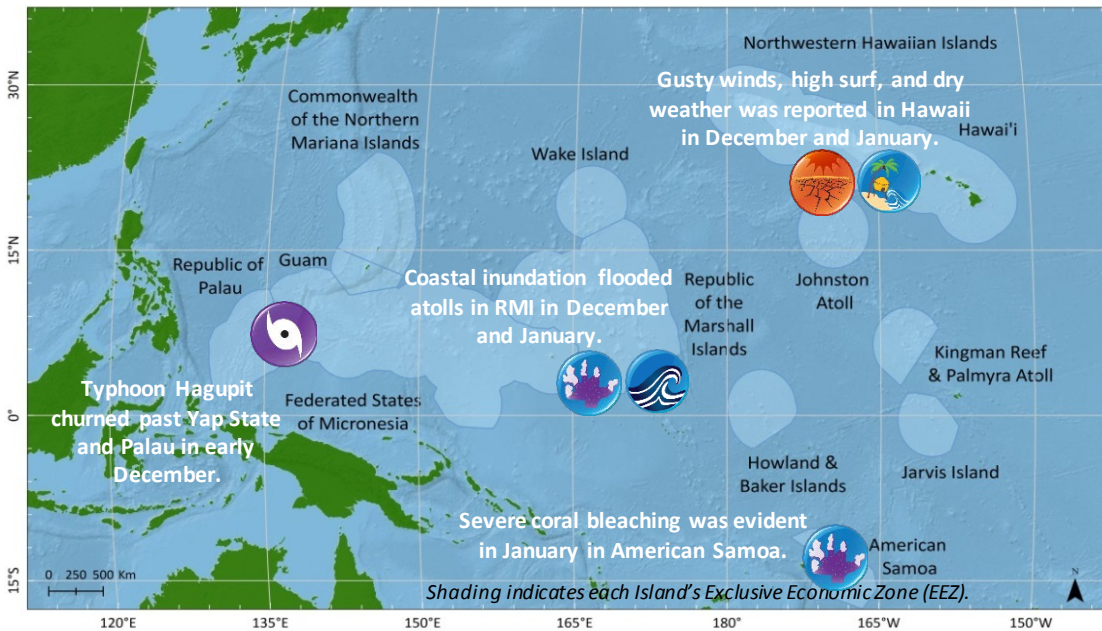


Climate Impacts and Outlook

Hawaii and U.S. Pacific Islands Region

1st Quarter 2015

Significant Events and Impacts for 4th Quarter 2014



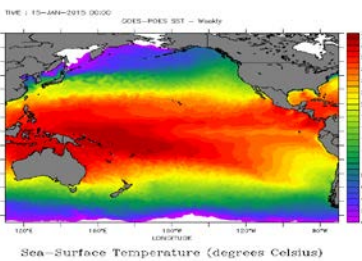
Above normal rainfall fell over American Samoa and parts of the Federated States of Micronesia.

Below normal rainfall fell in Hawaii and much of the Marshall Islands.

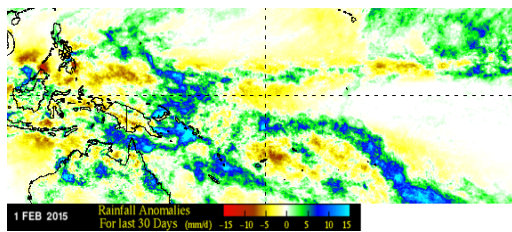
Sea-levels fell slightly across Palau, the Federated States of Micronesia, and the Republic of the Marshall Islands – supportive of a weak El Niño state.

Severe coral bleaching was documented in parts of the RMI and American Samoa.

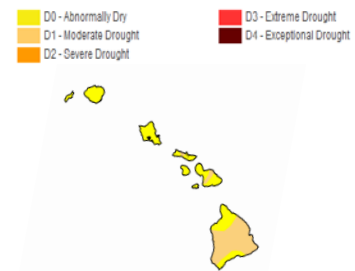
Regional Climate Overview for 4th Quarter 2014



Sea-Surface Temperatures, valid Jan 15, 2015.
Source: <http://oceanwatch.pifsc.noaa.gov>



Jan 2015 precipitation anomaly. Source:
http://trmm.gsfc.gov/trmm_rain/Events/thirty_day.htm



U.S. Drought Monitor for Hawaii, Feb 5, 2015.
Source: <http://www.drought.gov>

The region remains under an El Niño Watch, and weather patterns continued to resemble El Niño conditions during the quarter (e.g., above-average sea-surface temperatures, decadal -low sea levels, and dry weather across Hawaii). As of February 2nd, the Niño 3.4 region anomaly was +0.5°C, suggestive of ENSO neutral conditions.

Sea-surface temperatures were generally near-to-above normal across the equatorial Pacific, with the warmest anomalies exceeding 1.0°C near American Samoa and RMI. Sub-surface water temperature anomalies continue to be 1-2°C above normal across much of the equatorial Pacific, especially west of 140°W. Sea-levels hovered very close to their long-term normal but lower than levels seen over the last decade and are similar to levels from last quarter.

In Hawaii, rainfall was substantially below normal (41% of normal at Honolulu in January; only 30% at Hilo in January), placing all Hawaiian Islands in at least the early stages of drought. In Guam, rainfall was near normal as quarterly values were 95% of normal, while Saipan was 146% of normal. In Kwajalein and Majuro in the RMI, rainfall was 77% and 71% of normal. In the FSM, quarterly rainfall was highly variable: Chuuk (83%), Kosrae (75%), Pohnpei (97%), and Yap (115%). Further west, in Palau rainfall was 79% of normal. In American Samoa, rainfall was exceptionally high for the quarter (152%), as the monsoon trough drifted over the Samoan Island group in January.

