

Climate Indicators Summary

October 2018

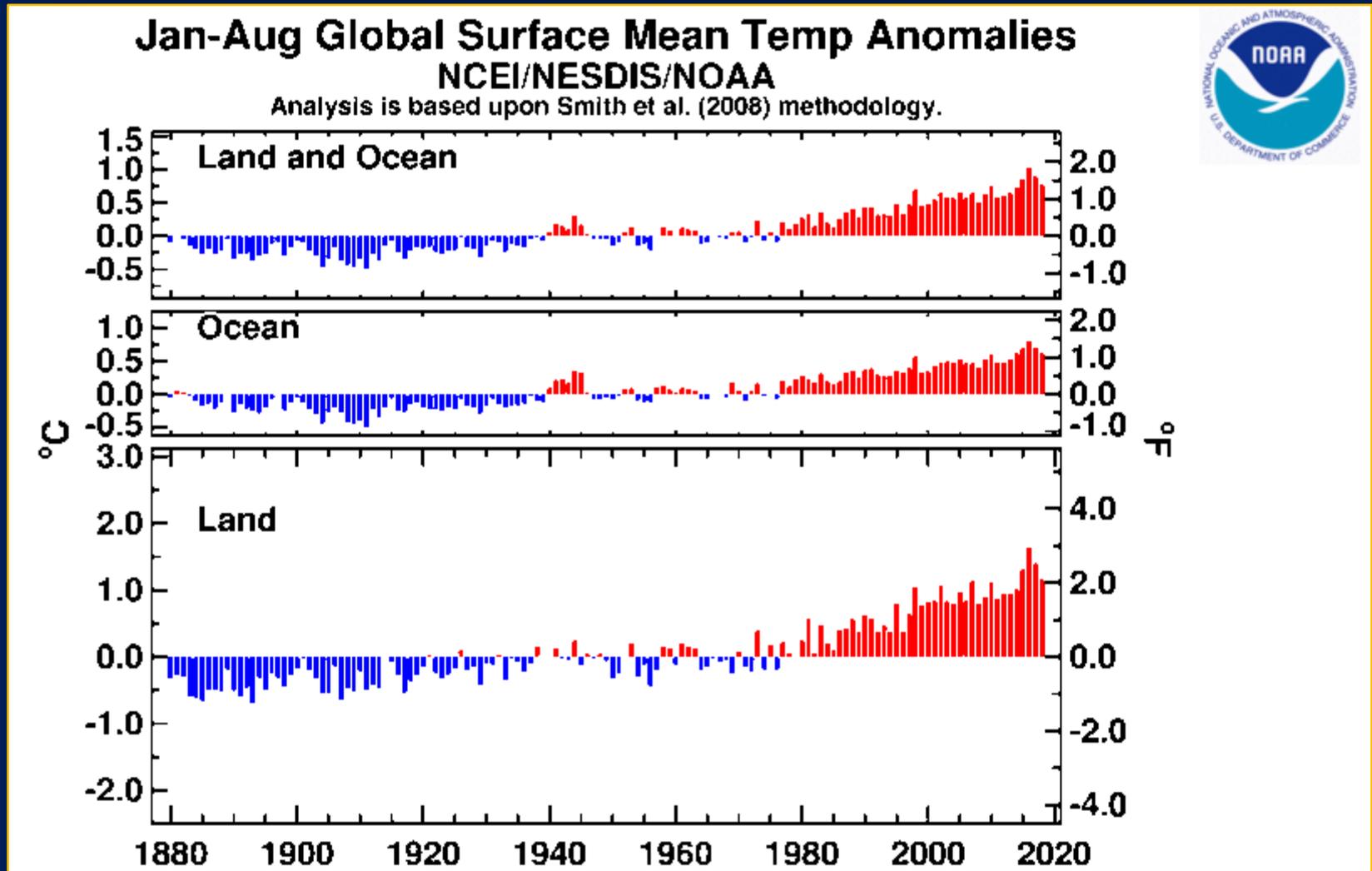
PMNM Climate Change Working Group

Dan A. Polhemus

U. S. Fish & Wildlife Service

Honolulu, HI

2018 shows a slight abatement from record heating trends

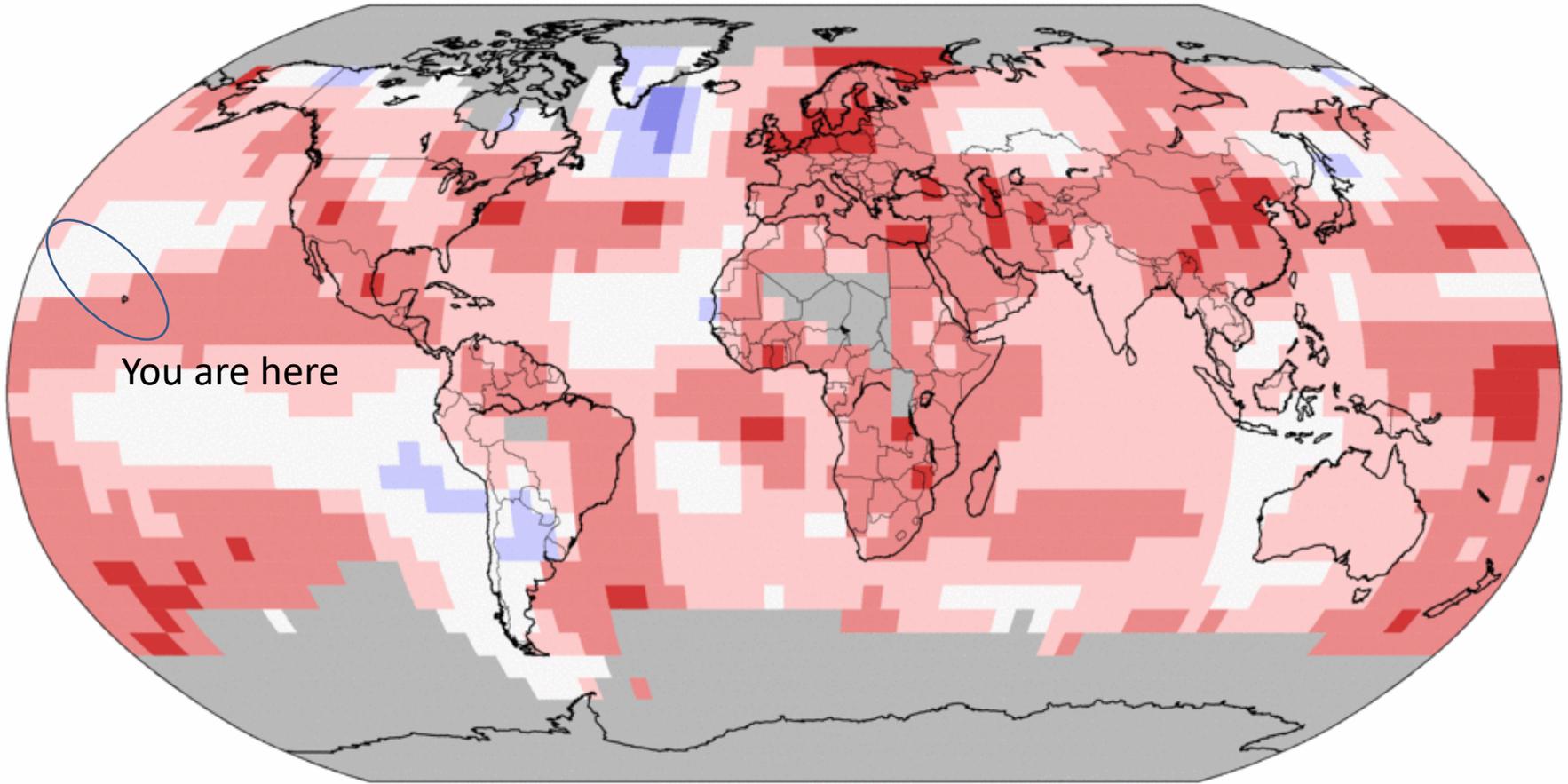


Only the 4th hottest year on record so far

Land & Ocean Temperature Percentiles Jun 2018–Aug 2018

NOAA's National Centers for Environmental Information

Data Source: GHCN-M version 3.3.0 & ERSST version 4.0.0



You are here



Record Coldest



Much Cooler than Average



Cooler than Average



Near Average



Warmer than Average



Much Warmer than Average

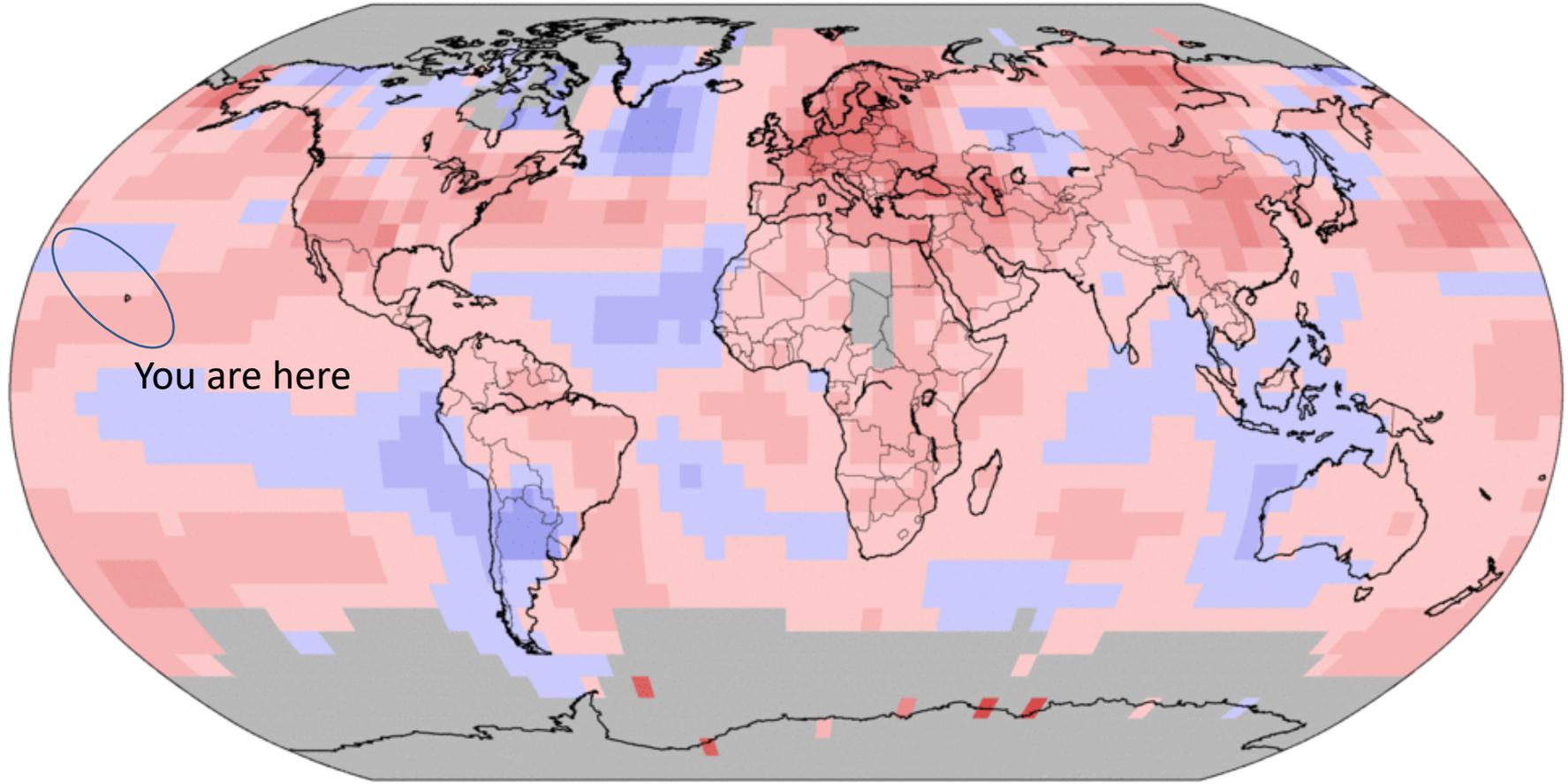


