

Climate Indicators Summary

October 2017

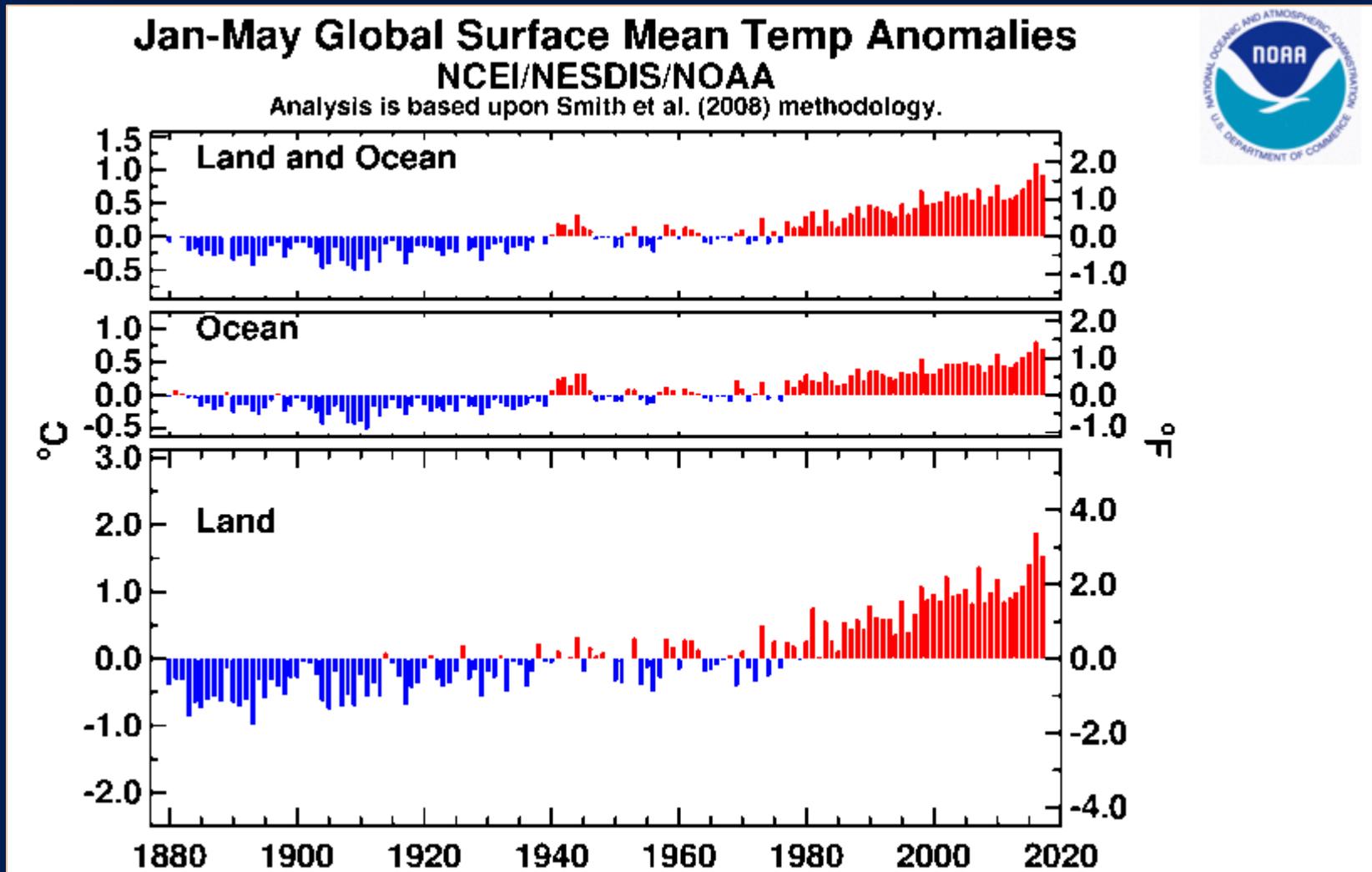
PMNM Climate Change Working Group

Dan A. Polhemus

U. S. Fish & Wildlife Service

Honolulu, HI

Good news - 2017 has shown some slight moderation from the successive record hot years of 2015 and 2016

