



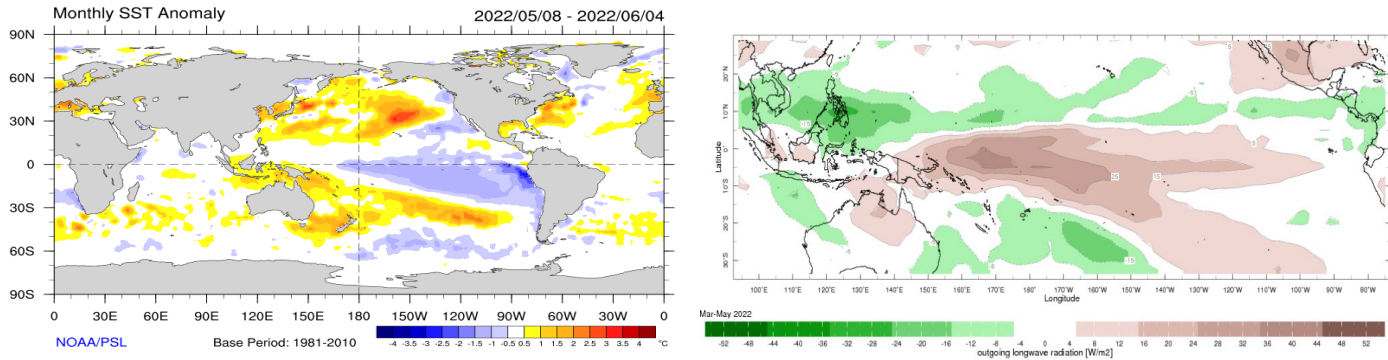
Significant Events – For March 2022–May 2022



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

- La Niña Advisory was in effect (June 9) with near- to below-normal sea surface temperatures (SSTs) observed across the east-central and eastern equatorial Pacific Ocean. La Niña is likely to continue into the Northern Hemisphere late summer 2022 (July–September 2022, 52% chance) with odds for La Niña slightly increasing through the Northern Hemisphere fall and early winter 2022 (58-59% chance), according to NOAA Climate Prediction Center.
- Moderate drought (D1) was observed in the Republic of the Marshall Islands (RMI) in Wotje and in the southern portion of the Federated States of Micronesia (FSM) in Kapingamarangi.
- For the March–May (MAM) period, precipitation was above normal in Palau, Saipan, northern areas of FSM (Chuuk, Kosrae, Yap) and in portions of RMI (Kwajalein, Majuro). Conversely, below-normal rainfall was observed in southern FSM (Kapingamarangi), American Samoa, and across much of the Hawaiian Islands (Mar–Apr) except for windward areas of the Island of Hawai'i where above-normal rainfall for April and May 2022 was observed.
- Satellite analysis showed above-normal sea levels occurring across the tropical western Pacific and central South Pacific during May consistent with the ongoing La Niña event while normal to below-normal sea levels were observed across much of the tropical eastern Pacific and central North Pacific.

Climate Overview – For March 2022–May 2022



Monthly sea surface temperature anomaly map for 5/08/22 to 6/04/22 (left) and seasonal outgoing long-wave radiation anomalies for Mar–May 2022. Areas with more rain/clouds than normal are depicted in **green** while areas with fewer clouds/less rain are depicted in **brown**. Source: IRI. (right). Sources: NOAA PSL, NOAA NCEP Climate Prediction Center, IRI.

Across most of the equatorial Pacific Ocean, sea surface temperatures (SSTs) were below normal with La Niña conditions present. All four Niño regions registered negative SST anomalies on the NOAA CPC update (5/30/22) at the end of the MAM period: Niño 3.4 region at -1.0°C ; Niño 3 at -0.9°C ; Niño 1+2 at -1.1°C ; and Niño 4 at -0.8°C .

