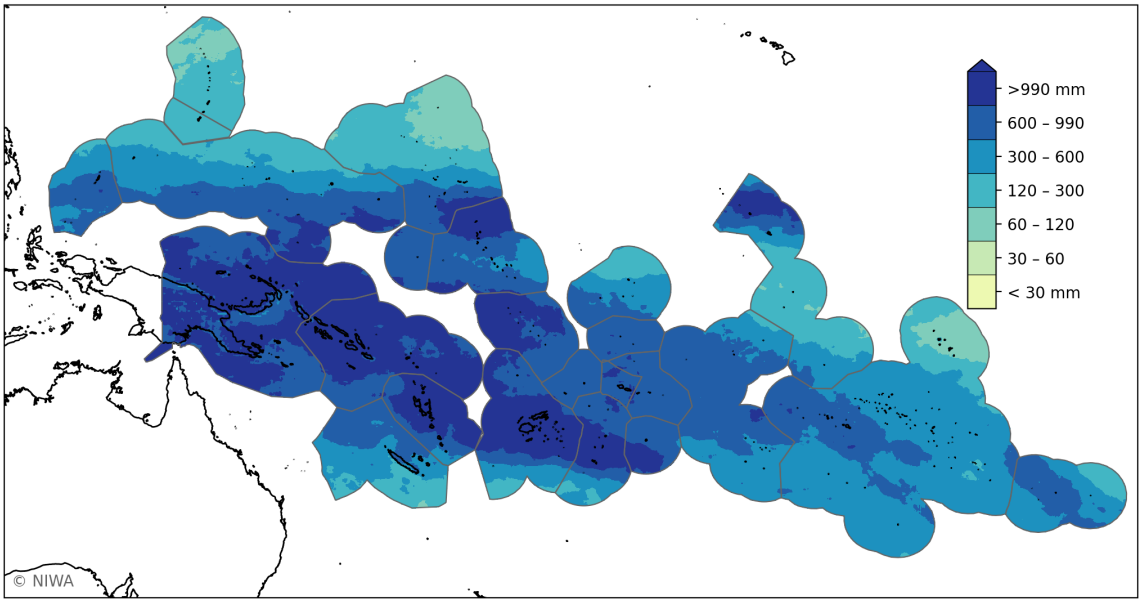
Regional situation summary (1 April 2024)

Rainfall summaries for the last month and three months are shown below.

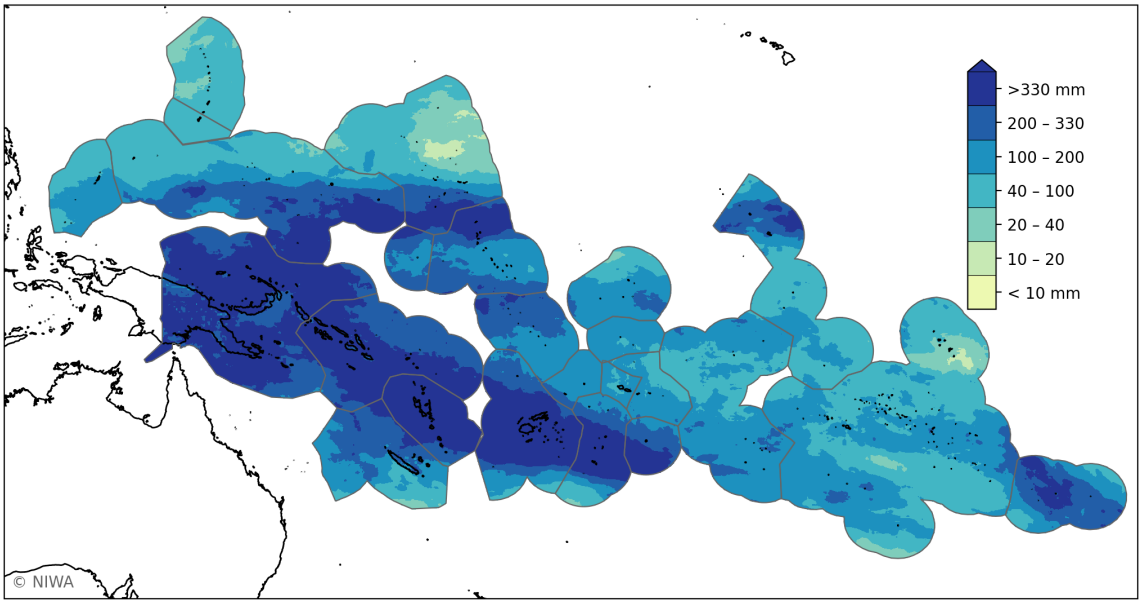
During January-March (top plot), over 990 mm of rain fell across parts of the southern Federated States of Micronesia (FSM), Papua New Guinea (PNG), the Solomon Islands, Vanuatu, Kiribati (northern Gilbert Islands and northern Line Islands), Tuvalu, Fiji, and Tonga. Less than 60 mm of rain was not observed in any island groups during January-March.