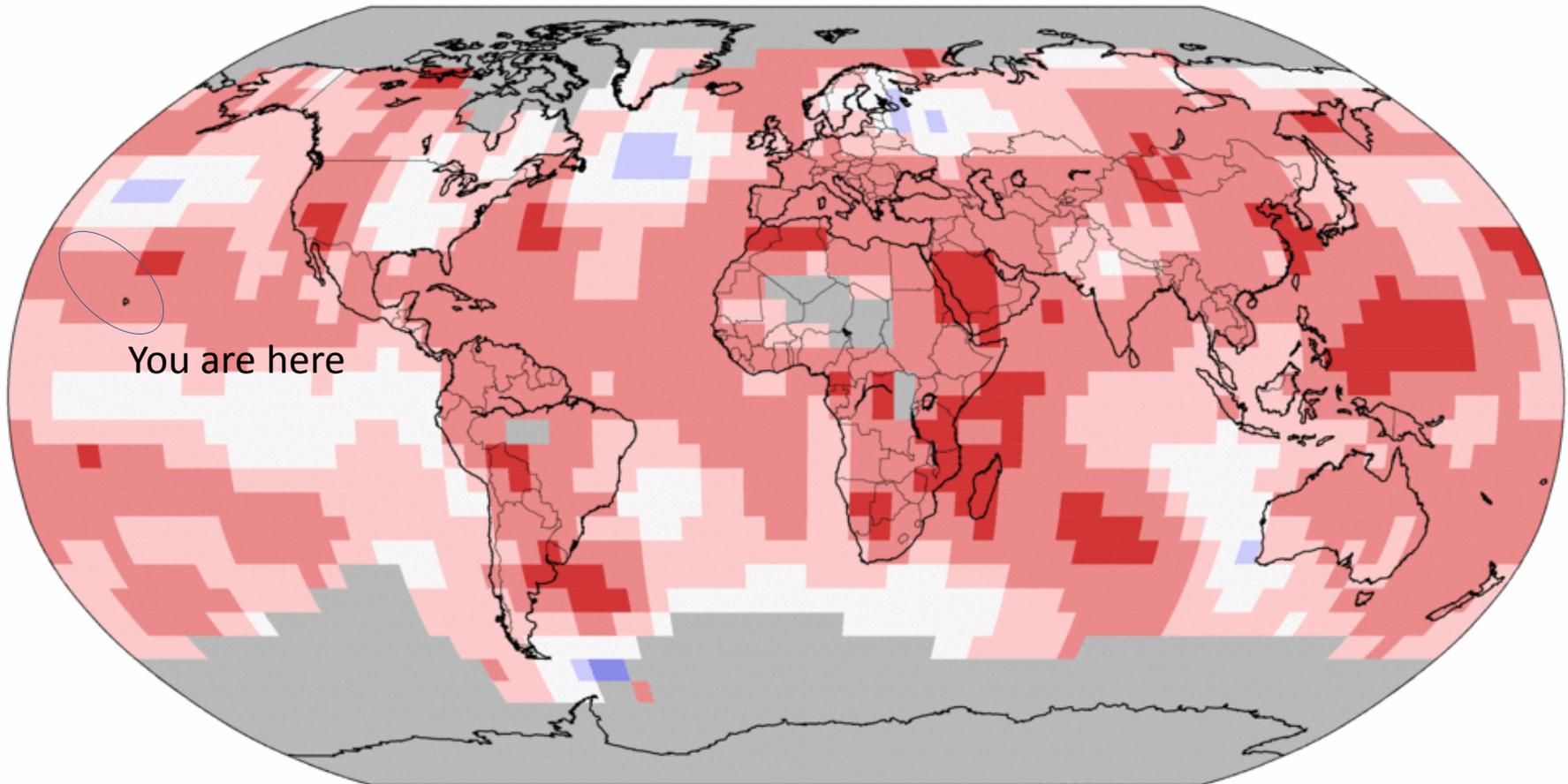


Bad news – this is still the second-hottest year ever recorded

Land & Ocean Temperature Percentiles Jun 2017–Aug 2017

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

