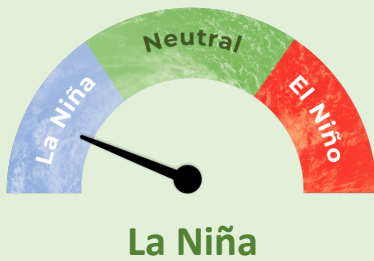


Island Climate Update



ENSO Watch
December 2021

Recent



La Niña conditions were observed in the equatorial Pacific during November.

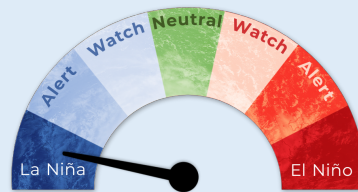
Sea surface temperatures were near the La Niña threshold in the central equatorial Pacific during November, on -0.59°C .

The Southern Oscillation Index (SOI) was $+1.1$ during November, in the La Niña range.

85% chance for **La Niña** conditions during **December 2021 – February 2022.**

Chance for **ENSO neutral** conditions during **March - May 2022.**

65%



La Niña Event

Forecast

ENSO situation summary

The NINO3.4 Index anomaly (in the central Pacific) during November (through the 28th) was -0.59°C and the Southern Oscillation Index (SOI) was $+1.1$, both near the La Niña threshold. The three-month average SOI was $+0.9$.

Upper-oceanic heat content was well below normal in the central and eastern equatorial Pacific during November as a full-basin La Niña signature matured. Modest cool anomalies persisted in the sub-surface, although the coolest water relative to normal has now surfaced or is surfacing. From an oceanic perspective, La Niña will likely peak over the next month.