During March (bottom plot), over 330 mm of rain fell across parts of southern FSM, southern Marshall Islands, PNG, Solomon Islands, Vanuatu, Kiribati (northern Gilbert Islands and northern Line Islands), Fiji, Tonga, and Pitcairn Islands. Less than 40 mm of rain fell in parts of the Marshall Islands and Marquesas.

Cumulative rainfall (mm), source: MSWEP 2.8.0
90 days to 01 Apr 2024



Cumulative rainfall (mm), source: MSWEP 2.8.0
30 days to 01 Apr 2024

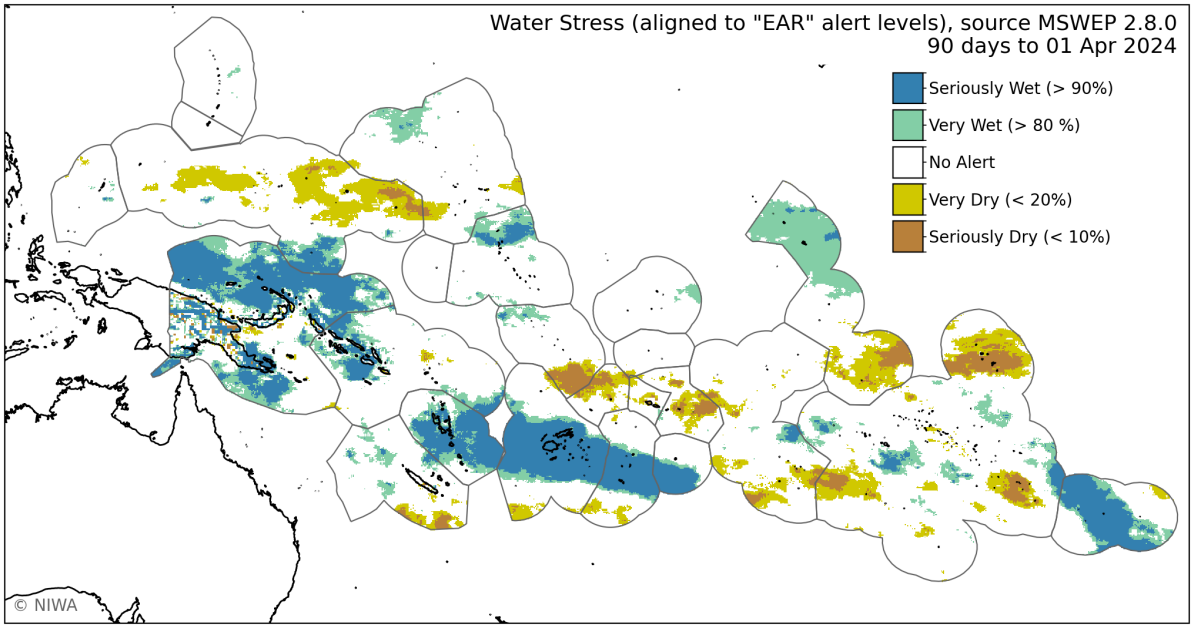


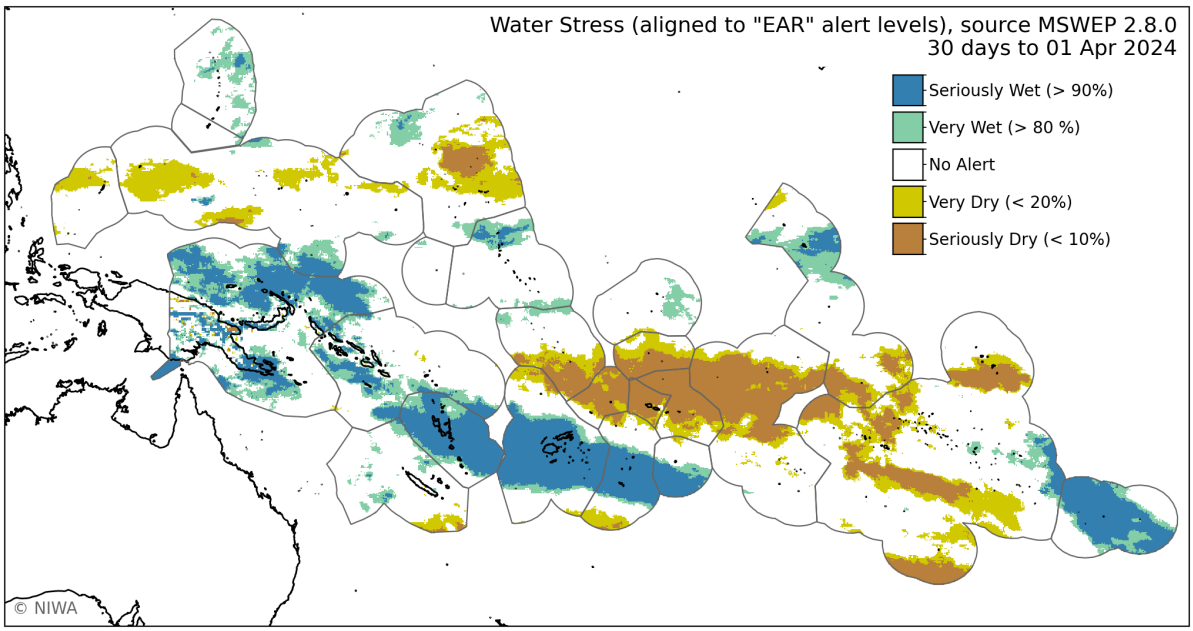
EAR regional situation summary (1 April 2024)