Record Warmest



Land & Ocean Temperature Departure from Average Jun 2018–Aug 2018 (with respect to a 1981–2010 base period)

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0



National Centers for Environmental Information
Thu Sep 13 04:19:57 EDT 2018

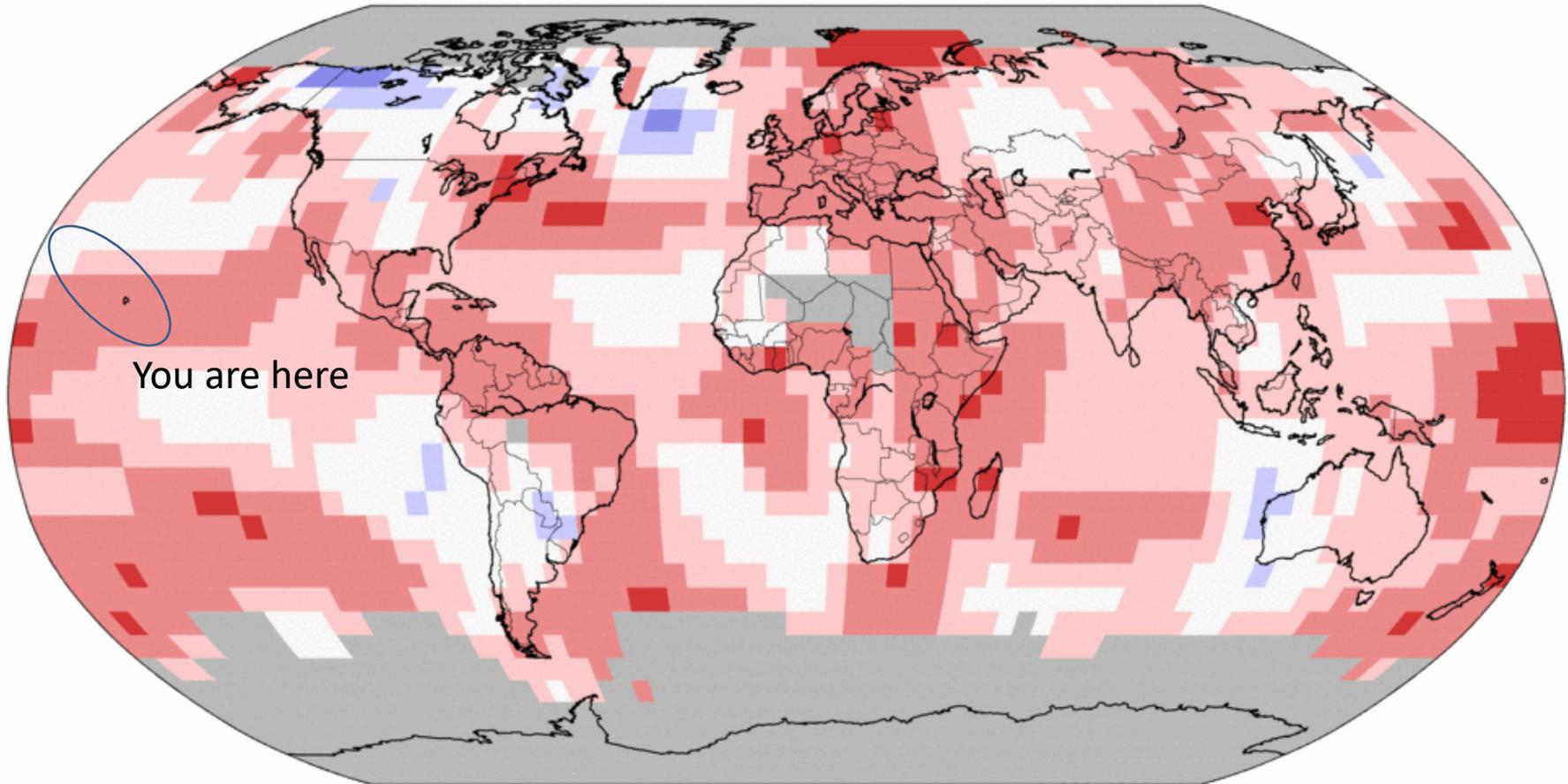
Degrees Celsius

Please Note: Gray areas represent missing data
Map Projection: Robinson

Land & Ocean Temperature Percentiles Aug 2018

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Data Source: GHCN-M version 3.3.0 & ERSST version 4.0.0



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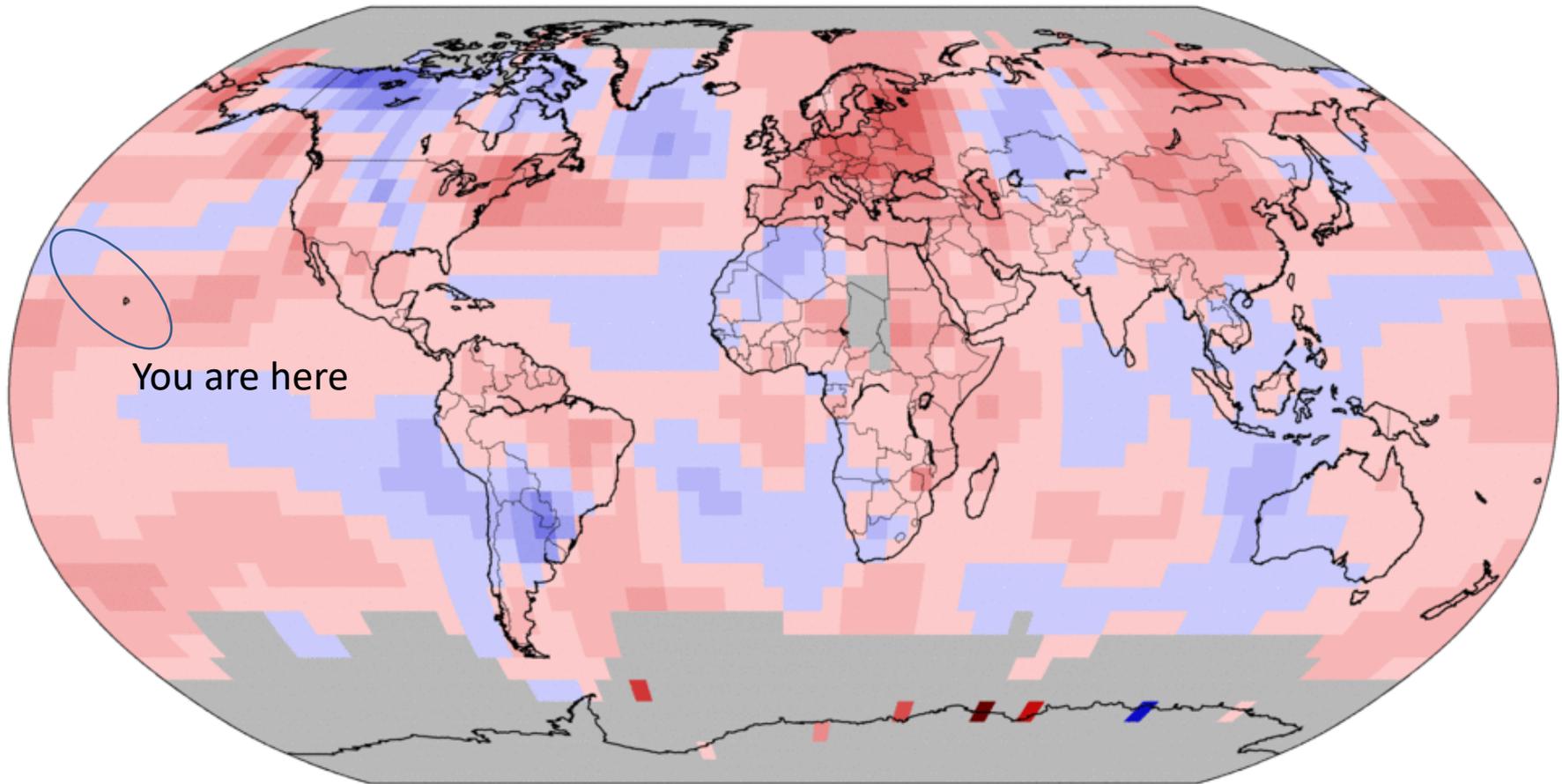