Temperatures dropped and north winds increased behind a dry cold front that crossed the Hawaiian Islands in early January. Record cold temperatures were felt in Honolulu with 57°F reported on 7 January, breaking a 122-year-old record. Records were also set at the Lihue, Kahului, and Hilo airports as temperatures at all three sites dropped below 60°F.

Tropical Cyclone activity for November-January in the western North Pacific basin was above-normal with 5 named storms, including 2 Super Typhoons with peak wind speeds greater than 150 mph. In the South Pacific Ocean, the season is off to a slow start, with just 2 tropical cyclones forming. Niko formed in the far eastern portion of the basin which is more typical of stronger El Niño conditions. The two storms did not impact any U.S. Territories.

Sectoral Impacts for 4th Quarter 2014

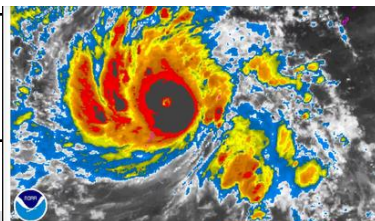
Water Resources – Water reservoirs in Majuro are currently at 75% capacity, while residential rain tanks in northern Chuuk were 50% full. Very heavy rains fell in American Samoa, closing public parks and forcing cruise ship cancellations due to the stormy weather. Meanwhile, dry weather in Hawaii had reduced the water volume in Rainbow Falls on the Big Island.

Coastal Hazards – There were several minor inundation events in Majuro, RMI and Lukunoch Island in Chuuk last quarter, pushing water, sand, and debris over roads and into residential yards, while a moderate inundation event hit Mejit Island on 21 January. Typhoon Hagupit passed near Yap State and the Republic of Palau in early December, bringing heavy rains, storm surge and flash flooding to coastal areas.

Facilities and Infrastructure – A pair of cold fronts passed Oahu in late December and early January, which were preceded by strong winds. Acceleration of the wind on the lee of the Koolau mountains caused gusts to near 50 mph producing damage to roofs and trees. In late January, high westerly swell affected the Hawaiian Islands, with wave run-up causing damage to a pier in Kawaihae harbor and toppling a lifeguard tower in Hapuna.

Natural Resources – The transition zone chlorophyll front, responsible for an increase in marine fauna, is well underway in its seasonal migration from north to south towards the Northwest Hawaiian Islands. Meanwhile, in the South Pacific, Coral Reef Watch's near-real-time satellite monitoring shows thermal stresses have spread from Nauru south towards American Samoa. In addition, coral bleaching was documented in the Marshall Islands in early December.

Infrared satellite image of Typhoon Hagupit as it passed over Yap and Palau.

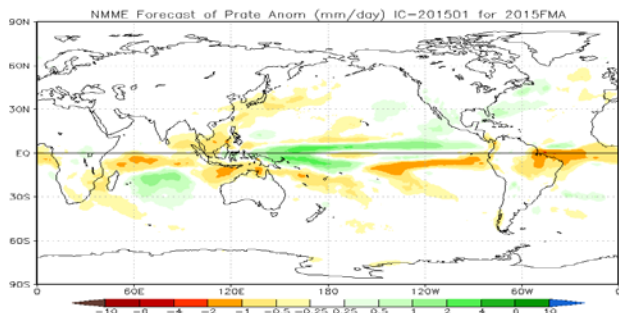


Flooding in Majuro, Marshall Islands, from high wave events in December. Photo courtesy of Karl Fellenius, Hawaii Sea Grant.



Bleached corals on American Samoa. Photo courtesy of Wendy Cover, NOAA.

Regional Outlook for 1st Quarter 2015 (Feb-Apr)



Precipitation Anomaly Forecast, Valid Feb-Apr. Source: <http://www.cpc.ncep.noaa.gov/products/NMME/seasanom.shtml>

The latest climate model consensus continues to suggest a 60% chance of El Niño developing over the February-April period.

The SST anomaly outlook for the 1st quarter indicates near-normal values in CNMI, Palau, and the FSM, but above-normal temperatures in the southern Marshall Islands and east through the southern Hawaiian Islands. High values of **coral bleaching thermal stress are forecast to continue to increase** throughout the waters around American Samoa.

The forecast values for sea level in the 1st quarter indicate that **most of the USAPI stations in the north and south Pacific regions are likely to stay near current levels.** Sea-levels at Honolulu and Hilo are likely to be slightly elevated, but generally near normal.

Rainfall is anticipated to be near-normal for CNMI, Palau, Chuuk, Pohnpei, Kosrae, and Majuro. Yap is expected to receive near to below normal rainfall. Rainfall for American Samoa is projected to be above normal, while **the northern Marshall Islands may be headed towards significantly drier than normal conditions.** The Hawaiian Islands are all projected to be drier than normal with worsening drought conditions through April.

Tropical cyclone activity in the western Pacific is expected to be quiet, which is normal for the cooler seasonal months. **There is a slightly elevated risk of a tropical cyclone in American Samoa**, consistent with borderline El Niño conditions. In the southwest Pacific, the outlook for the last half of the season is for the possibility of 6-8 more tropical cyclones, with perhaps at least one of these attaining Australian category 5 intensity.

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/>

USGS Science Center – Pacific Coastal and Marine Science Center: <http://walrus.wr.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/>