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

During January-March (top plot), seriously or very dry conditions affected parts of FSM, southern Marshall Islands, small parts of PNG, New Caledonia, southern Tuvalu, Samoa, American Samoa, southern Cook Islands, Austral Islands, Tuamotu archipelago, and Marquesas.

During March (bottom plot), seriously or very dry conditions affected parts of Palau, FSM, the Marshall Islands, small parts of PNG, Tuvalu, Tokelau, Wallis & Futuna, Samoa, American Samoa, northern Cook Islands, Society Islands, Tuamotu archipelago, and Marquesas.





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Water Stress Watch

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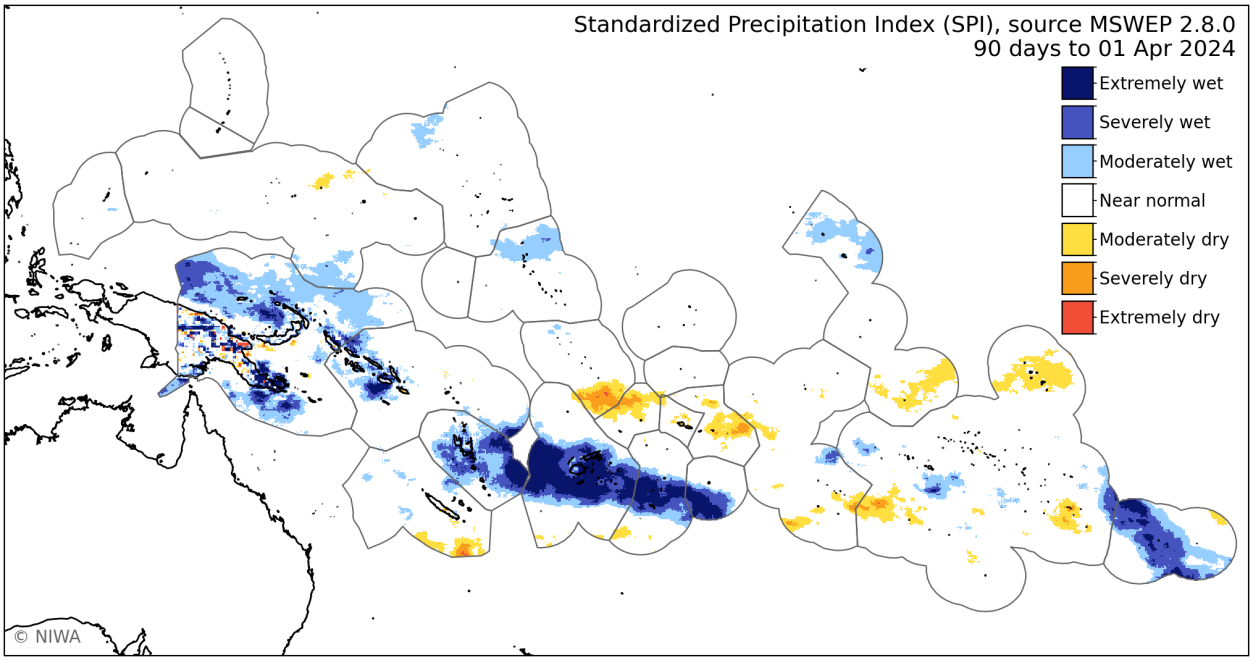
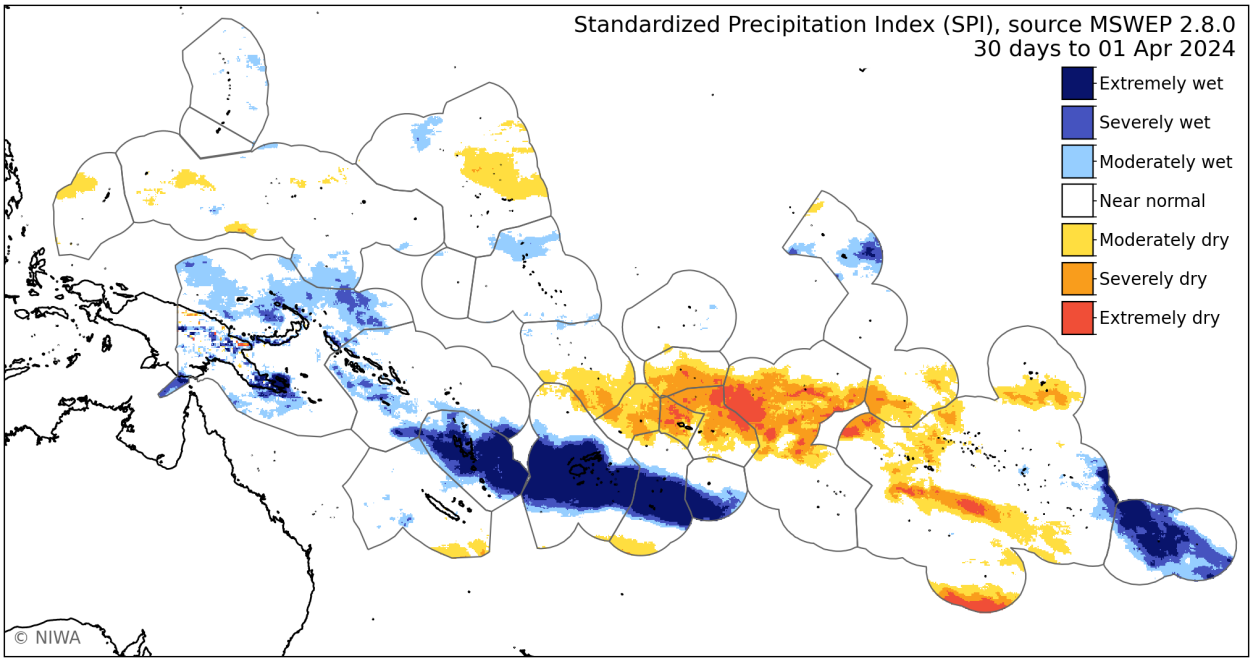
SPI Regional situation summary (1 April 2024)