Record Warmest



Land & Ocean Temperature Departure from Average Aug 2018 (with respect to a 1981–2010 base period)

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0



-5 -4 -3 -2 -1 0 1 2 3 4 5

Degrees Celsius



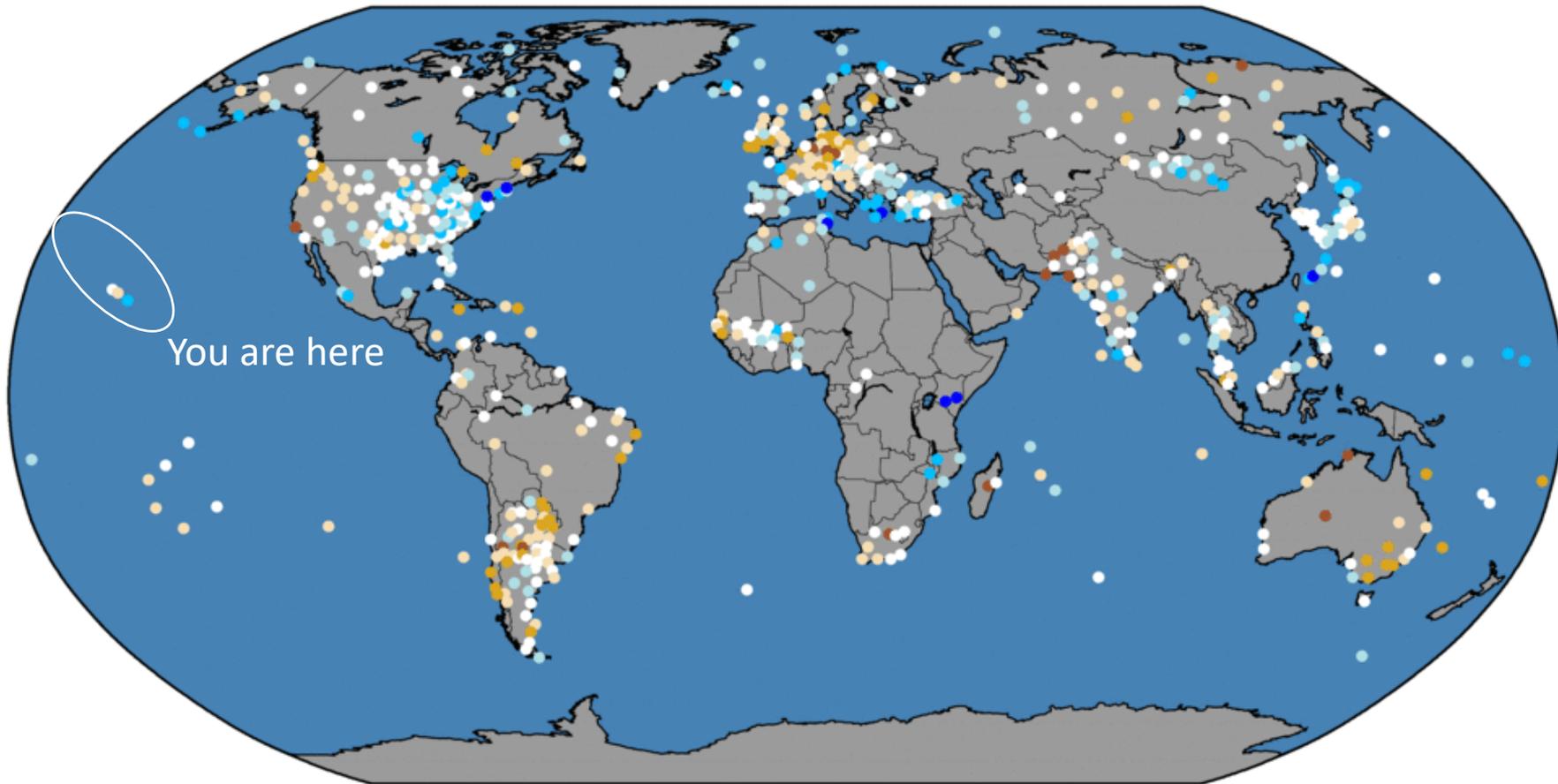
National Centers for Environmental Information
Thu Sep 13 04:19:57 EDT 2018