During MAM, **above-normal sea levels were observed across much of the equatorial western Pacific and central South Pacific while normal to below-normal levels were observed across the tropical eastern Pacific and central North Pacific.** In the Hawaiian Islands, near-normal sea levels (monthly means) were observed during MAM. In the western Pacific, monthly mean sea levels were above normal (10–30 cm) throughout MAM with numerous daily extreme-high sea level records broken during the period including in Palau (3/3–5), Guam (3/3–4, 4/12–13), Kapingamarangi (3/1, 3–4, 18, 4/2–4, 16–20), Kwajalein (3/3–5, 4/2), and in Pago Pago (3/1–5, 3/27, 29–31, 4/1, 3, 2–26, 28–30). In the Hawaiian Islands, daily extremes were broken in March at Mokuoloe (3/1, 29), Kahului (3/1–3), Nawiliwili (3/1–2), and Hilo (3/1), according to the University of Hawai'i Sea Level Center.

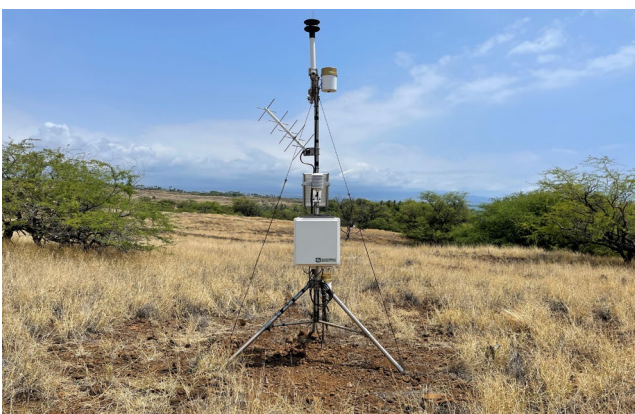
During the MAM period, **most of the U.S. Affiliated Pacific Islands were drought-free** except for Moderate (D1) observed in northern RMI (Wotje) and in southern FSM at Kapingamarangi, according to the U. S. Drought Monitor. **Median precipitation for the MAM period was near to above normal across areas of the tropical western Pacific** including in Palau with Airai recording 57.84 in. (192% of normal). In FSM (for MAM), Yap observed 33.55 in. (174% of normal), Kapingamarangi 16.78 in. (47% of normal), Pohnpei 78.99 in (144% of normal, 5th wettest), Lukunor 36.69 in. (104% of normal), Kosrae 90.93 in. (167% of normal, 4th wettest), and Chuuk 50.89 in. (148% of normal). In the Mariana Islands, Saipan observed 12.14 in. (202% of normal) and Guam 9.37 in. (88% of normal). In the RMI, Majuro observed 50.35 in. (196% of normal) for MAM, while Kwajalein logged 32.45 in. (188% of normal). In American Samoa, precipitation was below normal (20.24 in., 61% of normal, 5th driest) at Pago Pago for MAM despite near-normal rainfall during May (9.32 in.; 96% of normal). **Across much of the Hawaiian Islands, below-normal rainfall was observed during MAM, exacerbating drought-related conditions in leeward areas.** Conversely, above-normal rainfall was observed during Apr–May on the windward side of the Big Island in the North Hilo, South Hilo, and Puna districts. For the MAM period, Lihue observed 7.45 in. (76% of normal), Honolulu 1.83 in. (46% of normal), Molokai 1.87 in. (33% of normal), Kahului 0.46 in. (10% of normal), Kailua Kona 2.09 in. (93% of normal), and Hilo 32.63 in. (112% of normal).

Tropical cyclone (TC) activity has been **below normal in the South Pacific basin** (east of 135°E) with 7 named storms since December and an Accumulated Cyclone Energy (ACE) Index of 21.9 (normal is 68.8 by 5/31/22 based on 1991–2010 climatology). In the Northwest Pacific (west of 180°E), TC activity has been **slightly below normal** with 2 named storms early in the season bringing the ACE Index to 17.4 (normal 26.7) by 5/31/22. In the Northeast Pacific, the first hurricane of the season, Hurricane Agatha, made landfall along the coast of Oaxaca, Mexico on May 30.



Flash flooding observed in South Hilo, Hawaii during a heavy rainfall event on April 16, 2022. Rainfall in Hilo for April 2022 was 15.67 inches (167% of normal).

Photo credit: M. Wasser, National Park Service.