Trade winds across the central Pacific were enhanced along the equator during November, particularly near and west of the International Date Line.

Based on the trends described above, NIWA has classified a La Niña event, with an 85% chance of it continuing through February. Between March-May 2022, there is a 65% chance for the re-emergence of ENSO neutral conditions.

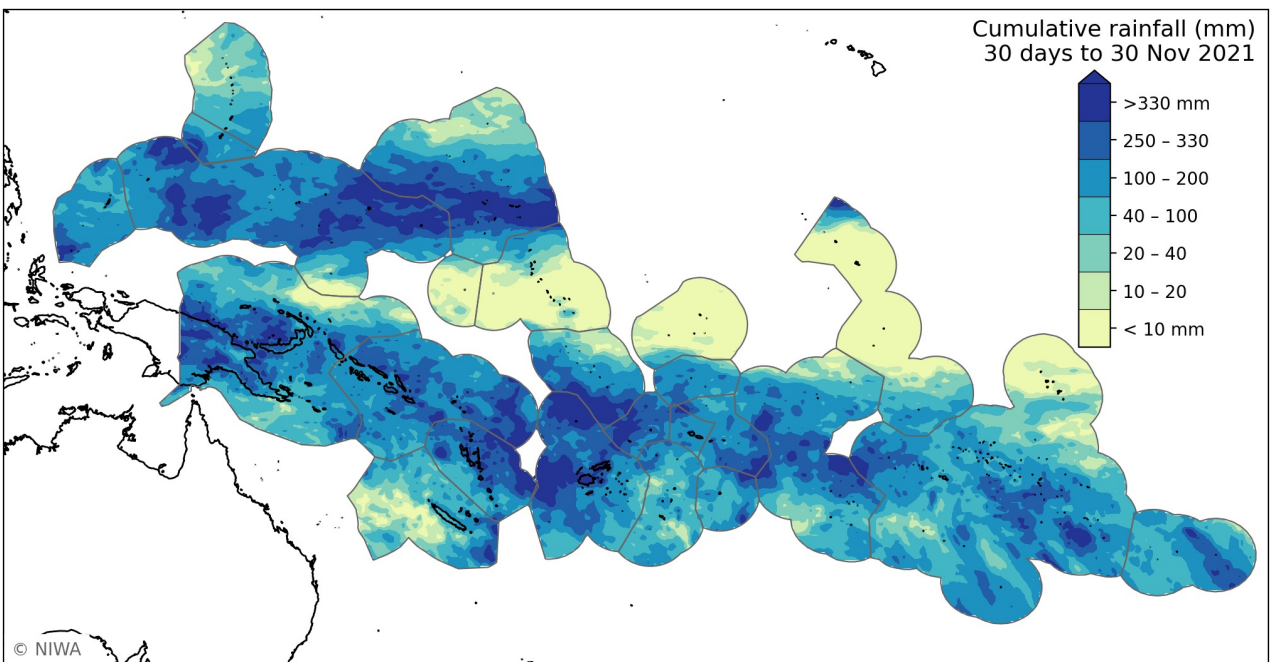
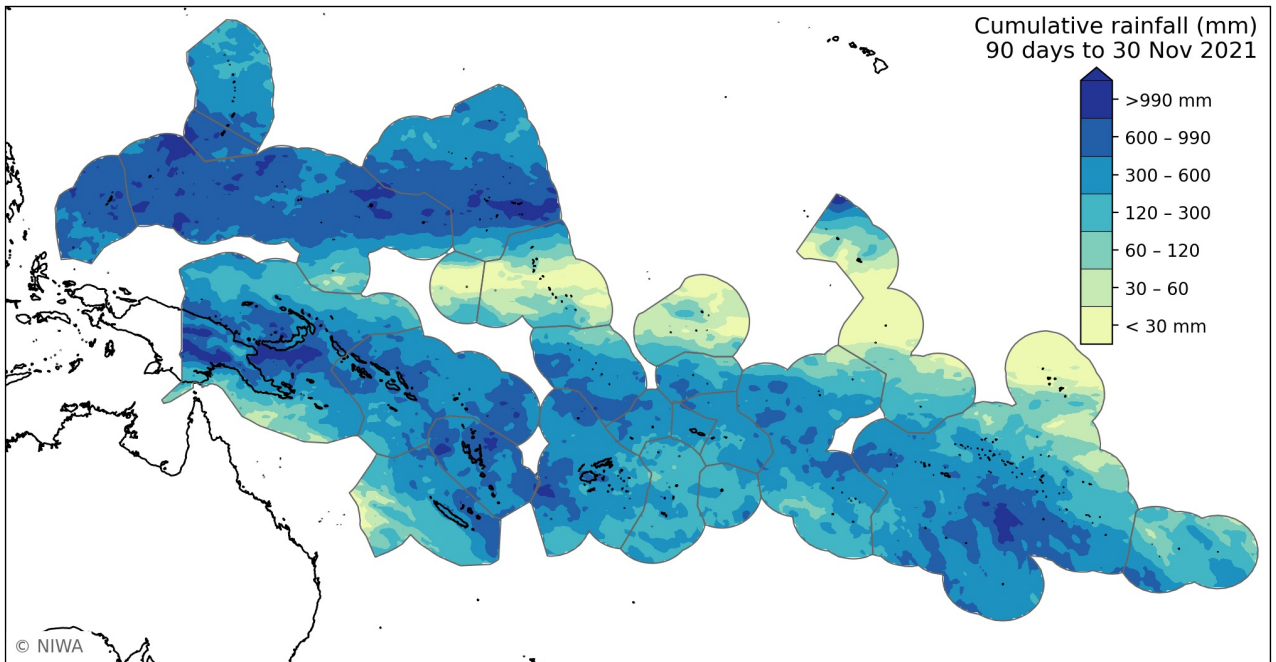
The active phase of the Madden-Julian Oscillation (MJO) was over the western Pacific at the beginning of December. This can help to facilitate a more favourable state for tropical cyclone development. As the MJO continues to move across the Pacific during mid-to-late December, island groups, particularly in the western part of the basin such as New Caledonia and Vanuatu, should remain aware of an increased risk for regional tropical cyclone activity.