Please Note: Gray areas represent missing data
Map Projection: Robinson

Land-Only Precipitation Percentiles Jun 2018–Aug 2018

NOAA's National Centers for Environmental Information

Data Source: GHCN-M version 2



Record Driest



Much Drier than Average



Drier than Average



Near Average



Wetter than Average



Much Wetter than Average

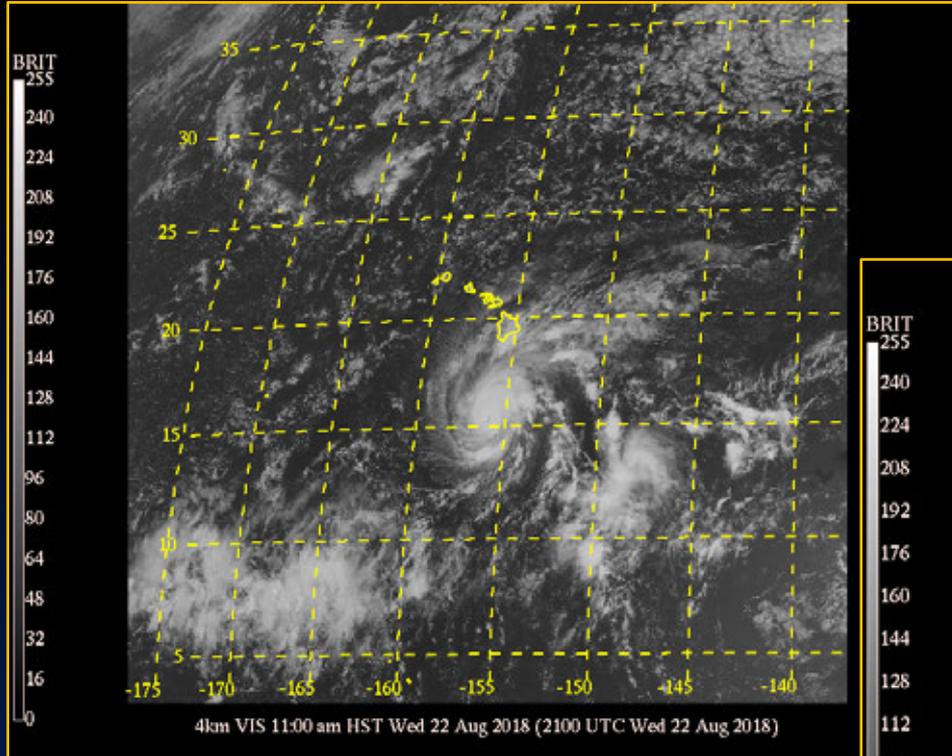


Record Wettest

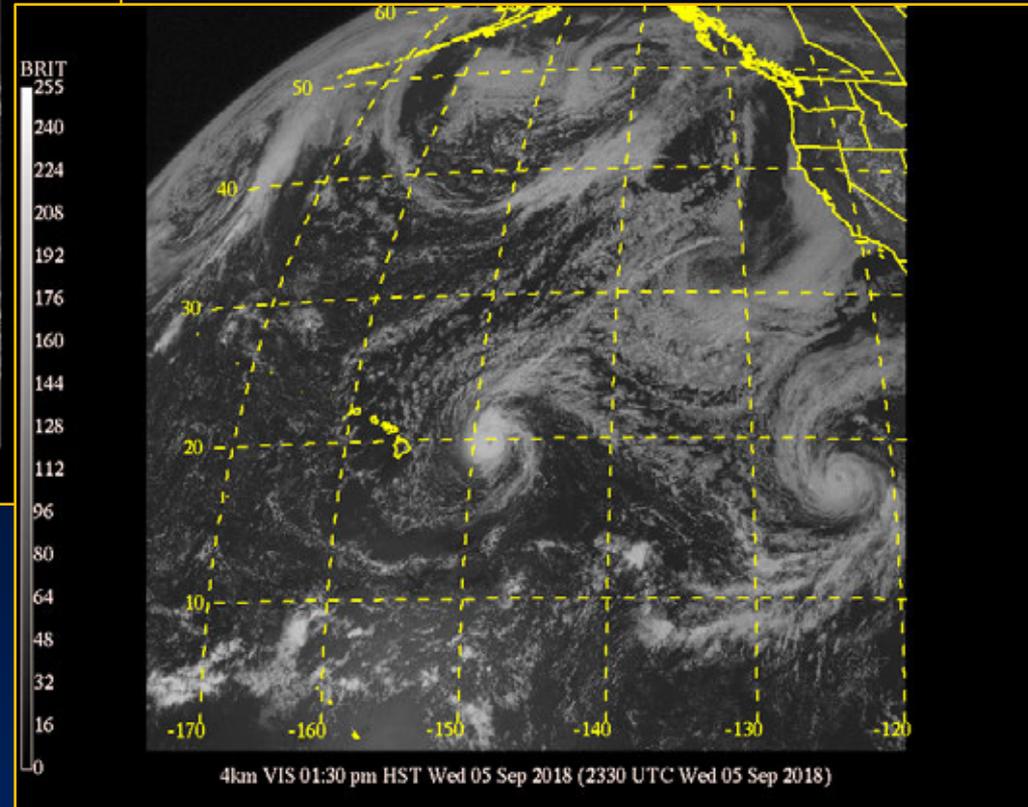


Digression #1 – The current summer looks a lot like an El Nino year

A spate of cyclogenesis occurred from August onward in the Eastern Pacific



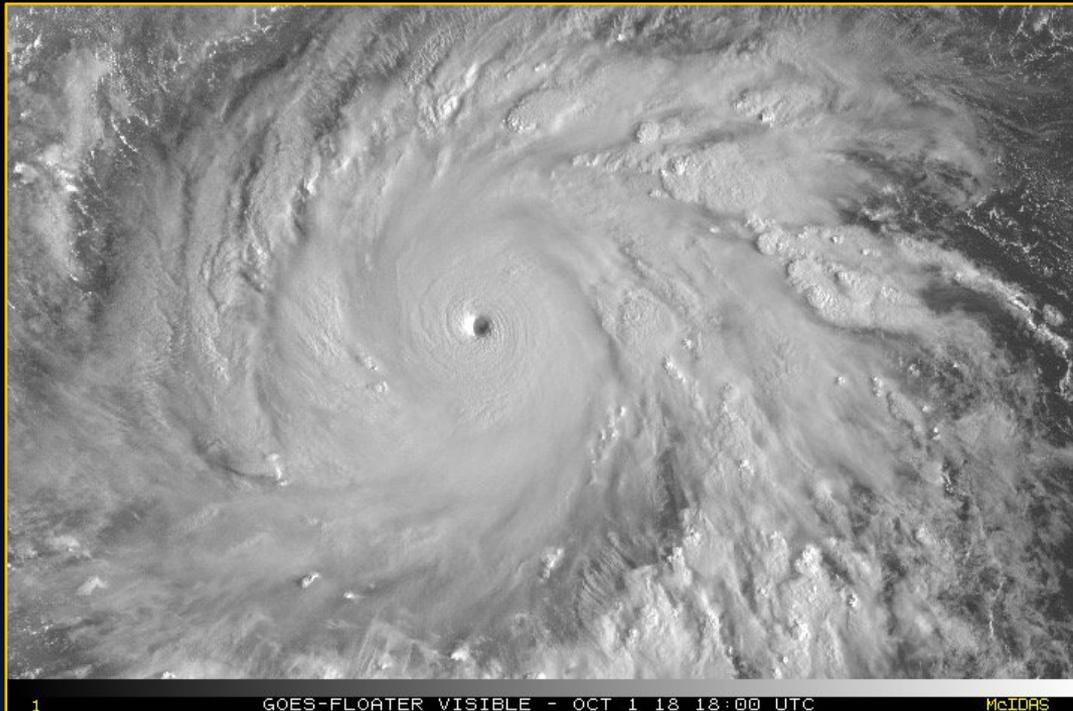
Hurricane Lane, 22 August 2018



Hurricanes Norman and Olivia, 5 September 2018

Hurricane Walaka passed through the Monument a week ago

Tracked close to Johnston Atoll, then through the French Frigate Shoals sector on 3 October 2018
Although the system was weakening, winds may have been near 120 knots (138 mph)

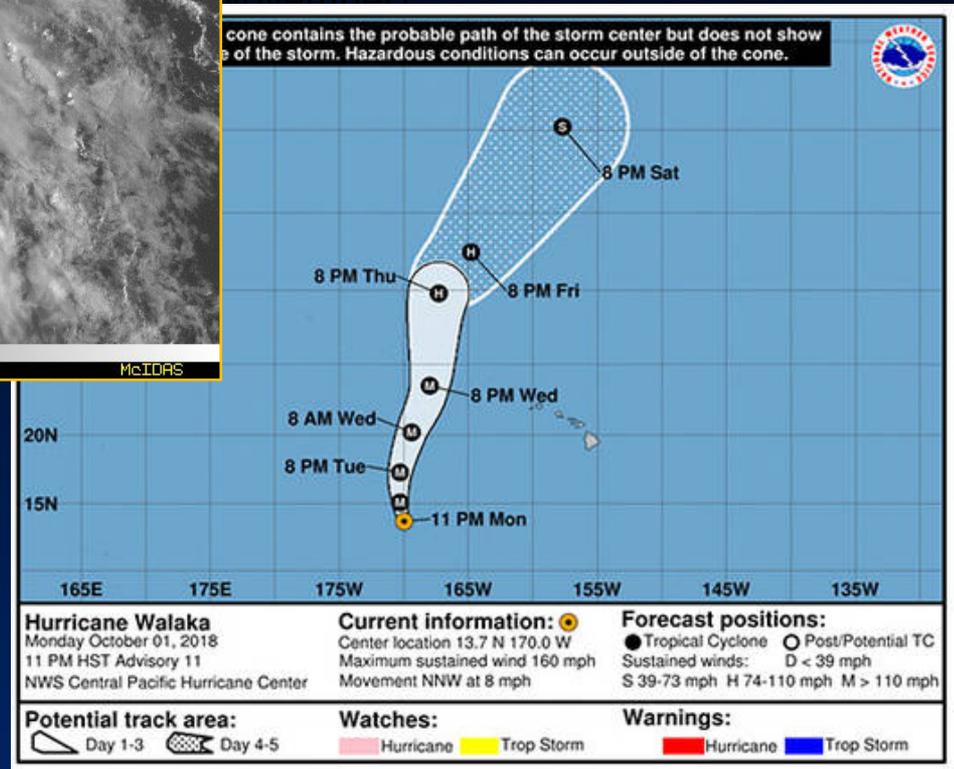


No instrumentation at FFS

No impact assessment currently available

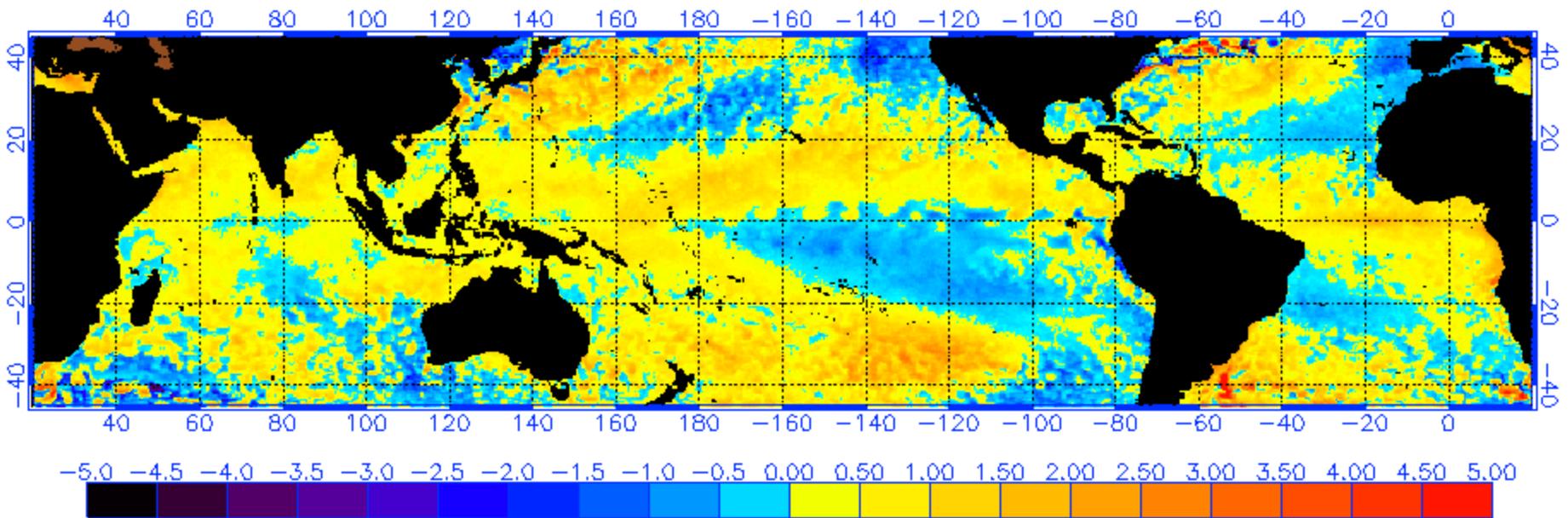
... temperatures
... November!

... cone contains the probable path of the storm center but does not show
... of the storm. Hazardous conditions can occur outside of the cone.



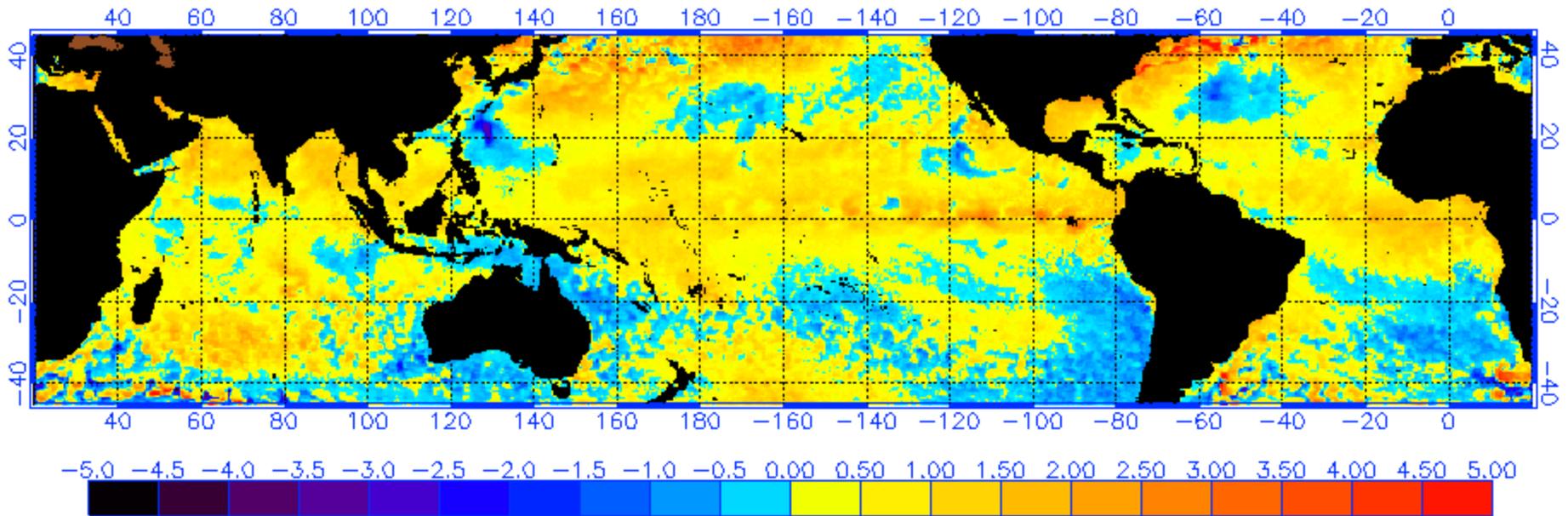
Global Sea Surface Temperature Anomaly – 7 May 2018

