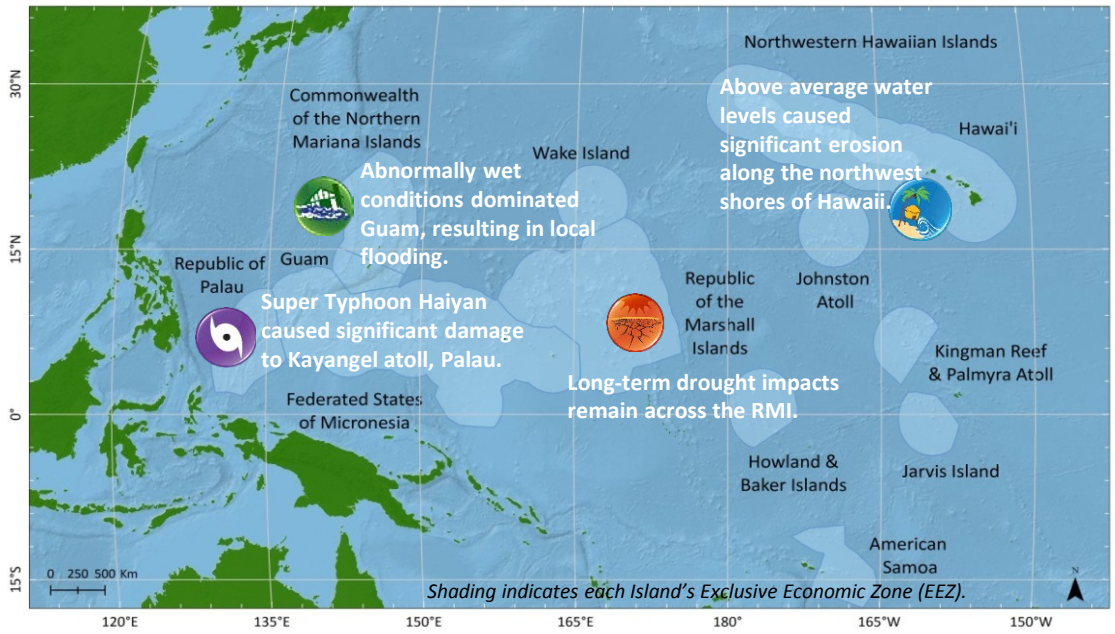
Climate Impacts and Outlook

Hawaii and U.S. Pacific Islands Region

4th Quarter 2013

Significant Events and Impacts for 3rd Quarter 2013

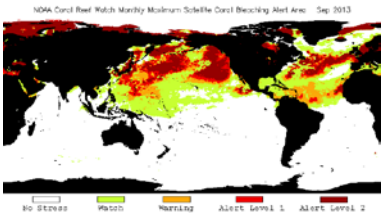


A record number of typhoons developed in October in the western Pacific.

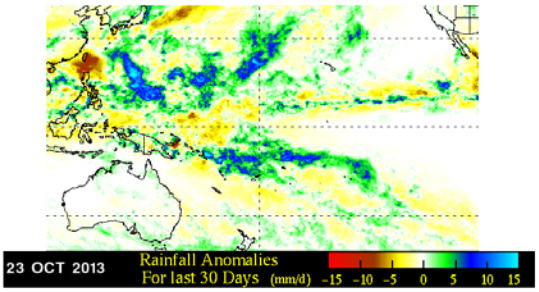
Persistently higher than average mean sea-level continues to be observed across FSM and American Samoa. No significant impacts were noted.

Near normal conditions prevailed for much of CNMI. No significant impacts were noted.

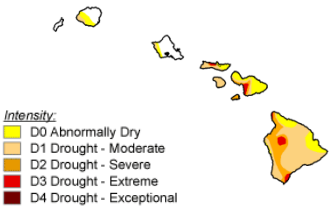
Regional Climate Overview for 3rd Quarter 2013



Coral Reef Watch Monthly Maximum Coral Bleaching Alert Areas for September. Source: http://coralreefwatch.noaa.gov



30-day TRMM satellite estimated precipitation anomalies September 22-October 23. Source: http://trmm.gsfc.nasa.gov/



U.S. Drought Monitor – Drought Conditions in Hawaii. Source: http://droughtmonitor.unl.edu

ENSO-neutral conditions continued in the Equatorial Pacific Region. Weather conditions were more in-line with La Niña early in the quarter (e.g., the position of the monsoon trough and elevated sea level), but later resembled El Niño (e.g., increased tropical cyclone activity). As of November 4th the Niño 3.4 region anomaly was -0.2°C, which corresponds to ENSO neutral conditions.

The monthly mean *sea level* in the 3rd quarter continued to show higher anomalies in most of the USAPI stations; all stations were 4-8 inches higher than normal. *Sea-surface temperatures* were generally above-normal except for the waters around and just south of the Equator where cooler waters prevailed.

Rainfall throughout much of the region was near normal for the quarter. In Hawaii, rainfall was near- to below-normal in many areas of the state, especially Hilo and Kahului. In Guam and the CNMI, rainfall was above normal with a record rainfall of 32.25 inches on Guam in September. In the RMI, rainfall was near-normal, while in the FSM, quarterly rainfall, in terms of percent of normal, was near-normal across most sites: Chuuk (107%), Kosrae (116%), and Yap (135%). The exception was Pohnpei, which was below normal (77%). In Palau and Koror, rainfall was slightly below-normal. In American Samoa, rainfall was above-normal for the quarter.