Regional situation summary (30 November 2021)

La Niña-like rainfall patterns have become established across the tropical Pacific, with less rainfall near the equator and more rainfall toward the sub-tropics.

During November, generally less than 20 mm of rain was observed in Nauru, most inhabited islands in Kiribati (central Gilberts, Phoenix & Line Islands), and parts of Marquesas.

These same islands have also experienced low rainfall during the last three months. Conversely, more than 300 mm of rain fell during November across FSM, the Marshall Islands, Papua New Guinea, the Solomon Islands, Vanuatu, and Fiji.

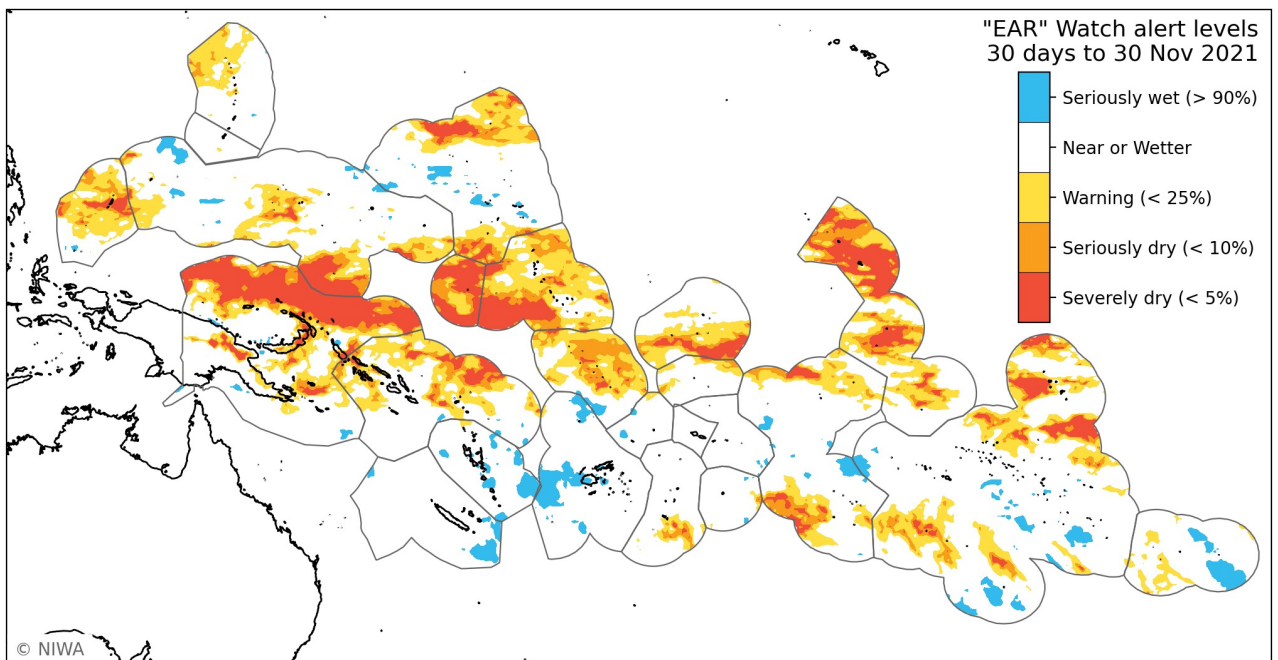
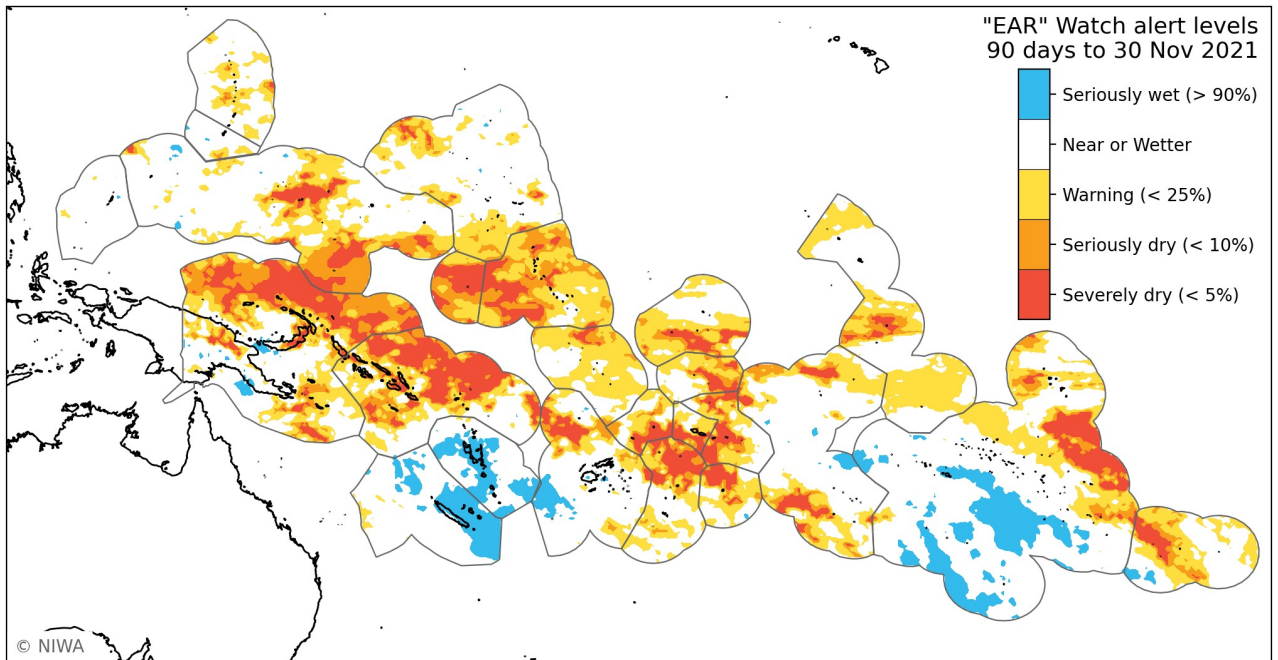