NOAA/NESDIS SST Anomaly (degrees C), 5/7/2018



Global Sea Surface Temperature Anomaly – 8 October 2018

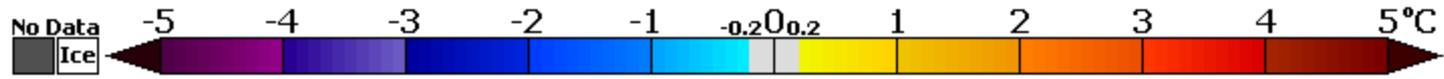
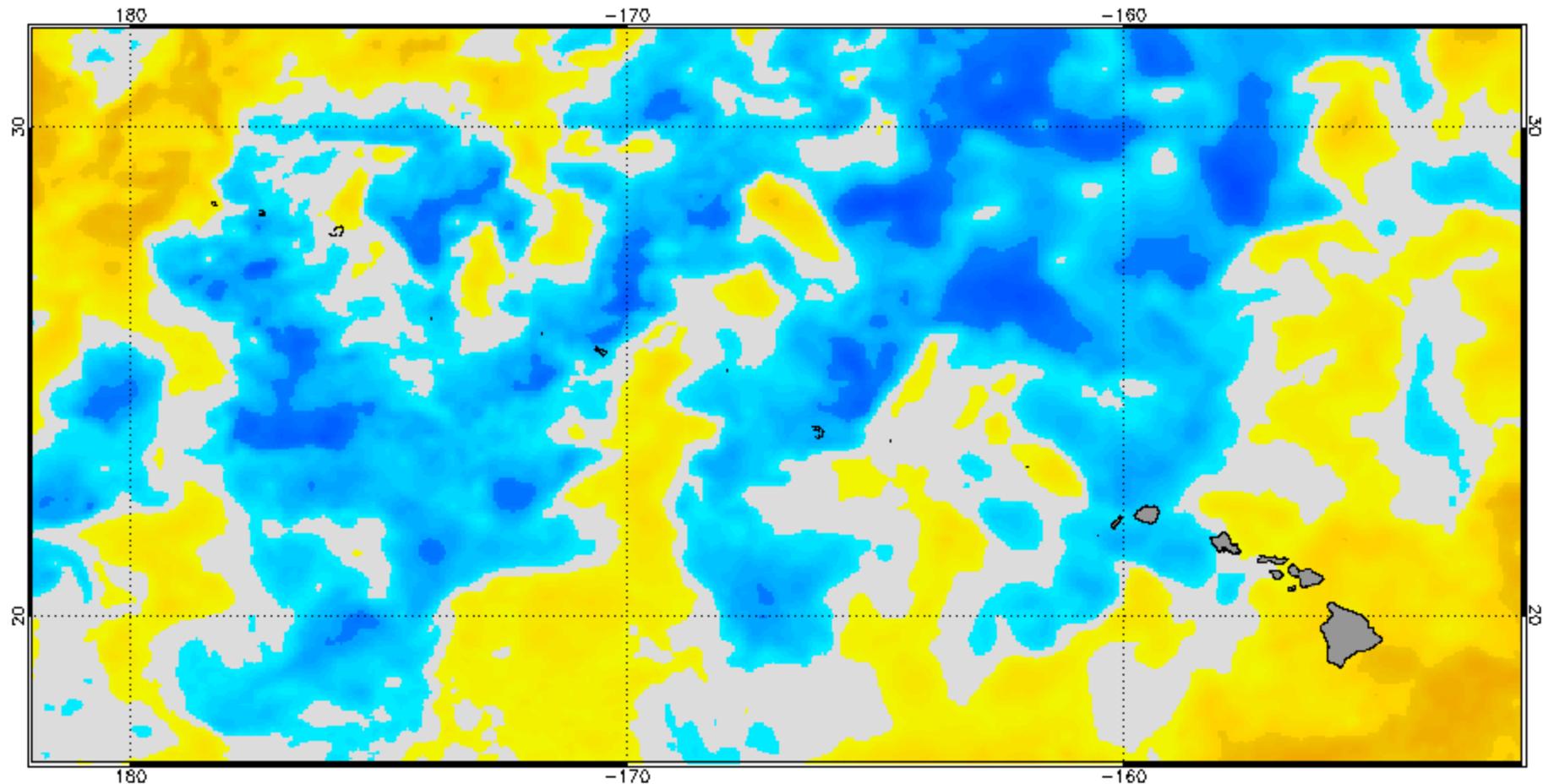
NOAA/NESDIS SST Anomaly (degrees C), 10/8/2018



Sea Surface Temperature Anomaly, Hawaii Sector – 7 May 2018

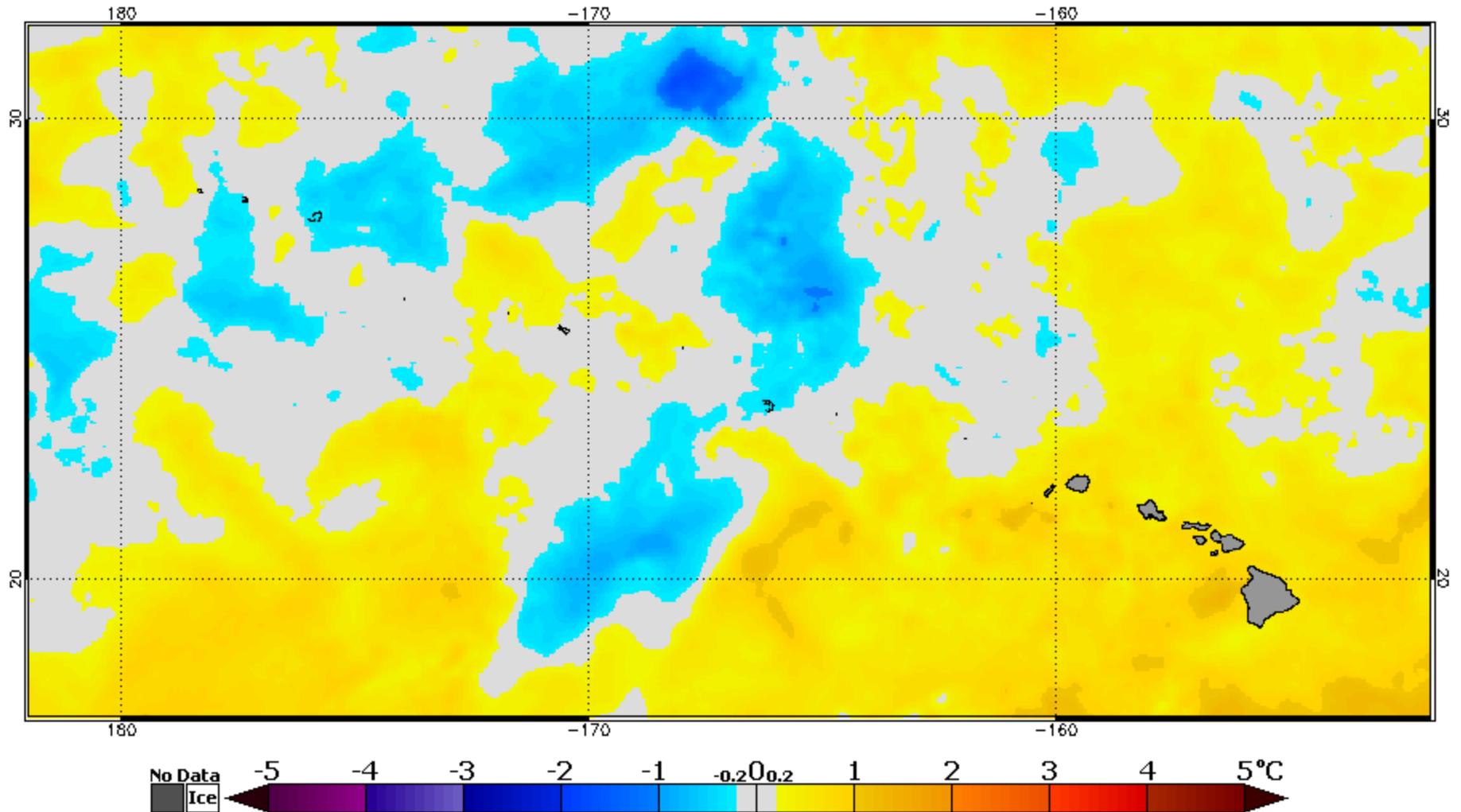
NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3)