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

During January-March (top plot), extremely or severely dry conditions occurred in parts of PNG, southern Tuvalu, American Samoa, Austral Islands, and eastern Tuamotu archipelago.

During March (bottom plot), extremely or severely dry conditions occurred in parts of PNG, Wallis & Futuna, Samoa, American Samoa, Tokelau, northern Cook Islands, Society Islands, western Tuamotu archipelago, and southern Marquesas.





Island Climate Update

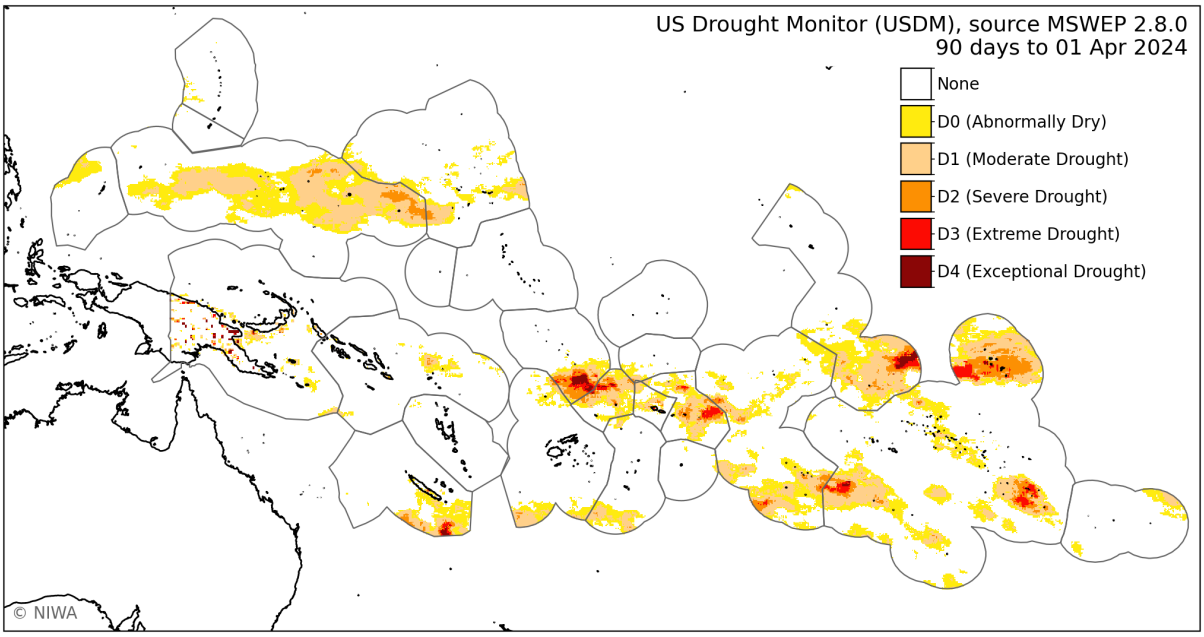
Water Stress Watch

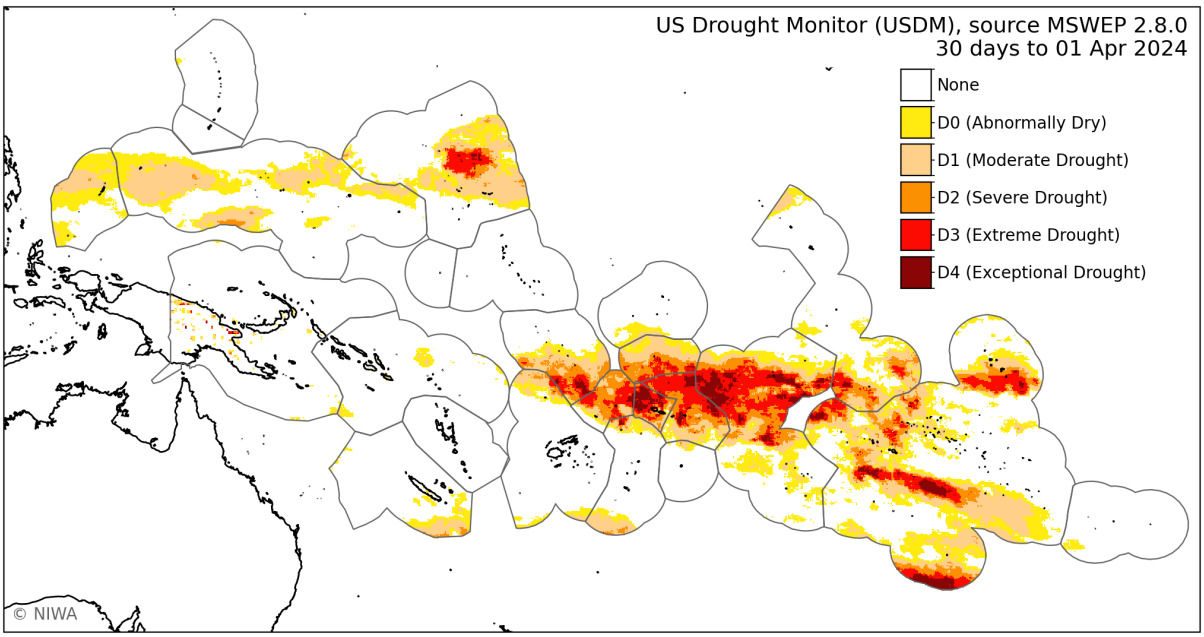
USDM Regional situation summary (1 April 2024)