EAR regional situation summary (30 November 2021)

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

Seriously (< 5th percentile) and severely dry (< 10th percentile) conditions were observed around Palau, eastern PNG, Tuvalu, Kiribati, Tuvalu, and Marquesas during November.

Over the last three months, seriously or severely dry conditions affected many of the same island groups, but also extended farther south to include the Solomon Islands, Wallis & Futuna, Samoa, American Samoa, Tokelau, Niue, the Southern Cook Islands, and Pitcairn Islands.

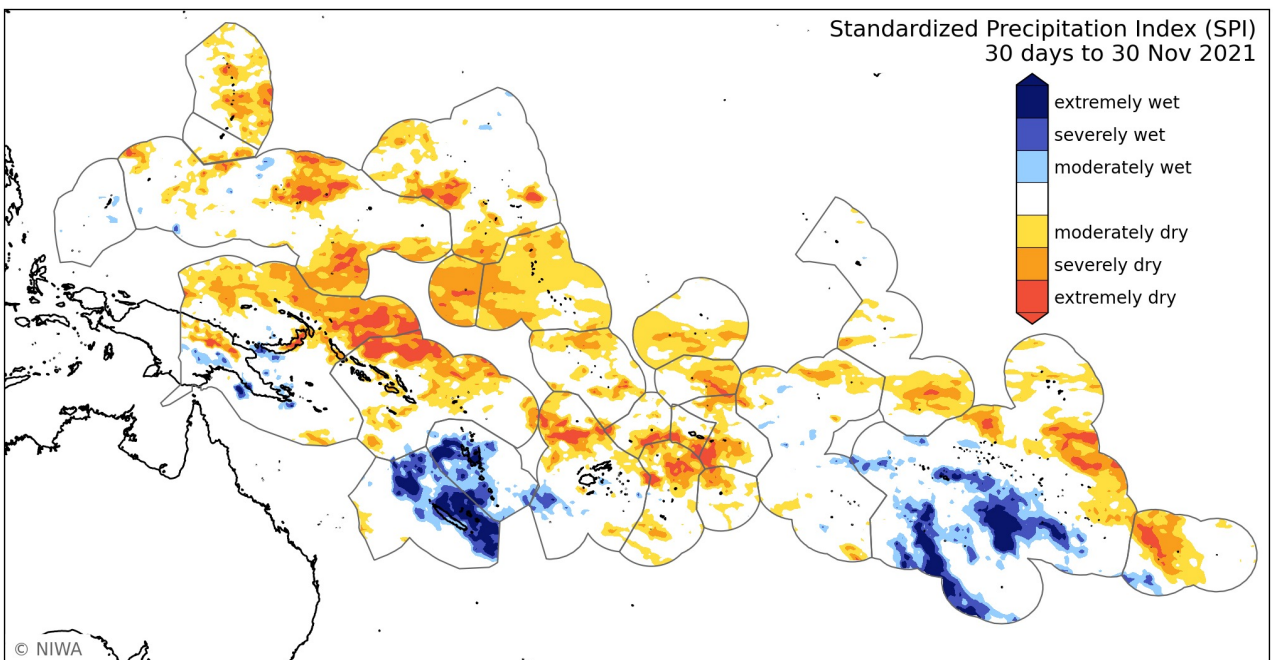
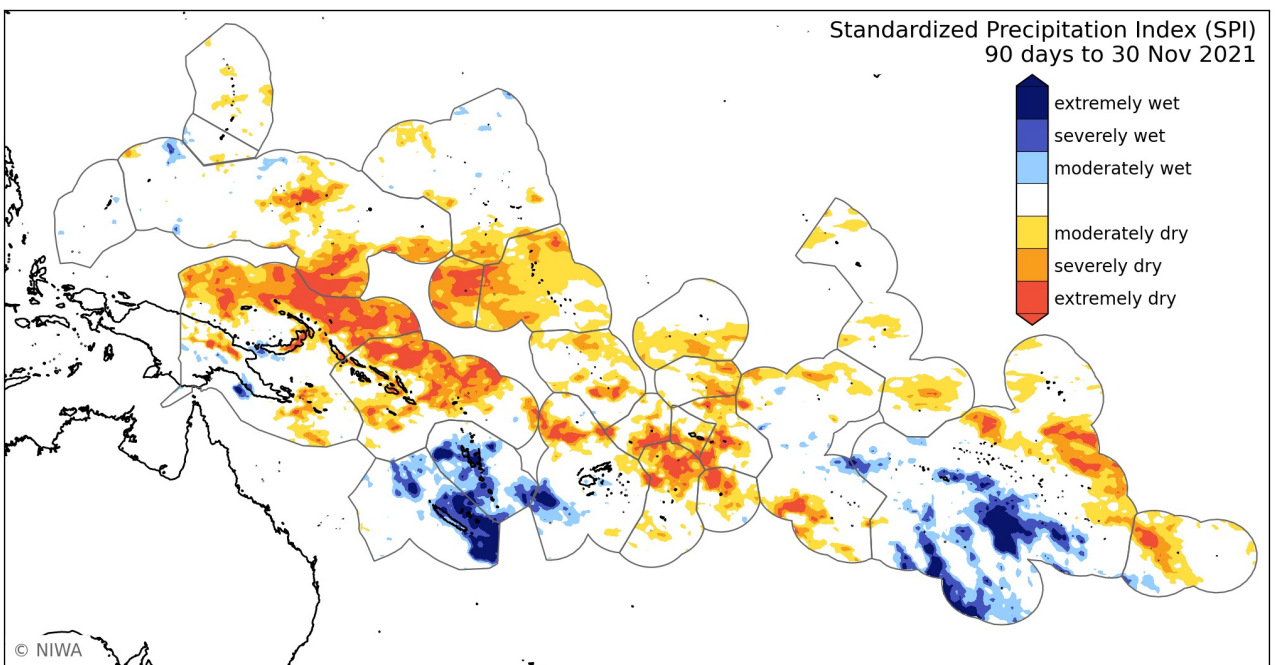


SPI Regional situation summary (30 November 2021)

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

During November, extremely and severely dry conditions were observed in parts of the Northern Marianas, central FSM, eastern PNG, southern RMI, Nauru, the northern Gilberts, the southern Phoenix Islands, Tuvalu, Tokelau, Wallis & Futuna, Samoa, American Samoa, northern Tonga, parts of French Polynesia, and Pitcairn Islands.

Over the last 3 months, the driest conditions were found in many of the same island groups, although most severe over Nauru, the Gilberts, the southern Phoenix Islands, Tokelau, and northern Tonga.