Drought conditions continued over the Hawaiian Archipelago and portions of the RMI. As of the end of October, 86% of the state of Hawaii was abnormally dry or in drought, with degradation on the windward side of Hawaii and Maui. Meanwhile, abnormal dryness lingered in Kapingamarangi, while moderate drought conditions developed in Kwajalein.

Tropical Cyclone activity for August-October in the western North Pacific basin was above-normal. Many Super Typhoons developed this quarter, especially west and south of CNMI. The southwest Pacific was seasonally inactive and the central Pacific had below-normal activity.

Sectoral Impacts for 3rd Quarter 2013

Agriculture and Husbandry – Drought impacts remained in the RMI as humanitarian and supplemental food sources continued to be delivered from international countries. A complete loss of local subsistence crops has necessitated the ongoing relief efforts. On the Big Island of Hawaii, long-term drought has stressed citrus trees and irrigation schedules continue to be scaled back.

Water Resources – Over 65" of rain fell in the 3rd quarter on Guam, ending the long dry spell that began in November 2012. The heavy rains generated a quarterly surplus of 20".

Facilities and Infrastructure - Kayangel atoll in the Republic of Palau was devastated by Super Typhoon Haiyan. All people living there have been evacuated to shelters in Koror. Meanwhile, the combination of multiple and unique ocean effects resulted in major beach erosion impacting residential structures along the north shore of Oahu.

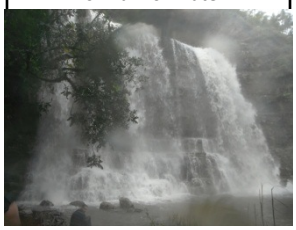
Fishing – Waters off the northeast coast of Hawaii were overcome by a large algal bloom that began in June and intensified through September. In addition, a cold-core eddy appeared southwest of the Big Island of Hawaii, upwelling nutrient-rich food sources.

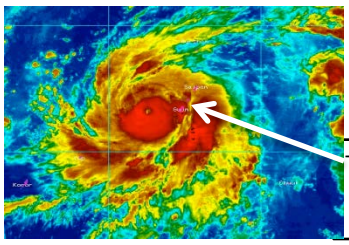
Natural Resources- Prolonged warming and calm weather caused widespread, patchy coral bleaching and mortality along eastern Guam and around Saipan affecting mostly branching corals in shallow water.

Structural damage to a school on Kayangel, Palau, was caused by Super Typhoon Haiyan.

Funnel clouds were spotted over central Oahu during mid-October.

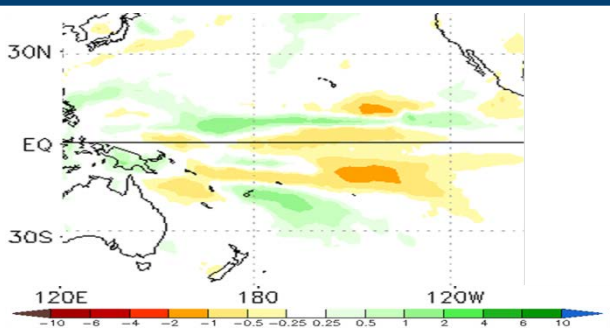
Heavy rains on Guam swelled Sigua Falls to three times its normal flow rate.





Typhoon Francisco as seen through infrared satellite, 130 nm west of Guam.

Regional Outlook for 4th Quarter 2013 (Nov-Jan)



Precipitation outlook, November-January 2013/2014. Source: http://www.cpc.ncep.noaa.gov/products/NMME/

ENSO Neutral conditions are expected to continue through the Northern Hemisphere spring 2014. It is unclear how long these conditions will persist.

The SST anomaly outlook for the 4th quarter indicates near to above-normal temperatures throughout the region. **Coral bleaching thermal stresses are projected to be high across the equatorial Pacific, especially from FSM to American Samoa.**

The forecast values for sea level in the 4th quarter indicate that most of the stations in the north Pacific region are likely to stay about 4-6 inches higher than normal. American Samoa is also likely to be 4-6 inches higher than normal. In Hawaii, both Honolulu and Hilo are projected to be closer to normal. **Sea levels are expected to slowly fall towards the end of the quarter.**

Parts of FSM are expected to be wetter than normal in the next quarter. Specifically, rainfall is anticipated to be near normal for Yap and Chuuk and slightly above normal for Pohnpei and Kosrae. Palau and the CNMI are expected to receive near normal rainfall. For the RMI, Kwajalein is expected to receive near normal rainfall while Majuro is expected to receive slightly above normal rainfall. Rainfall for American Samoa and Hawaii is projected to be slightly above normal.

Near to above-normal tropical cyclone activity in the western North Pacific is expected to continue. In the southwest Pacific, TC activity is expected to be near-normal, with below-normal activity between Vanuatu and New Caledonia, eastward towards French Polynesia.

Regional Partners

Pacific ENSO Applications Climate Center: http://www.prh.noaa.gov/peac/

NOAA NWS Weather Forecast Office Honolulu: http://www.prh.noaa.gov/pr/hnl/

NOAA NWS Weather Forecast Office Guam: http://www.prh.noaa.gov/pr/guam/

NOAA NESDIS National Climatic Data Center: http://www.ncdc.noaa.gov/sotc/

NOAA NESDIS National Oceanic Data Center: http://www.nodc.noaa.gov/

NOAA NMFS Pacific Island Fisheries Science Center: http://www.pifsc.noaa.gov/

NOAA OceanWatch - Central Pacific: http://oceanwatch.pifsc.noaa.gov/

NOAA Coral Reef Watch: http://coralreefwatch.noaa.gov/

USGS Pacific Islands Water Science Center: http://hi.water.usgs.gov/

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

University of Guam - Water and Environmental Research Institute: http://www.weriguam.org/