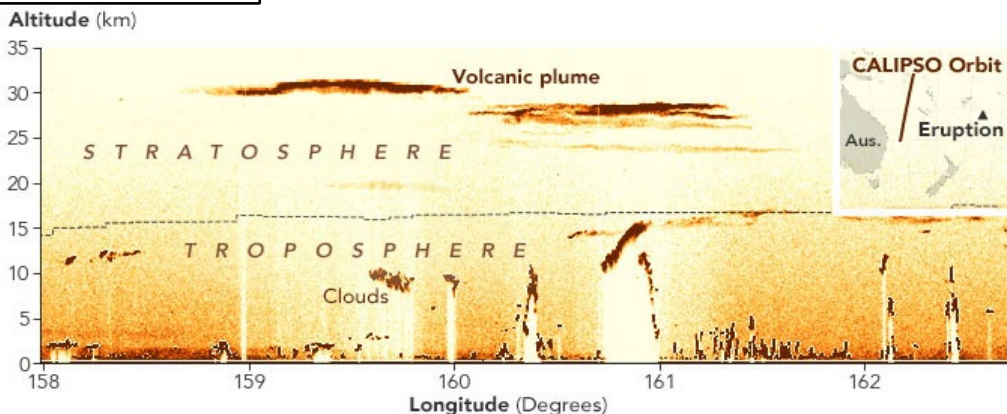
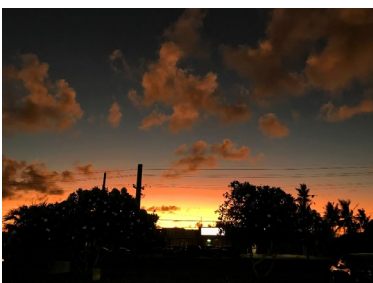
Poor vegetation health observed along the northwestern coast (currently in Extreme Drought – D3) of the island of Hawai'i at the National Park Service weather station at the Pu'ukoholā Heiau National Historic Site on May 17, 2022.

Photo credit: D. Simeral, Western Regional Climate Center

Agriculture – In the Hawaiian Islands, persistent rainfall shortfalls in some leeward areas of the Big Island, Maui, and Molokai during the Mar–May 2022 period resulted in agricultural drought impacts including poor vegetation health and poor pasture conditions. In Maui and Molokai, poor wildland forage conditions have led to continued feral deer encroachments onto farmlands resulting in severe damage to crops, pastures, and losses for local producers.

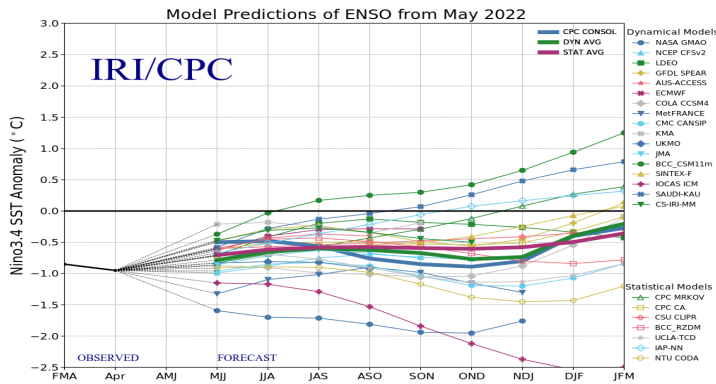
Facilities and Infrastructure – In American Samoa, heavy rainfall on May 17 led to flash flooding of the main roadway in the village of Failolo; landslides in Agugulu; and a rockslide on Ofu Island (according to the NWS Pago Pago).

Water Resources/Wildfire – According to the Hawai'i Dept. of Land and Natural Resources (DLNR; March 8), persistent below-normal rainfall in areas of Maui have led to reduced groundwater recharge and surface water flows raising concerns of the effect of drought on local domestic water supplies and for agricultural irrigation moving into the dry season. As of 5/31/22, the USGS 14-day average streamflows (compared to historical flows for the day of the year) at numerous gaging stations were registering below-normal flows ranging from the 1st to the 24th percentile on the Big Island, Maui, Molokai, and Oahu. The on-going dry conditions are causing growing concern regarding the potential for devastating wildfires, according to DLNR Division of Forestry and Wildlife. In Kapingamarangi (FSM), short-term dryness during May (1.19 in.), has caused public water tanks to drop to 60% of capacity while private water tanks are reported as very low, according to the NWS Guam. On Majuro (RMI), reservoir storage reached 78% of total capacity on May 31.