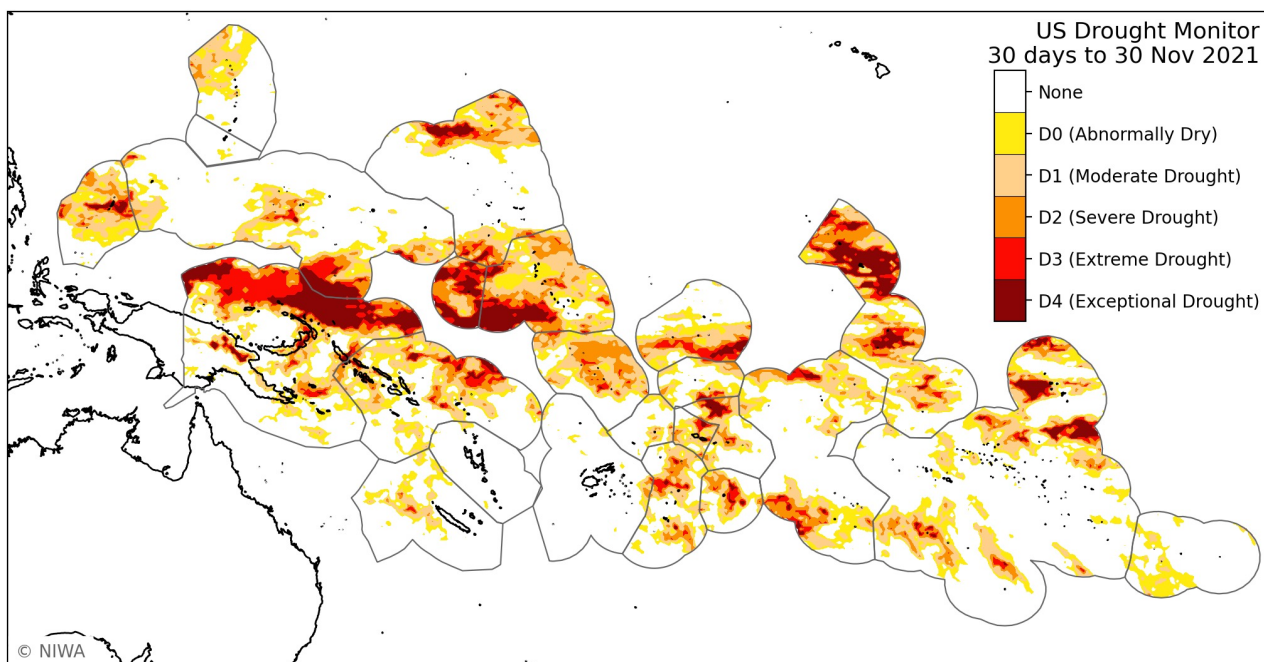
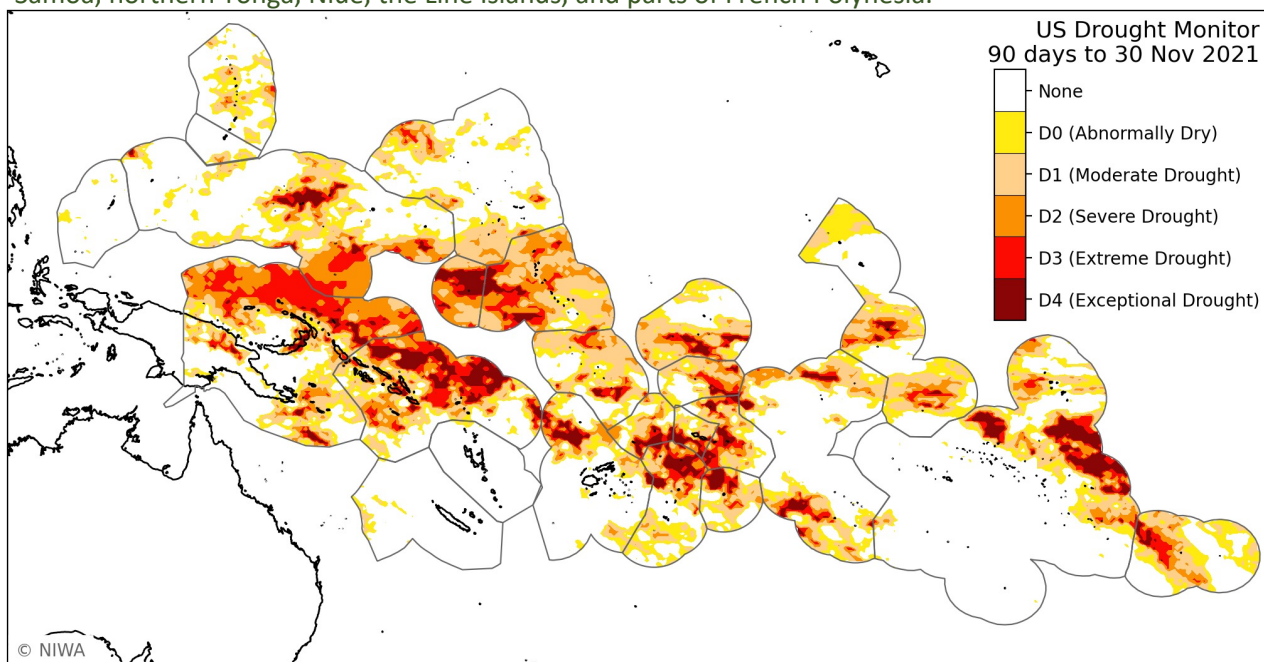


USDM Regional situation summary (30 November 2021)

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

During November, extreme and exceptional drought was observed over parts of Palau, southern RMI, eastern PNG, Nauru, the Gilberts, Tuvalu, the Phoenix Islands, Samoa, American Samoa, parts of Tonga, Niue, the Southern Cook Islands, the Line Islands, and parts of French Polynesia.

Over the last 3 months, extreme and exceptional drought was most pronounced for eastern PNG, Solomon Islands, Nauru, the Gilberts, the southern Phoenix Islands, Tokelau, Wallis & Futuna, Samoa, American Samoa, northern Tonga, Niue, the Line Islands, and parts of French Polynesia.