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

During January-March (top plot), extreme or exceptional drought occurred in parts of PNG, southern Tuvalu, American Samoa, Austral Islands, eastern Tuamotu archipelago, and Marquesas.

During March (bottom plot), extreme or exceptional drought occurred in parts of PNG, Marshall Islands, Tuvalu, Tokelau, Wallis & Futuna, Samoa, American Samoa, Northern Cook Islands, Society Islands, western Tuamotu archipelago, and southern Marquesas.





Island Climate Update

Water Stress Outlook

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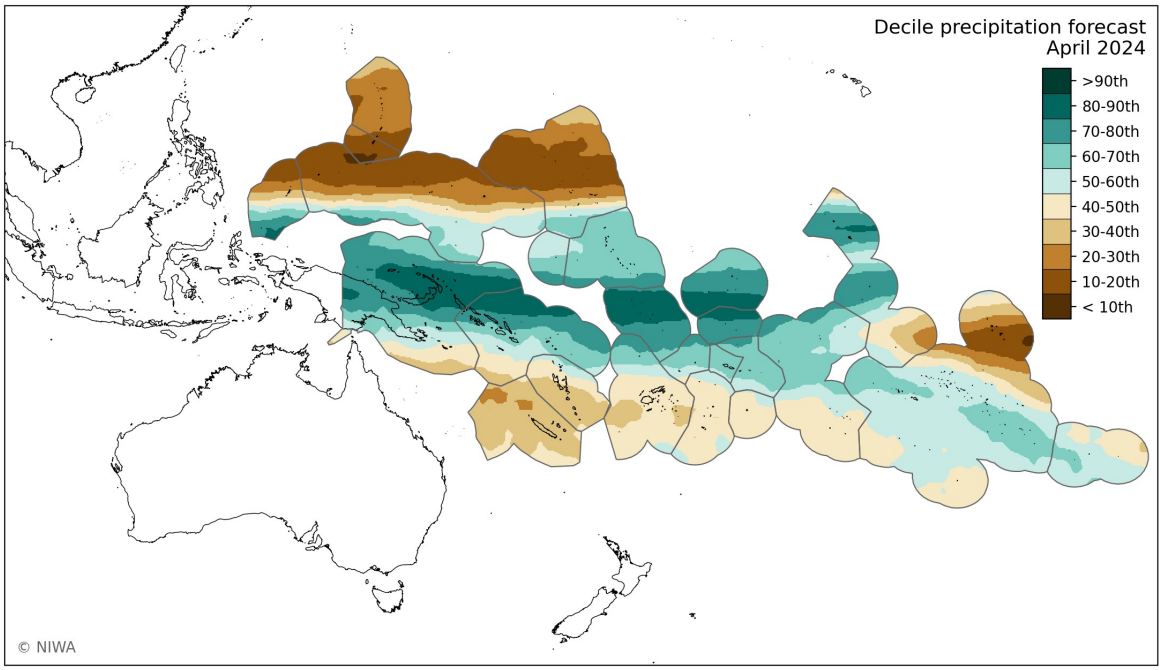
April 2024 forecast summary