8 May 2018



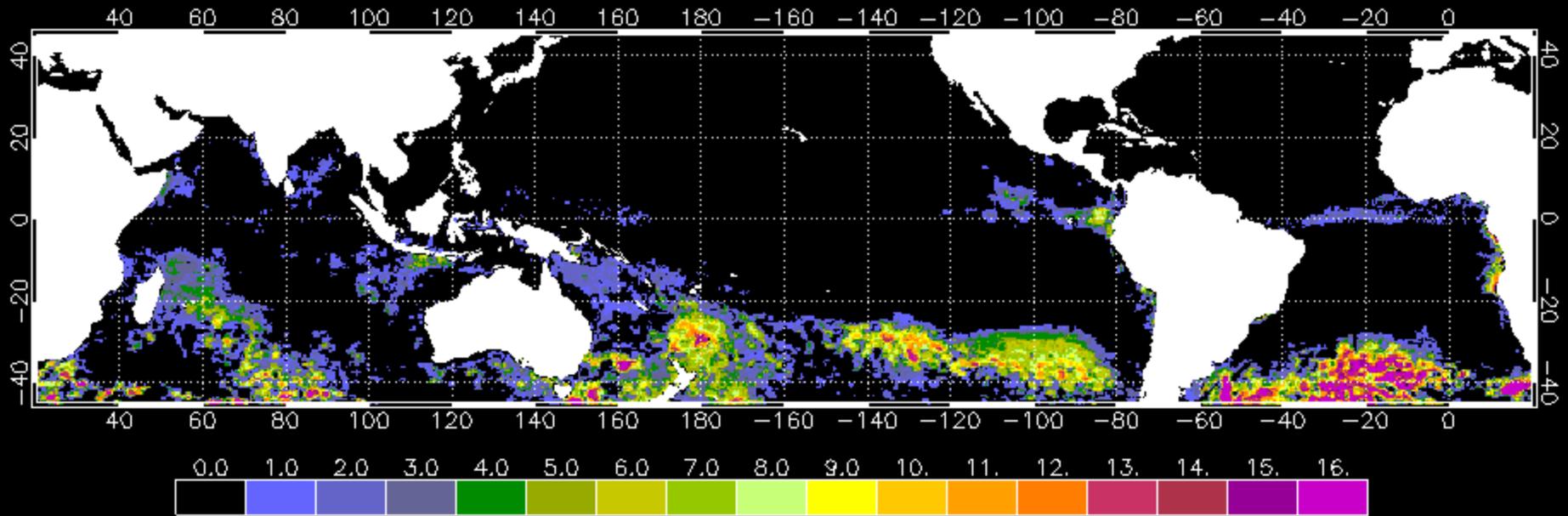
Sea Surface Temperature Anomaly, Hawaii Sector – 19 Oct. 2018

NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 9 Oct 2018



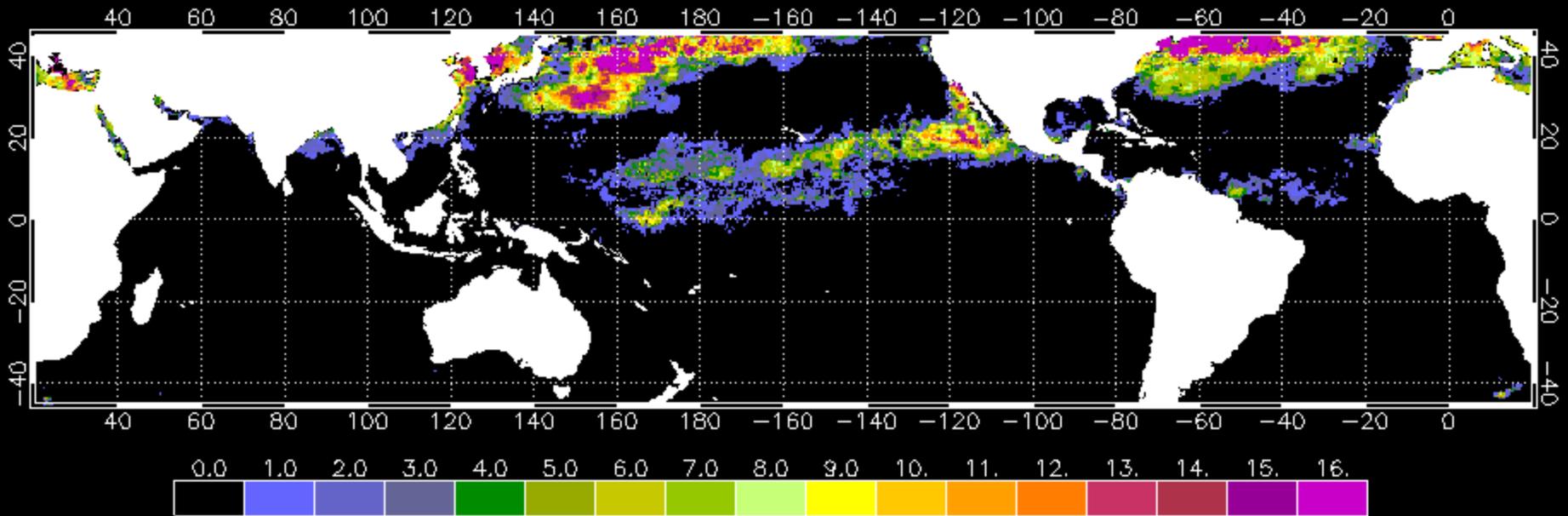
Degree Heating Weeks – 7 May 2018

NOAA/NESDIS Degree Heating Weeks for last 12 Weeks – 5/7/2018



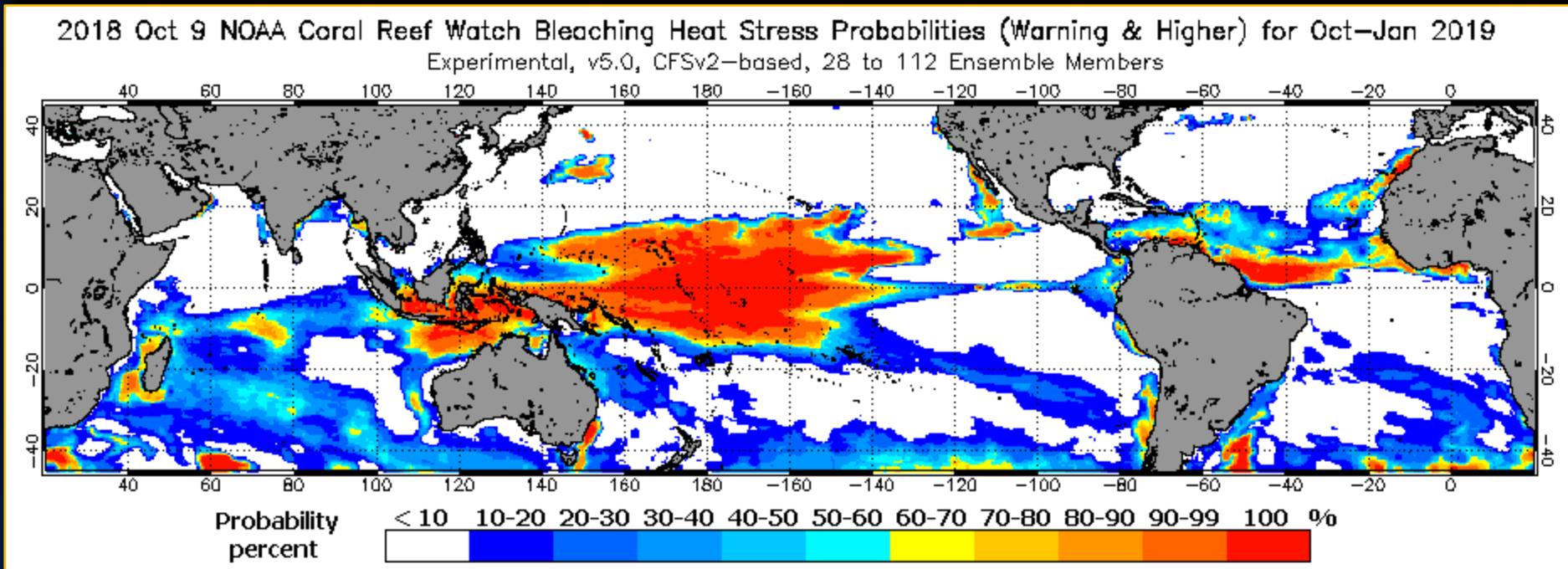
Degree Heating Weeks – 8 October 2018

NOAA/NESDIS Degree Heating Weeks for last 12 Weeks – 10/8/2018



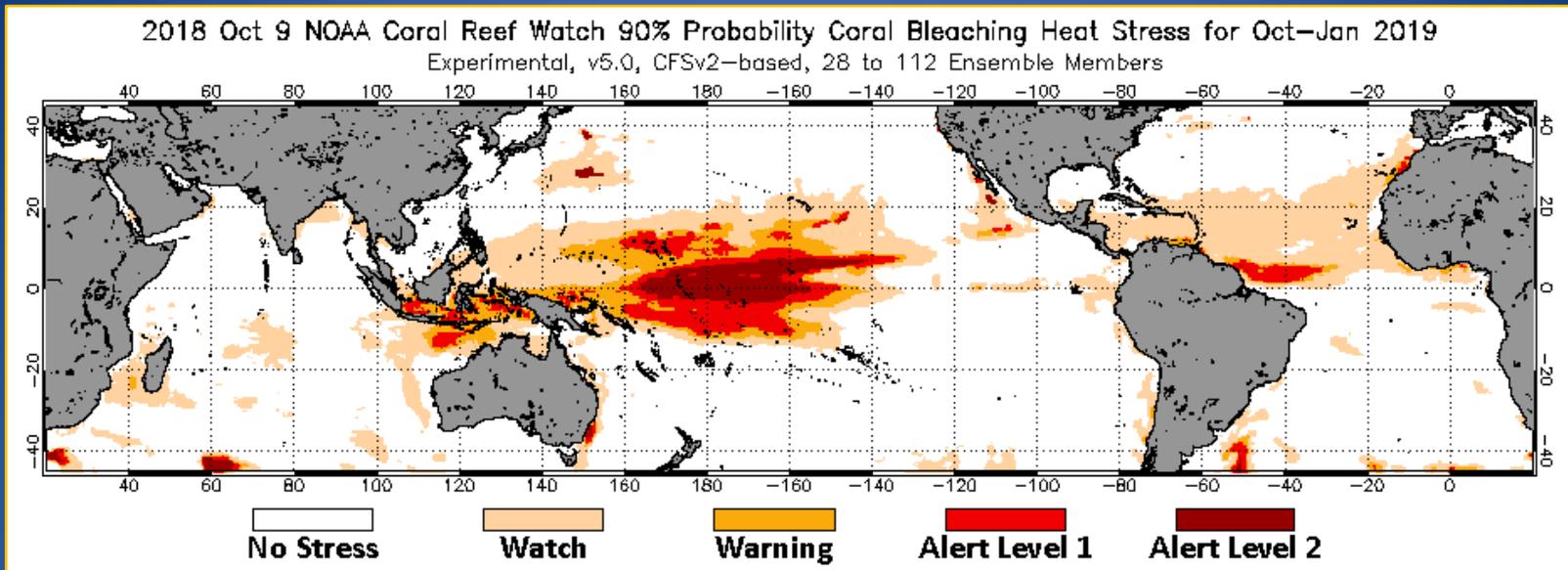
Bleaching Stress Probability – October 2018-January 2019