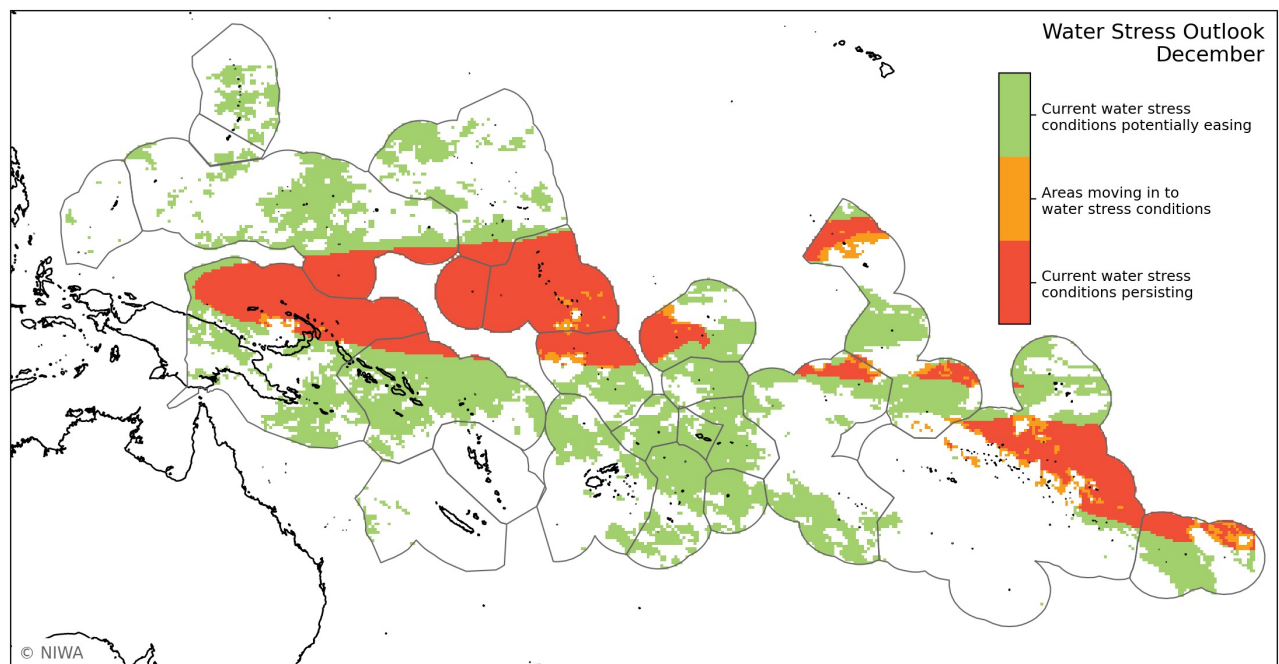
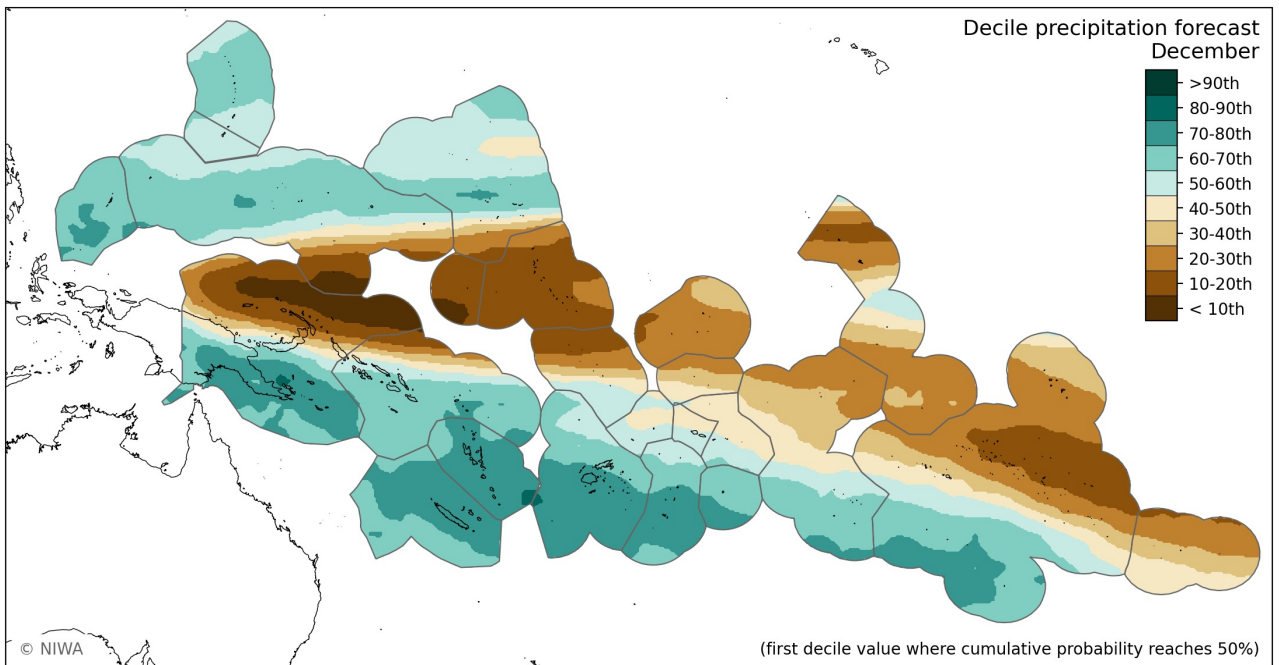


December 2021 forecast summary

Drier than normal conditions are expected to occur along and extending southeastward of the equator during December.

The island groups most likely to experience drier than normal conditions include eastern PNG, far southern RMI, Nauru, Kiribati, northern Tuvalu, Tokelau, Northern Cook Islands, French Polynesia, and Pitcairn Islands. To the contrary, wetter than normal conditions are forecast for island groups north of the equator in the western Pacific, and most island groups extending southeastward of PNG.

Water stress may continue for eastern PNG, far southern RMI, Nauru, the Gilberts, northern Tuvalu, the western Phoenix Islands, the northern Line Islands, and parts of French Polynesia.