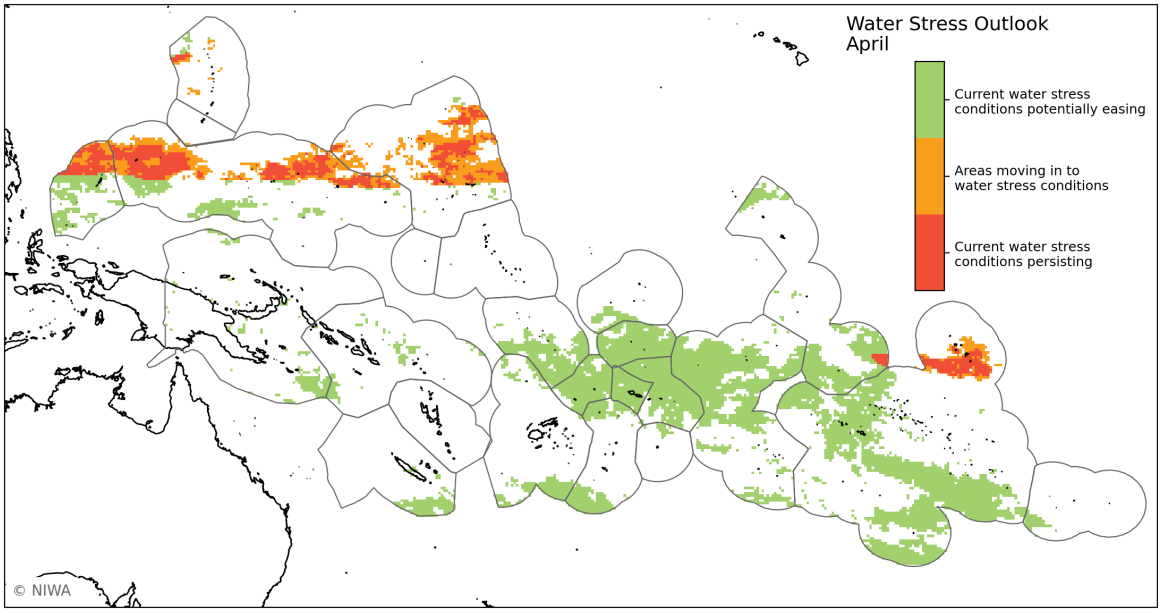
During April, significantly below normal rainfall is favoured in northern Palau, Guam, Northern Marianas Islands, much of FSM, Marshall Islands, and Marquesas.

Significantly above normal rainfall is favoured in much of PNG, Solomon Islands, Tuvalu, Tokelau, Phoenix Islands, and northern and central Line Islands.

All other island groups are expected to see rainfall amounts closer to normal in April.

Water stress conditions may persist or develop in parts of northern Palau, northern FSM, Marshall Islands, and Marquesas.





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Water Stress Outlook

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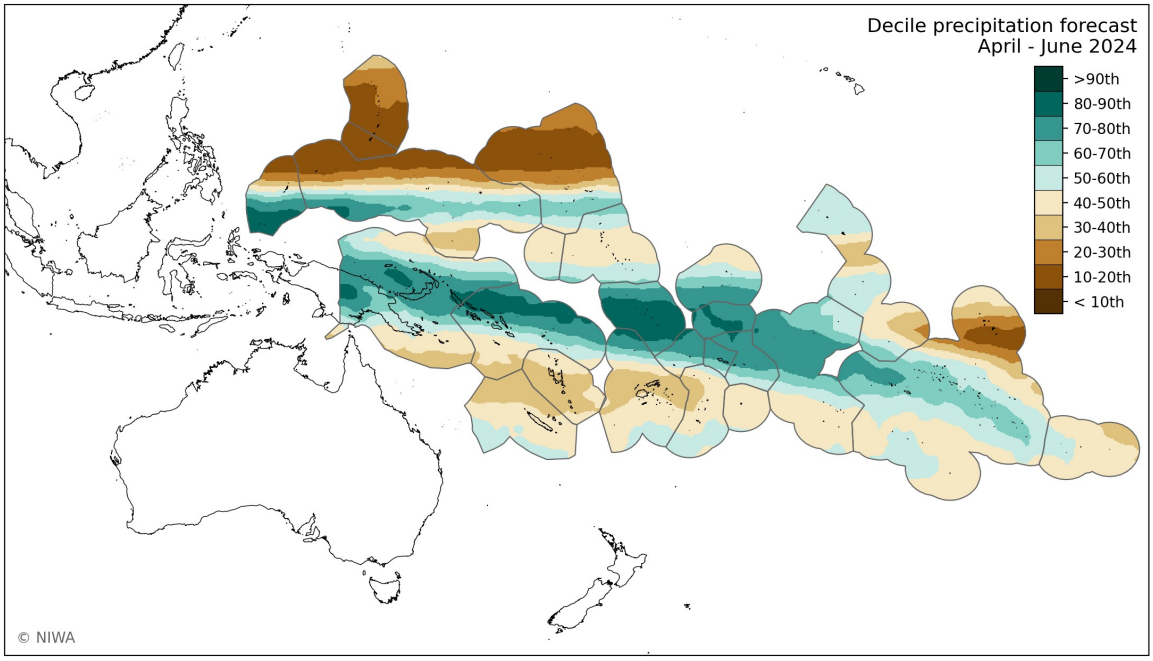
April-June 2024 forecast summary