Vivid sunset (left) in Guam (June 2022) associated with volcanic dust from the Hunga Tonga-Hunga Ha'apa (HT) eruption. Lidar image (right) from the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) mission showing the **volcanic plume from HT eruption** reaching into the **stratosphere** (altitude of 31 km [19 miles]). The sulfate aerosols in the stratosphere are expected to affect the radiative balance in the atmosphere and possibly Southern Hemispheric ozone over the next year.

Image/content credit: M. Lander, Univ. of Guam (left); NASA/CALIPSO; NOAA Tonga Rapid Response Experiment (right).



ENSO forecast model predictions – May 2022
 Source: IRI/CPC. <https://iri.columbia.edu/our-expertise/climate/forecasts/ens0/current/>

According to the majority of ENSO prediction models (see IRI/CPC forecast above), there is a high probability that weak **La Niña** conditions continue into the Northern Hemisphere summer 2022. The odds for La Niña are forecasted to decrease into the late Northern Hemisphere summer (58% chance in Aug-Oct 2022) before slightly increasing through fall and early winter 2022 (61%).

NOAA’s Coral Reef Watch four-month (Jun 2022–Sept 2022) coral bleaching heat stress outlook calls for **a high probability (90%) of high heat stress bleaching Alert Level 1** (bleaching likely) in the western Pacific including areas around Palau, and western FSM (Yap). A bleaching **Warning** (possible bleaching) is forecasted for areas including the central FSM and the southern extent of the Mariana Islands.

During the period June-through August 2022, **below-normal** precipitation is forecasted for much of USAPI, including Palau, Mariana Islands (Guam, CNMI), much of FSM, American Samoa, and the Hawaiian Islands. **Normal to above-normal** rainfall is expected in areas of RMI (Kwajalein, Majuro) while **near-normal** rainfall is expected in the eastern portion of FSM in Pohnpei, according to the NOAA Pacific ENSO Applications Climate (PEAC) Center. In terms of the 2022 Central Pacific hurricane season (Jun 1–Nov 30), NOAA’s NWS Central Hurricane Center and NOAA’s Climate Prediction Center (May 18) is predicting **below-normal (60% chance) tropical cyclone activity** with a 30% chance of near-normal activity and a 10% chance of an above-normal season. For the season, 2 to 4 tropical cyclones (4 to 5 is normal) are predicted for the region.

For the next 3 to 6 months, dynamical models (NOAA CFSv2, ACCESS-S2 [Australia]) suggest continuation of **above-normal sea levels** for the western Pacific, especially south of 15°N (including areas around Guam, Malakai, Chuuk, Pohnpei, Majuro) and extending southeastward through most of the South Pacific Convergence Zone (SPCZ) region, according to the University of Hawaii Sea Level Center.

- NOAA Coral Reef Watch:
<https://coralreefwatch.noaa.gov/>
- NOAA National Centers for Environmental Information:
<http://www.ncei.noaa.gov/>
- NOAA NMFS Pacific Island Fisheries Science Center:
<https://www.fisheries.noaa.gov/region/pacific-islands#science>

NOAA NWS Weather Forecast Office Honolulu & Guam:
<https://www.weather.gov/hfo/>
<https://www.weather.gov/gum/>

NOAA OceanWatch - Central Pacific:
<https://oceanwatch.pifsc.noaa.gov/>

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):
<http://apdrc.soest.hawaii.edu/index.php>

University of Hawaii - Joint Institute of Marine and Atmospheric Research:
<https://www.soest.hawaii.edu/jimar/>

University of Hawaii Sea Level Center:
<https://uhslc.soest.hawaii.edu/>

USGS Science Center – Pacific Coastal and Marine Science Center:
<https://www.usgs.gov/centers/pcmssc>

USGS Pacific Islands Water Science Center:
<https://www.usgs.gov/centers/piwsc>

Western Regional Climate Center:
<https://wrcc.dri.edu/>