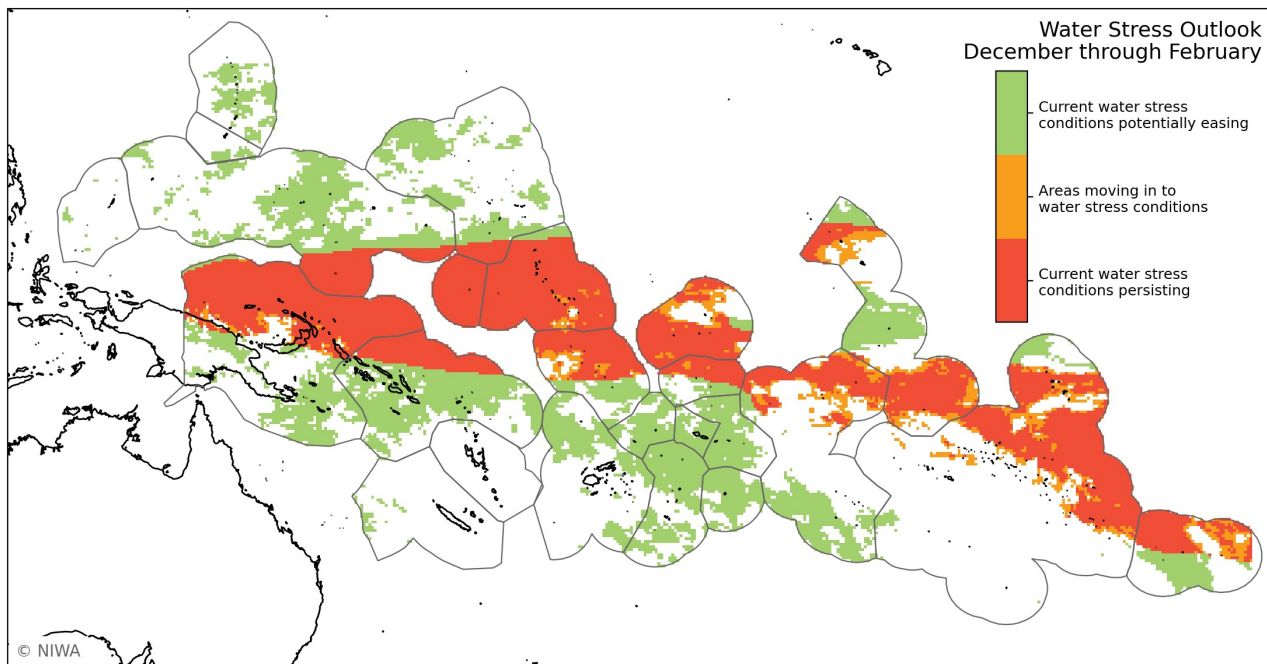
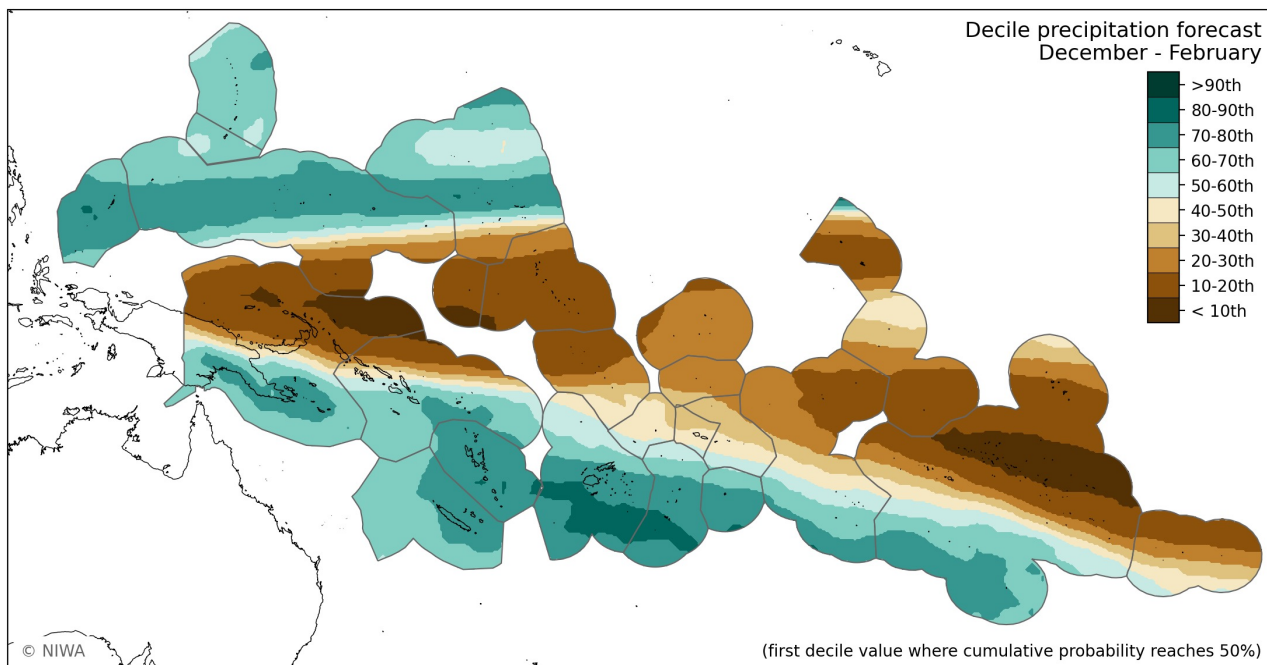


December 2021 – February 2022 forecast summary

Seasonal rainfall patterns are forecast to be similar to the next month, as influenced by La Niña in the equatorial Pacific.

Compared to December, reduced seasonal rainfall extends slightly farther south. In addition to the island groups mentioned on the previous page, Wallis & Futuna, Samoa, American Samoa have a chance for less rainfall than normal during the next 3 months.

Seasonal hotspots may develop over many of the same island groups mentioned in the previous slide, but also Tokelau, Northern Cook Islands, the southern Line Islands, and Marquesas.

