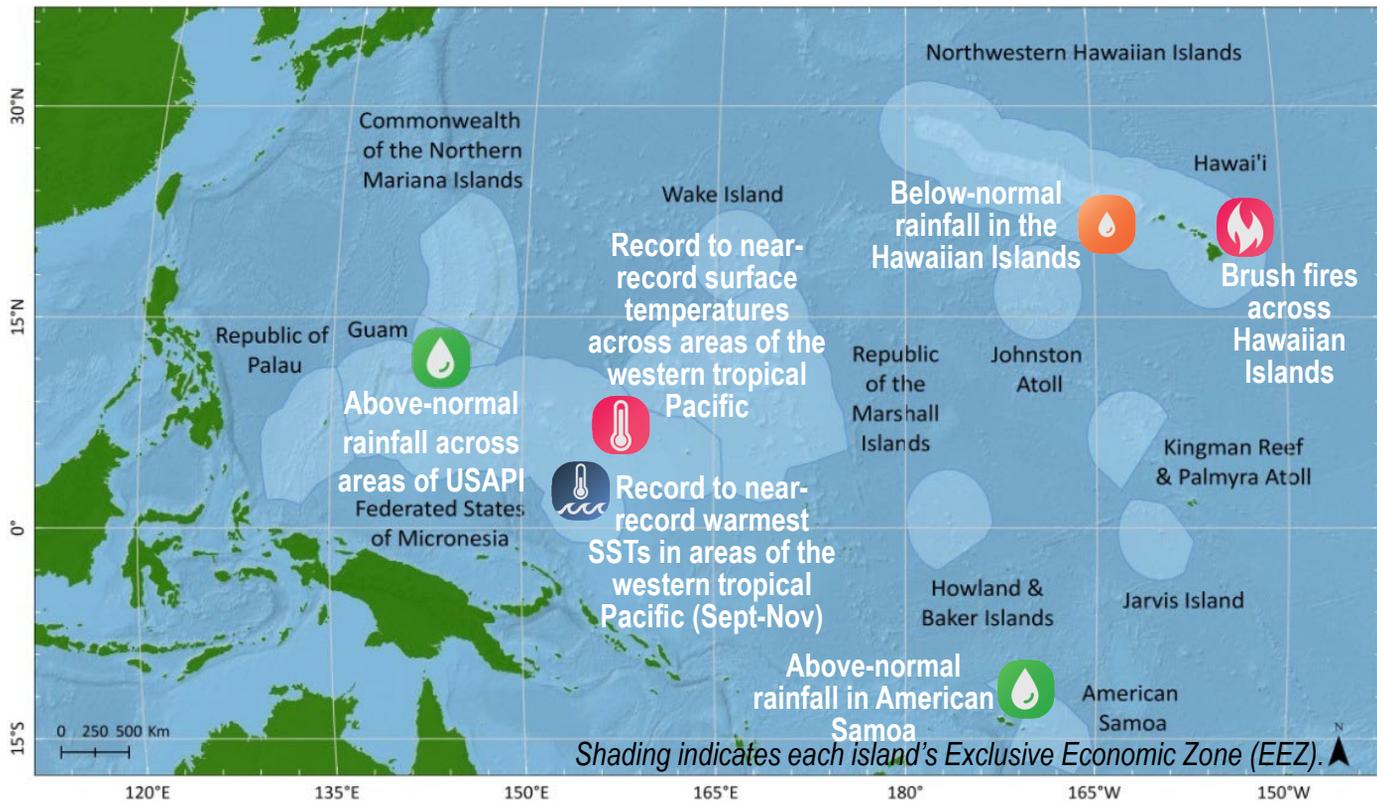




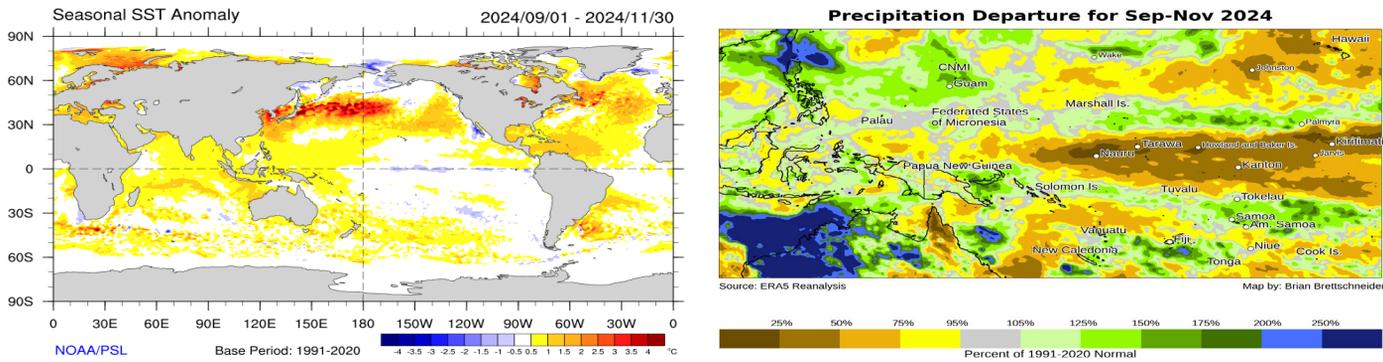
Significant Events – For September 2024–November 2024



Highlights for Hawaii and the U.S. Affiliated Pacific Islands

- ENSO-neutral conditions continued during the September-November (SON) period, with near- to below-average sea surface temperatures (SSTs) observed across the central and eastern Pacific Ocean moving into early December. Currently, a La Niña Watch is in effect, and favored to emerge in the November 2024-January 2025 period (59% chance) and transition to ENSO-neutral conditions by March-May 2025 (61% chance), according to the latest (12/12/24) ENSO diagnostic discussion by NOAA Climate Prediction Center (CPC).
- For the SON, period, above-normal precipitation was observed across much of the U.S. Affiliated Pacific Islands (USAPI) including in Palau, portions of the Federated States of Micronesia (FSM), the Commonwealth of the Northern Mariana Islands (CNMI), the Republic of the Marshall Islands (RMI), and American Samoa. Conversely, below-normal rainfall was observed in areas closer to the equator in FSM, including in Kapingamarangi, Kosrae, and Lukunor. For the SON period, drought-free conditions prevailed across USAPI, except for short periods of drought impacting Kapingamarangi. In the Hawaiian Islands, dry conditions prevailed during the SON period leading to the expansion and intensification of drought, particularly in areas of Kauai, Molokai, and Maui, according to the U.S. Drought Monitor.
- According to reanalysis data, record to near-record warm sea surface temperature anomalies (SON) were observed in areas of western tropical Pacific Ocean with coral bleaching in FSM.

Climate Overview – For September 2024–November 2024



Seasonal sea surface temperature anomaly map for 9/1/24 to 11/30/24 (left) and 3-month seasonal precipitation departures from normal for the September–November 2024 period (right) for the central and western tropical Pacific Ocean with warmer colors representing drier-than-normal conditions and cooler colors wetter-than-normal conditions. Source: NOAA Physical Sciences Laboratory (left); ERA5 Reanalysis, B. Brettschneider, National Weather Service (right).

By the end of the SON period, SSTs were near- to below-normal across most of the central and eastern tropical Pacific Ocean, while areas of slightly above-normal SSTs were present across much of the western tropical Pacific Ocean. According to the NOAA CPC update (12/9/24), Niño region SST departures were as follows: Niño 3.4 at -0.3°C, Niño 3 at -0.4°C, Niño 1+2 at -0.1°C, and Niño 4 at -0.2°C.