Prediction as of 9 October 2018

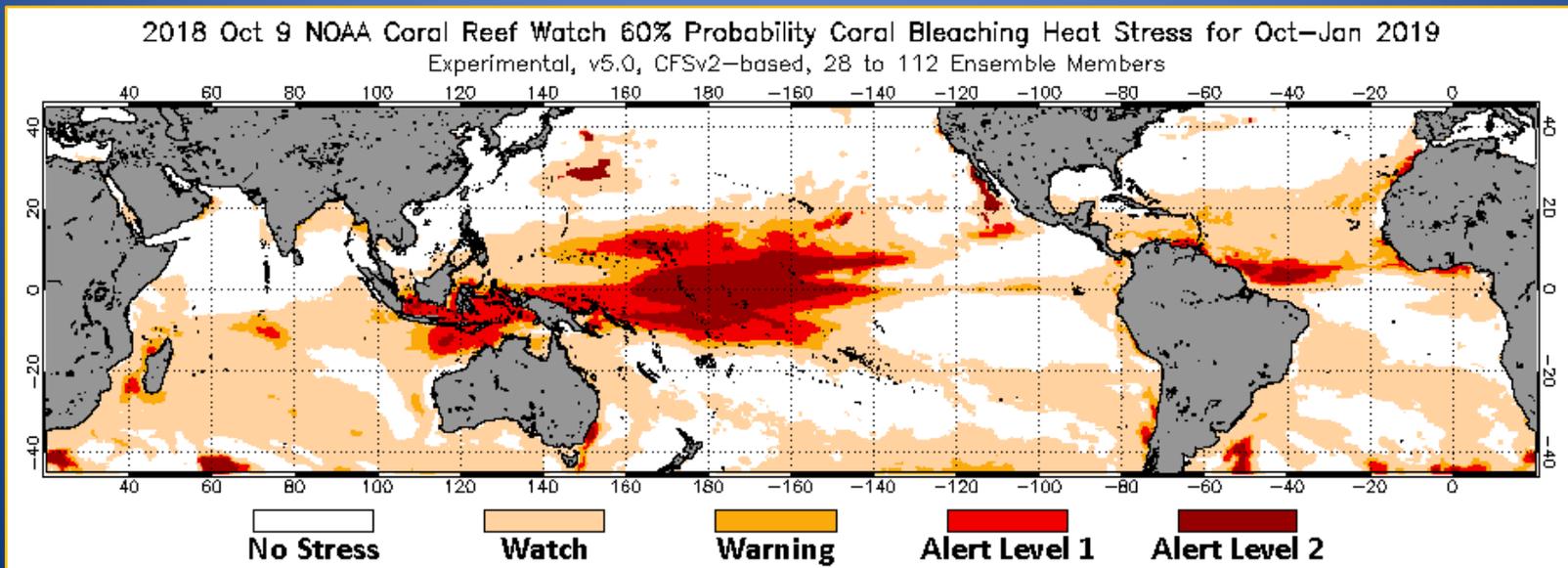


Experimental product indicates near zero probability of significant thermal stress for Monument reefs from now through January 2019

90% Stress Level Probability – October 2018-January 2019



60% Stress Level Probability - October 2018-January 2019



Digression #2 – A warmer atmosphere holds more water

Hurricane Lane was the second-wettest tropical cyclone in U. S. History
The wettest ever was Hurricane Harvey in Texas – just last year



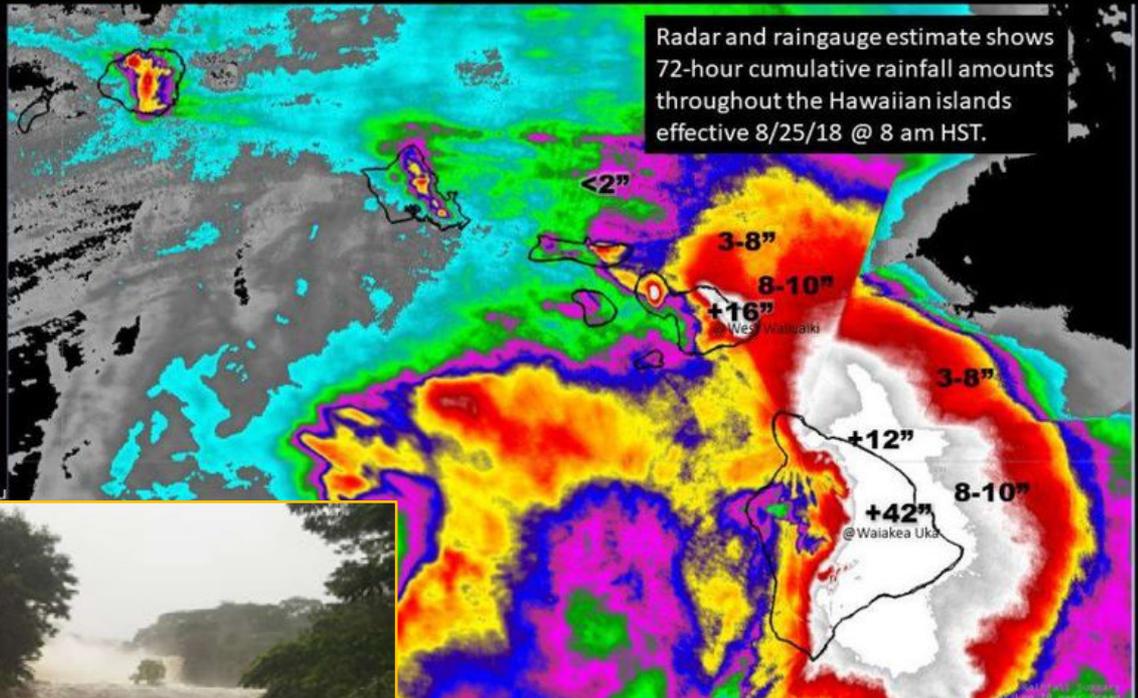
72 Hour Rainfall totals from Hurricane Lane

National
Weather Service
Honolulu

August 25th, 2018
issued at 11am HST

@NWSHonolulu

facebook.com/NWSHonolulu

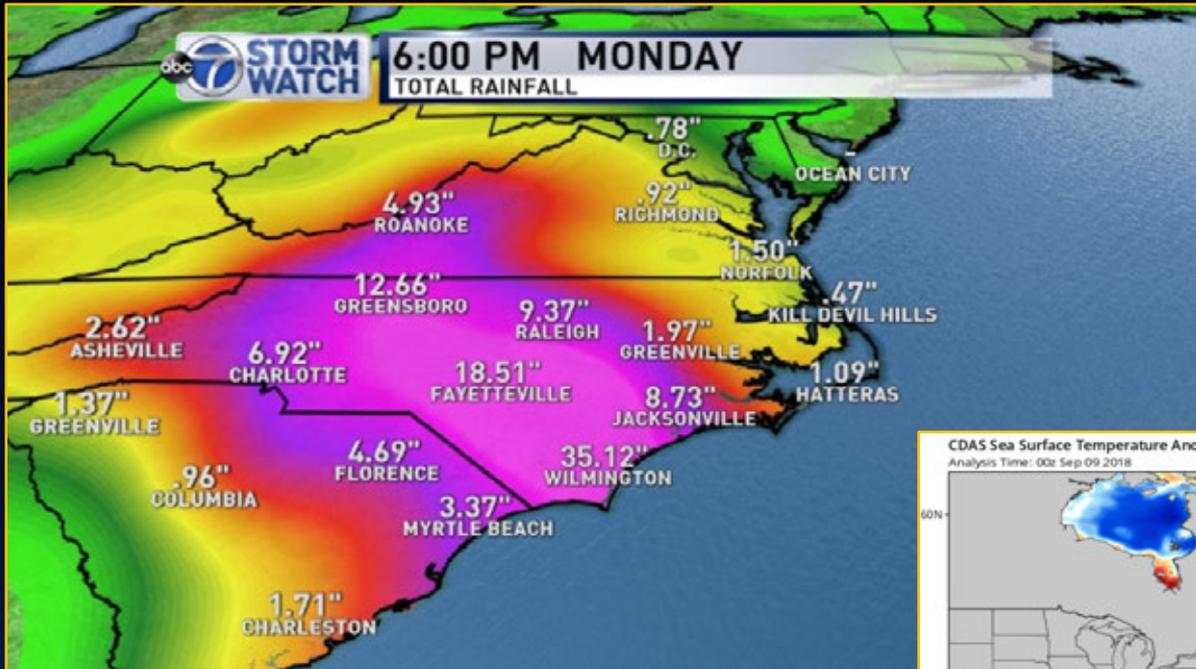


Storm total of 52 inches of rain
in Mountain View on Big Island

Rainbow Falls at Hilo – before and after

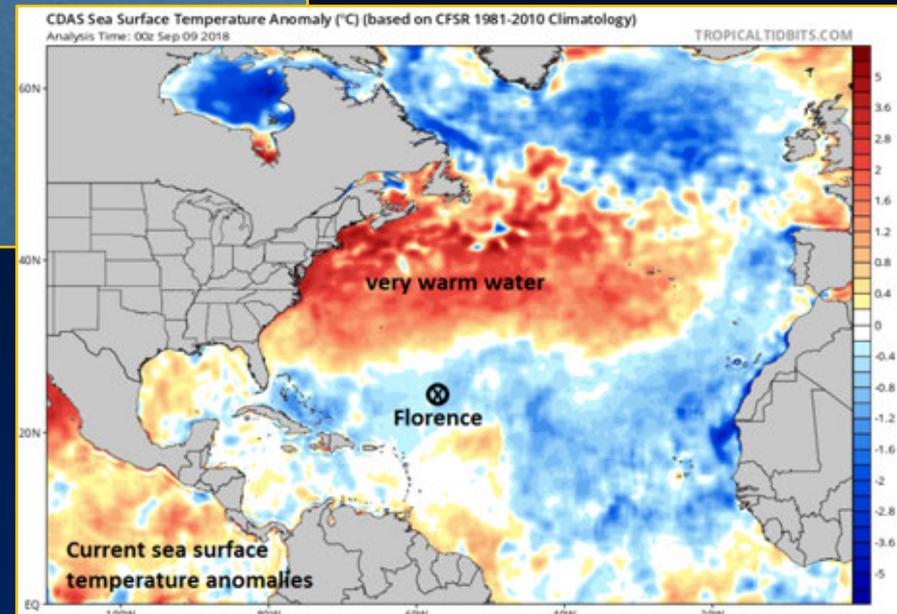
The Carolinas were wet as well

Hurricane Florence dumped enough rain on the Carolinas to fill Chesapeake Bay
Pacific and Atlantic hurricane seasons are no longer alternating in intensity
- a warm Atlantic now drives its own cycle