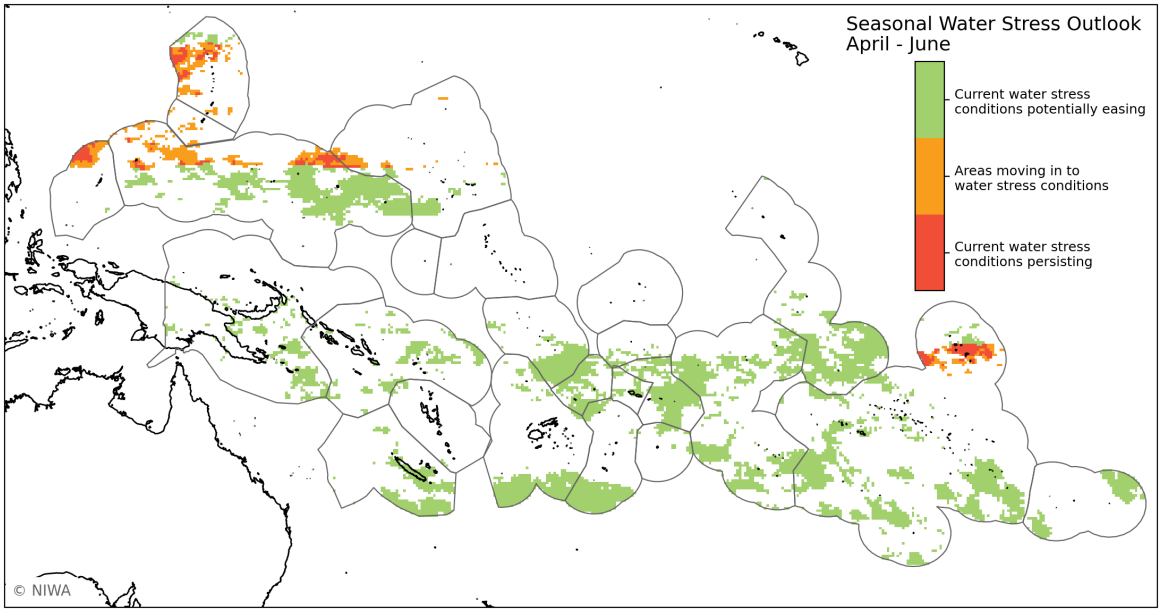
During April-June, significantly below normal rainfall is favoured in northern Palau, Guam, Northern Marianas Islands, northern FSM, northern Marshall Islands, and Marquesas.

Significantly above normal rainfall is favoured in southern Palau, much of PNG and the Solomon Islands, Tuvalu, Tokelau, Phoenix Islands, far northern Fiji, Wallis & Futuna, Samoa, American Samoan, northern Cook Islands, and Society Islands.

All other island groups are expected to see rainfall amounts closer to normal during April-June.

Water stress conditions may persist or develop in parts of northern FSM, Guam, Northern Marianas Islands, and Marquesas.