During the SON period, near-normal sea levels were generally observed in areas closer to the equator in the western and far eastern Pacific Ocean, while areas further northward (above ~7°N) in the western Pacific, including the Marianas and areas of FSM, observed above-normal sea levels (~+5 to +10 cm anomalies). In contrast, below-normal sea levels were observed across equatorial areas of the central Pacific Ocean as well as in the southwestern tropical Pacific including in Pago Pago, American Samoa, according to data from the University of Hawaii Sea Level Center.

During the SON period, drought-free conditions prevailed across USAPI with numerous locations experiencing above-normal rainfall accumulations. For SON precipitation totals, Airai (Palau) recorded 40.60 in. (112% of normal). In FSM, Yap observed 52.63 in. (147% of normal; 2nd wettest), Kapingamarangi 19.4 in. (61% of normal), Pohnpei 45.41 in. (103% of normal), Lukunor 27.34 in. (82% of normal), Kosrae 35.58 in. (79% of normal), and Chuuk 48.43 in. (103% of normal). In the Mariana Islands, Saipan observed 46.76 in. (167% of normal; 2nd wettest) and Guam 48.43 in. (143% of normal; 4th wettest). In the RMI, Majuro observed 44.43 in. (116% of normal), while Kwajalein logged 30.91 in. (97% of normal). In Pago Pago, American Samoa, precipitation for SON was above normal (38.0 in., 131% of normal, 10th wettest). Moreover, observing stations (Siufaga Ridge, Toa Ridge) located in the mountainous, higher-elevation terrain of the National Park of American Samoa logged 42.93 in. and 28.66 in., respectively. In terms of broader-scale surface temperature anomalies in the western Pacific, reanalysis data (ERA5) showed record to near-record temperatures (2-meter) observed during the SON period across much of the western tropical Pacific region. In the Hawaiian Islands, dry conditions prevailed for SON, with Lihue observing 3.67 in. (39% of normal), Honolulu 1.04 in. (22% of normal), Molokai 1.16 in. (22% of normal), Kahului 0.64 in. (21% of normal), Kailua-Kona 2.33 in. (103% of normal), and Hilo 28.28 in. (85% of normal). In terms of temperature, the National Weather Service (NWS) observing station at Lihue Airport broke daily maximum temperature records on ten separate days in September.

In the Northwest Pacific region (west of 180°), tropical cyclone (TC) activity has been below normal with 22 named storms and a regional Accumulated Cyclone Energy (ACE) Index of 204 (normal 291.7) by 12/10/24. In the Northeast Pacific region (east of 180°), TC activity was also below normal with 13 named storms and an ACE Index of 82 (normal 132.7), according to the Colorado State University Tropical Meteorology Project.

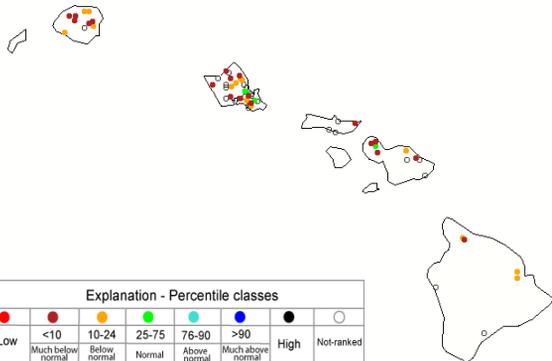


Observed coral bleaching in Pohnpei, FSM.
Source: Alois Malfitani.



Maalaea Fire in central Maui on 11/14/24. Temporary road closures were reported on the Honoapiilani Highway and Kuihelani Highway.
Source: County of Maui Department of Fire and Public Safety.

Sunday, December 08, 2024



14-day average streamflow compared to historical flows for the day of year (12/8/24).
Source: U.S. Geological Survey.