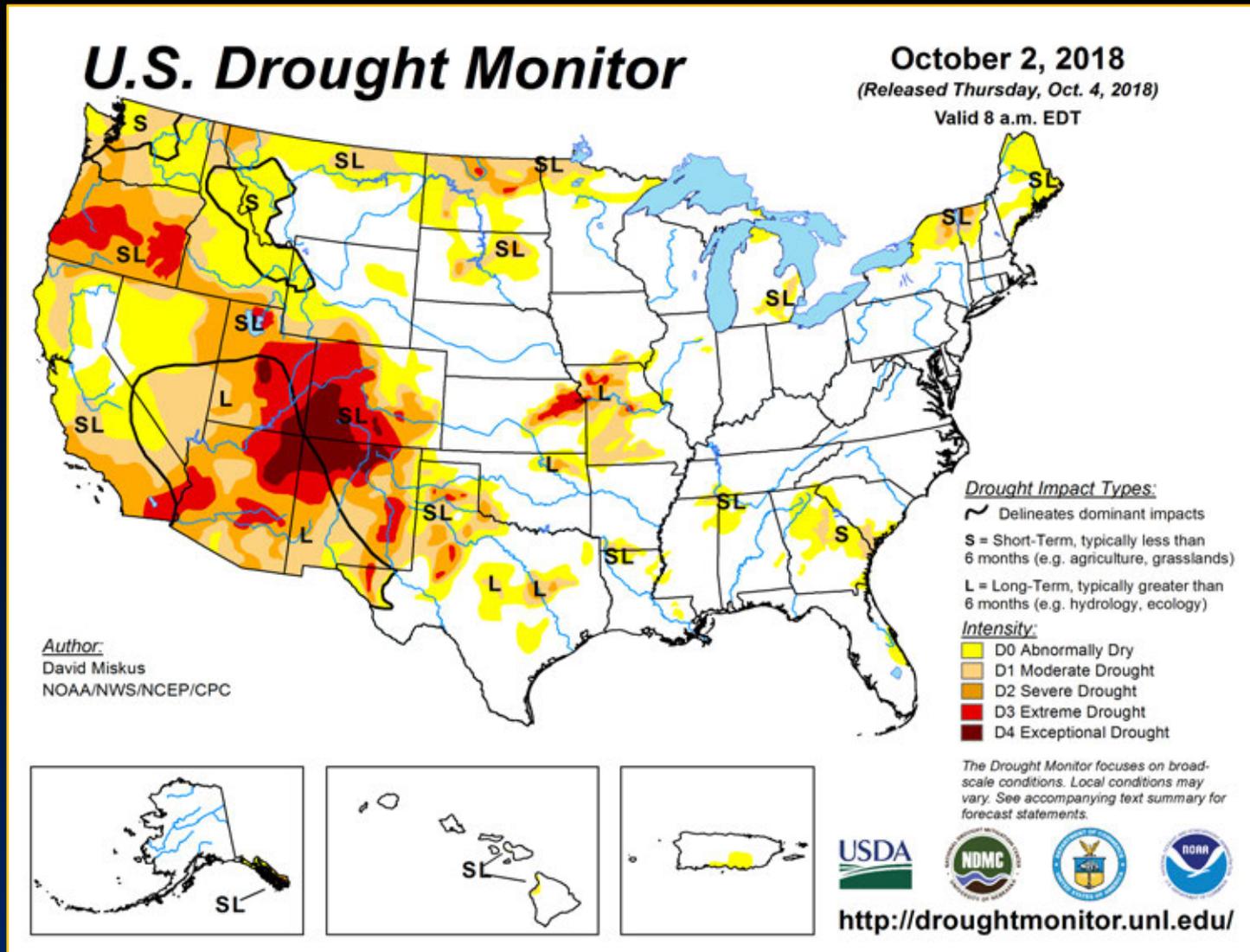
Wilmington, North Carolina ended up with a storm total of 35.12 inches of rain

This has enormous impacts in a continental setting



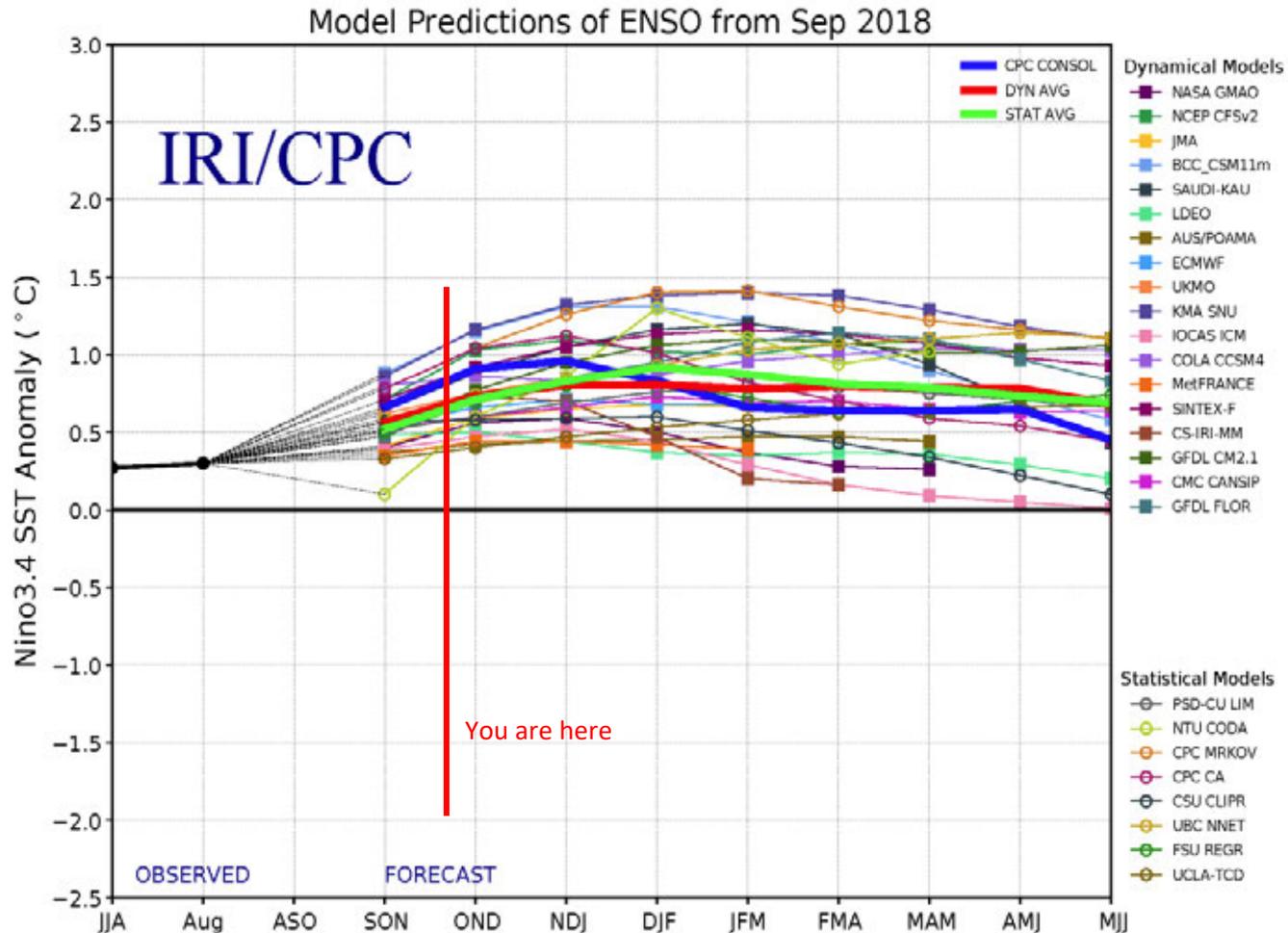
Digression #3 - it is not wet everywhere: the American West is very dry

On the Colorado River, Lake Mead is only 38% full, and Lake Powell is only 45% full
The Colorado River basin has now been in some form of drought for 20 years



Looking Forward

An ensemble of 25 climate models predicts moderate El Niño conditions going into winter 2019



Conclusions

2018 has shown some abatement from the recent trend of record hot years

The ocean surrounding Hawaii is not carrying the same amount of heat as in 2017

ENSO-neutral conditions currently prevail, but may change to El Niño by fall

65-70% chance of El Niño development this winter

Recent local cyclogenesis is consistent with El Niño development

This could produce drier than average winter conditions in the Monument

There is a near zero chance of significant thermal stress to the Monument's coral reefs from now through early 2019

Ocean heating is instead occurring to the south of us, in the Central Pacific

Local cyclogenesis occurred in the Eastern Pacific from August onward

Hurricane Walaka passed directly through the Monument near FFS as a Category 3 hurricane with winds potentially in excess of 130 mph

Sea level continues to rise at 3-5 mm per year

Inundation is a long-term problem that will not go away, and may increase over time depending on rates of ice sheet melt in Greenland and Antarctica

Questions?