Island Climate Update

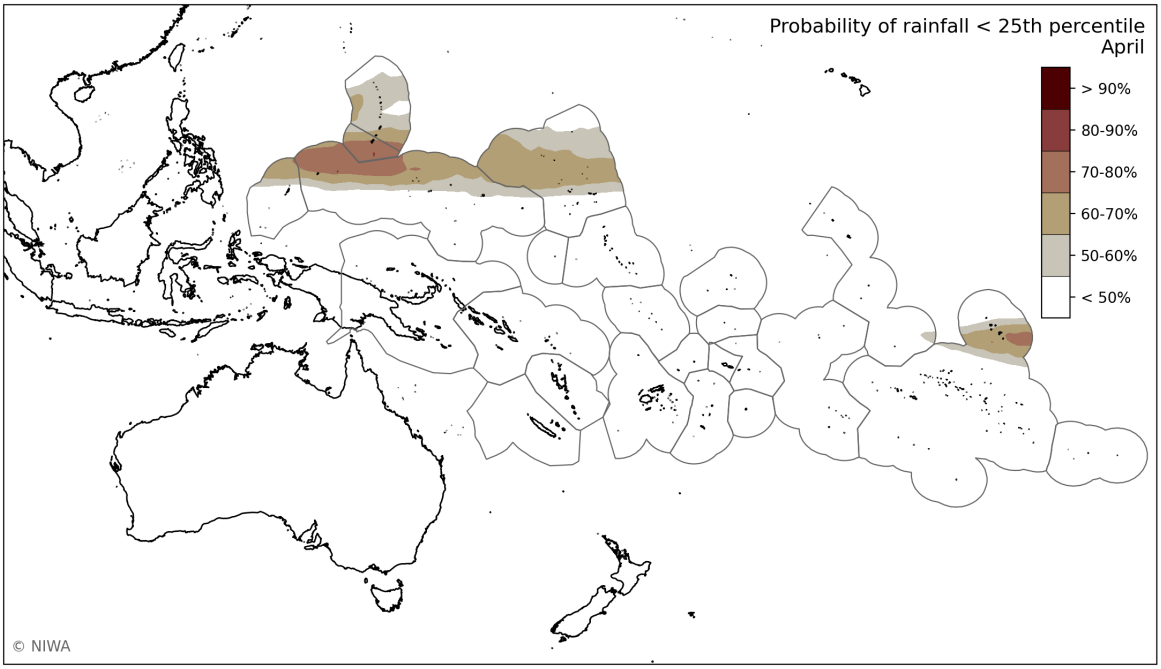
Water Stress Outlook

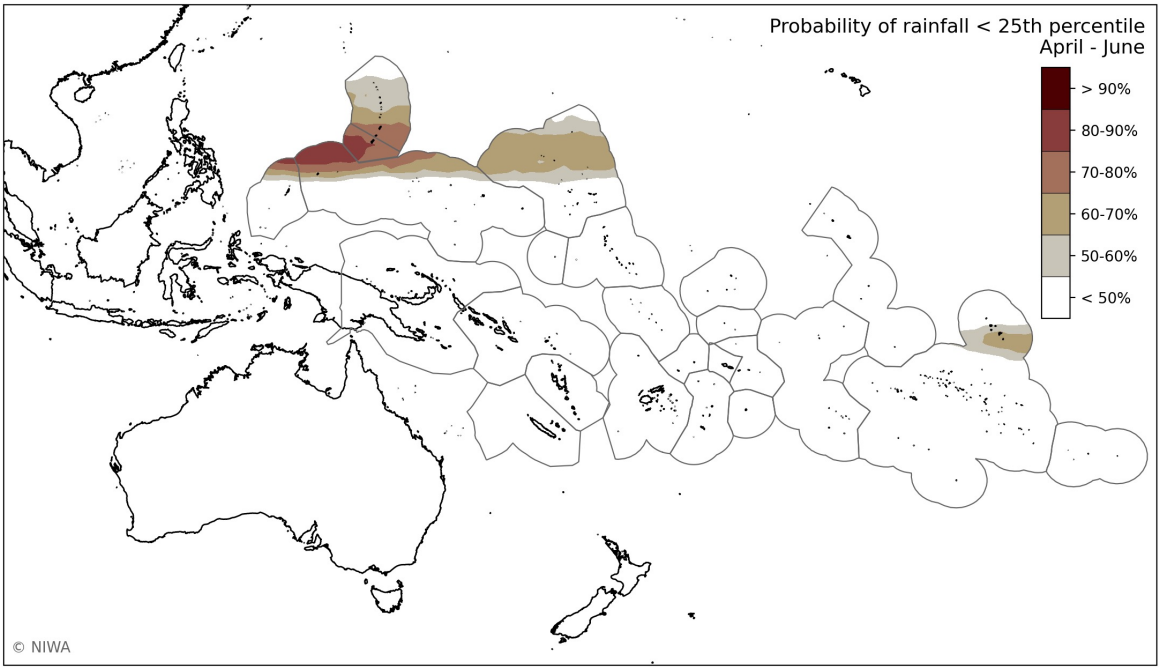
Probabilities of rainfall < 25th percentile

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

For April, the highest chances for very dry conditions are across parts of northern FSM, Guam, Northern Marianas Islands, Marshall Islands, and Marquesas.

For April-June, the highest chances for very dry conditions are across the Northern Marianas Islands, Guam, northern FSM and Marshall Islands, and Marquesas.





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About

Understanding the Island Climate Update bulletin

The ICU utilises rainfall data from the Multi-Source Weighted-Ensemble Precipitation (MSWEP) and a multi-model ensemble forecast utilising 550+ members derived from nine global climate models available from the Copernicus Data Store.

Bulletin page	Description
Rainfall watch	Rainfall plots are derived from MSWEP 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 MSWEP 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. • A range of probabilistic one to five monthly and seasonal forecast plots updated around the 11th of each month. • Click here for the imagery and here for the underlying data.

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 PRAS2401.

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