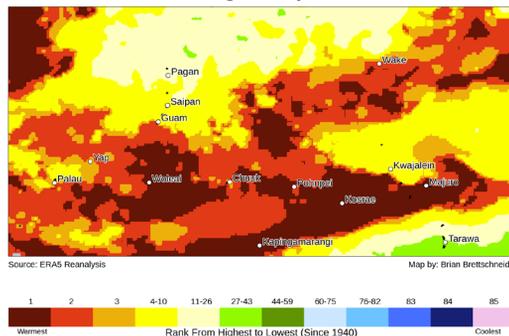
Facilities and Infrastructure – In central Tutuila Island, American Samoa, a landslide was reported (10/1/24) by the American Samoa Department of Homeland Security between the villages of Fatumafuti and Faga’alu. For November 2024, the NWS Pago Pago reported well-above-average precipitation (17.69 in.; normal 12.05 in.) for the month with multiple flash flooding events observed in Tutuila.

Fire – Dry conditions during SON exacerbated brush fire potential and activity across Hawaii, with fires reported during SON in Kauai, Oahu, Molokai, Maui, and the Big Island.

Heat – In the western Pacific, anomalously warm air temperatures were observed in areas of FSM, RMI, and CMNI. In FSM, record-breaking mean average temperatures were observed in September (82.8°F) and for the SON period (82.8°F) at the NWS WSO Pohnpei (FSM) observing station. In Yap (FSM), the NWS WSO observing station recorded its 8th warmest October (82.8°F) and 10th warmest November (83.1°F) on record dating back to 1951. In RMI, the observing station at the NWS WSO Majuro (RMI) logged its 3rd warmest October mean average temperature (84.0°F) and its 4th warmest SON period (83.7°F) on record dating back to 1955. In CMNI, Saipan International Airport logged its 2nd warmest SON mean average temperature (83.9°F) as well as its 2nd warmest monthly mean average temperature for both September (84.1°F) and November (84.2°F). In addition, the impacts from above-normal SSTs in the western tropical Pacific led to areas experiencing coral bleaching around the main island in Pohnpei (FSM).

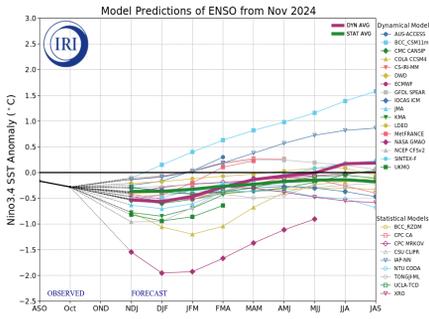
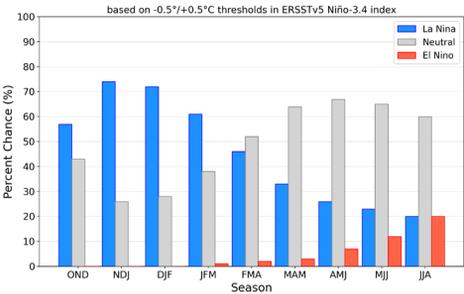
Water Resources – In Majuro (RMI), reservoir storage reached 89% of total capacity (36,000,000 gallons) on 11/30/24. Across the Hawaiian Islands, 14-day average streamflows (12/8/24) were below normal at numerous USGS gauging stations across the island chain, including at Waikele Stream (5th percentile), Waipahu, Oahu.

SST Ranking for Sep-Nov 2024



Sea surface temperature rankings for Micronesia.
Source: ERA5 Reanalysis, B. Brettschneider, National Weather Service.

Official NOAA CPC ENSO Probabilities (issued November 2024)



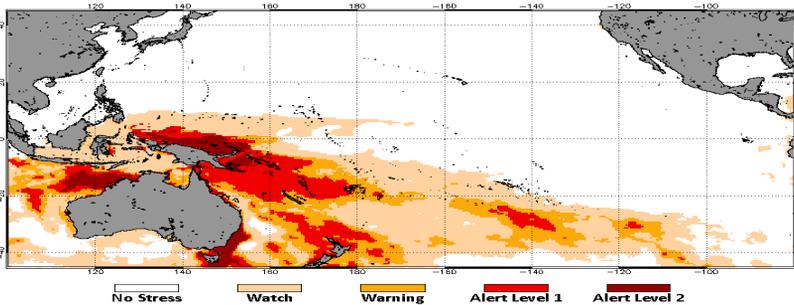
Forecast for each of the three possible ENSO categories for the next 8 overlapping 3-month seasons. Blue bars show the chances of La Niña, gray bars the chances for neutral, and red bars the chances for El Niño (left); and ENSO forecast model predictions (right).