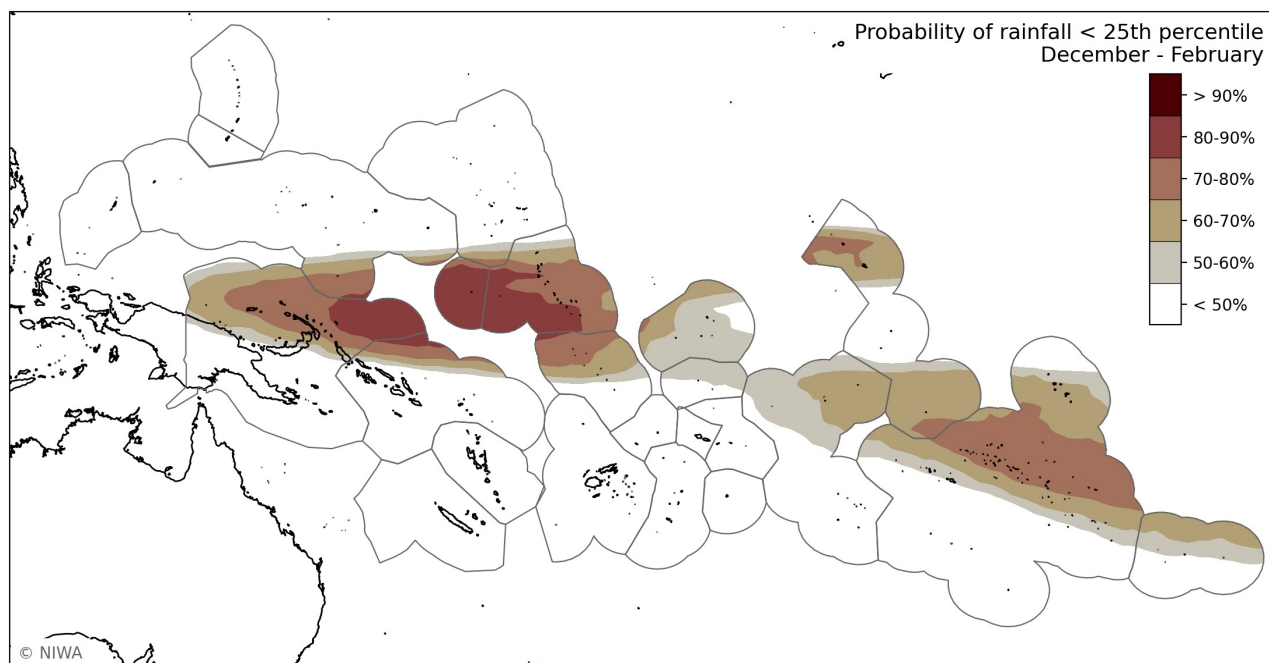
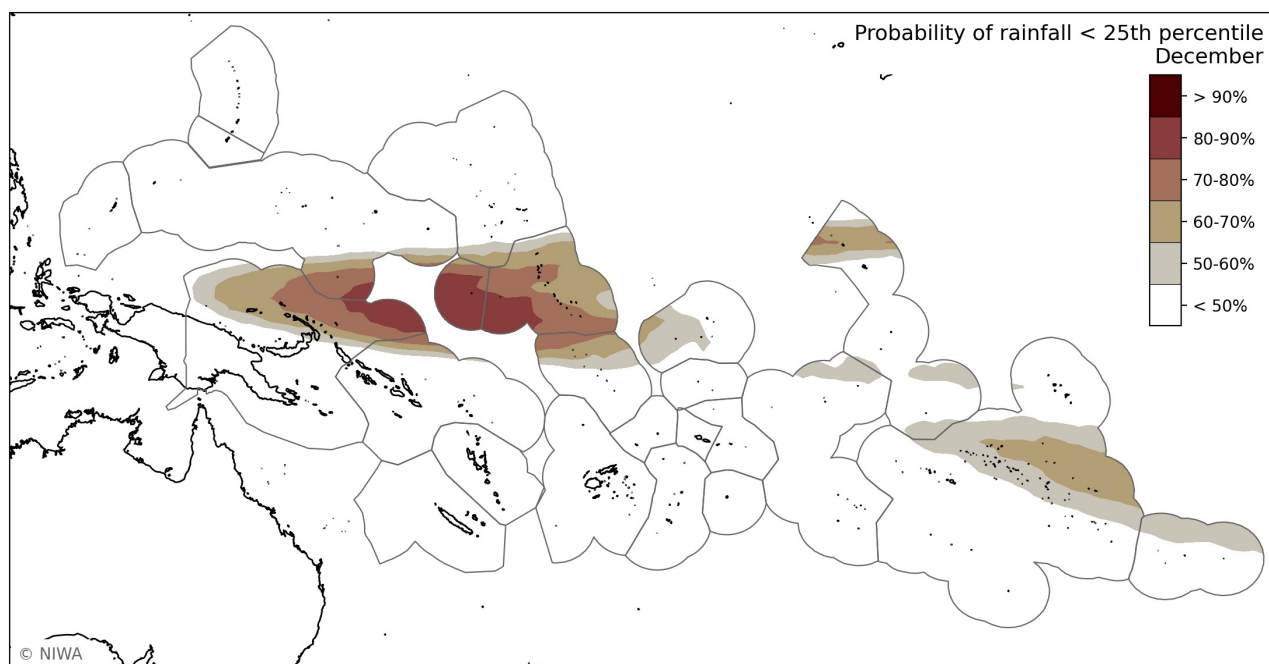


Probabilities of rainfall < 25th percentile

The probability (likelihood) of dry conditions with cumulative rainfall being less than the 25th percentile for December and for the season (December through February) are shown.

For December, very dry conditions are highly likely for portions of eastern Papua New Guinea, southern RMI, Nauru, the Gilberts, northern Tuvalu, the northern Line Islands, and parts of French Polynesia.

For December-February, very dry conditions are highly likely for many of the same island groups mentioned above, but also the Phoenix Islands, the Northern Cook Islands, the southern Line Islands, and Marquesas.






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 480+ 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> |
|  Online Resources | <p>Additional regional and country-level resources are available online:</p> <ul style="list-style-type: none"> • 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 UNDM indices. • A range of probabilistic one to five monthly and seasonal forecast plots updated shortly after the 15th of each month. |



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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