Source: NOAA CPC (left); Columbia University IRI (right).

According to the latest ENSO prediction model simulations (above right), the IRI plume predicts a weak and short-duration La Niña, as indicated by the Niño 3.4 index values less than -0.5°F . La Niña is favored to emerge during the Nov 2024-Jan 2025 period (59% chance) and is expected to transition to ENSO-neutral conditions by Mar-May 2025 (61% chance). Moreover, the dynamical models in the IRI plume (upper right) continue to predict a weak and short duration La Niña as indicated by the Niño 3.4 index values less than -0.5°C . In terms of sea level anomalies, the NOAA NCEP CFSv2 model suggests positive sea level anomalies of +5 to +15cm over the next several months in the western tropical Pacific and negative anomalies of -5 to -15cm in the central and eastern tropical Pacific.

The NOAA's Coral Reef Watch four-month coral bleaching heat stress outlook (Dec 2024-Mar 2025) calls for a high probability (90%) of high heat stress (Alert Level 1-2) developing in areas across the western tropical Pacific Ocean, including areas around New Guinea, Fiji Islands, Solomon Islands, and Tonga.

2024 Dec 3 NOAA Coral Reef Watch 90% Probability Coral Bleaching Heat Stress for Dec-Mar 2025



NOAA Coral Reef Watch four-month coral bleaching heat stress outlook for Dec-Mar 2025. Red and maroon colors represent areas with a high probability of coral bleaching heat stress Alert Levels 1 & 2. Source: NOAA NESDIS.

Looking at the Nov 2024-Jan 2025 precipitation forecast, normal rainfall amounts are expected for Guam, CNMI (Saipan), and American Samoa. Elsewhere, above-average precipitation is forecasted for FSM (Chuuk, Kosrae, Pohnpei, Yap), RMI (Kwajalein, Majuro), and the Hawaiian Islands, according to the NOAA Pacific ENSO Applications Climate Center.

- NOAA Coral Reef Watch: <https://coralreefwatch.noaa.gov/>
- NOAA National Centers for Environmental Information: <https://www.ncei.noaa.gov/>
- NOAA NMFS Pacific Island Fisheries Science Center: <https://www.fisheries.noaa.gov/about/pacific-islands-fisheries-science-center>
- NOAA NWS Weather Forecast Office Honolulu & Guam: <https://www.weather.gov/hfo/> <https://www.weather.gov/gum/>

- NOAA OceanWatch - Central Pacific Node: <https://oceanwatch.pifsc.noaa.gov/index.html>
- NPS Pacific Island Inventory & Monitoring Network: <https://www.nps.gov/im/pacn/index.htm>
- University of Guam - Water and Environmental Research Institute: <https://weri.uog.edu/>

- University of Hawaii - Asia Pacific Data Research Center (APDRC): <https://apdrc.soest.hawaii.edu/>
- University of Hawaii - Cooperative Institute for Marine & Atmospheric Research: <https://www.soest.hawaii.edu/jimar/index.htm>
- University of Hawaii - Sea Level Center: <https://uhscl.soest.hawaii.edu/>

- USGS Science Center - Pacific Coastal and Marine Science Center: <https://www.usgs.gov/pacific-coastal-and-marine-science-center>
- USGS Pacific Islands Water Science Center: <https://www.usgs.gov/pacific-coastal-and-marine-science-center>
- Western Regional Climate Center: <https://wrcc.dri.edu/>