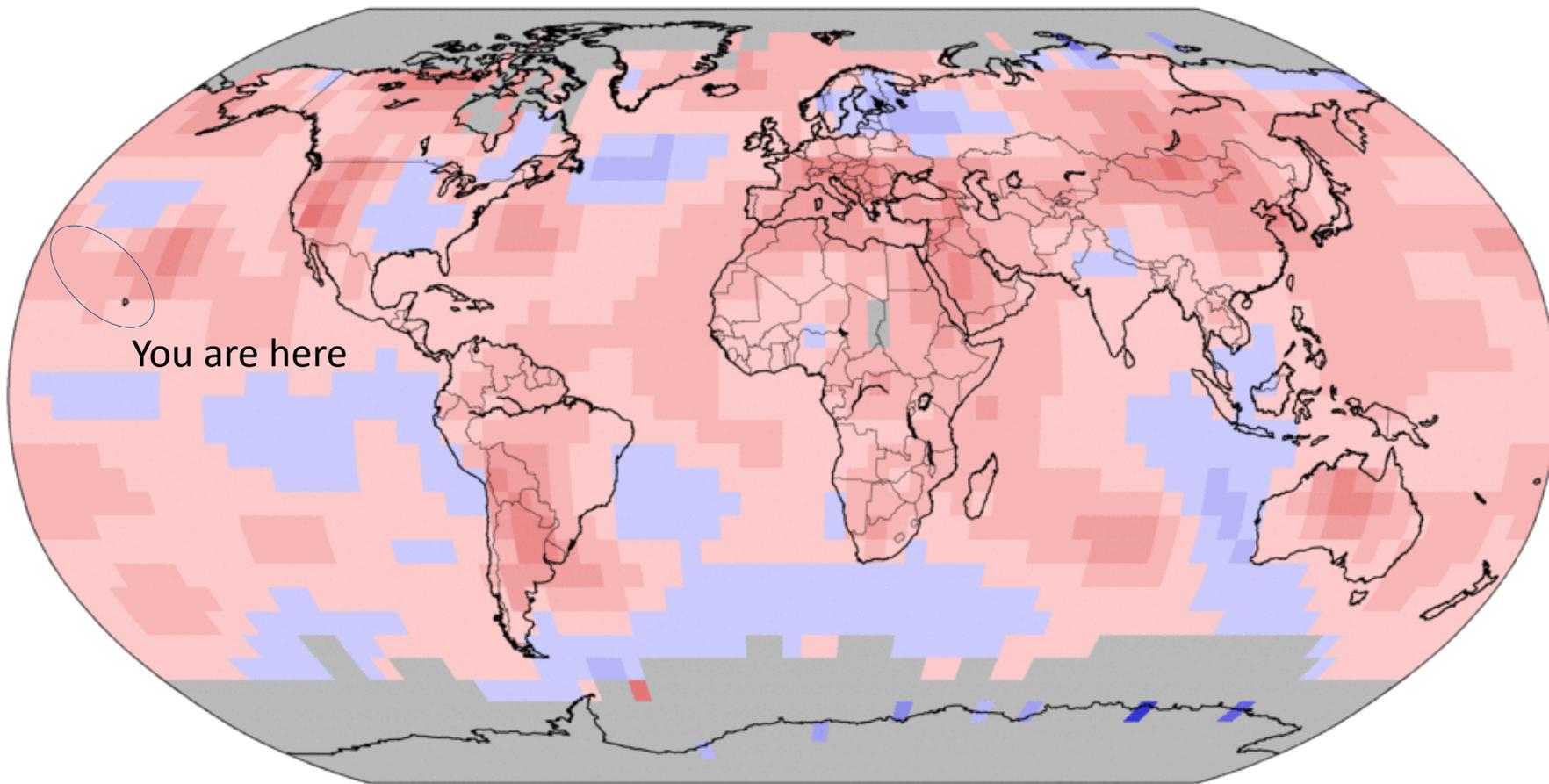

Much
Warmer than
Average


Record
Warmest



Land & Ocean Temperature Departure from Average Jun 2017–Aug 2017 (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



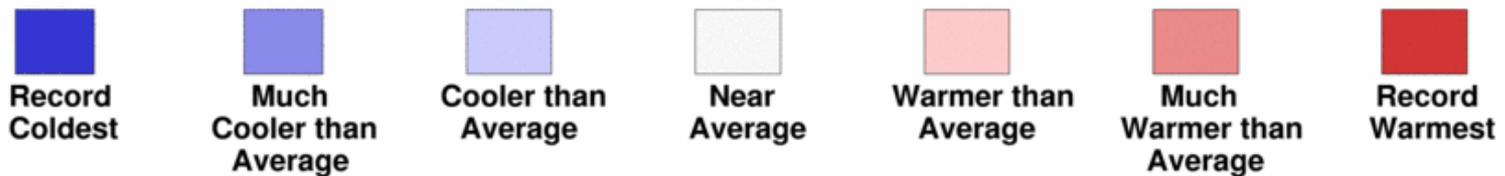
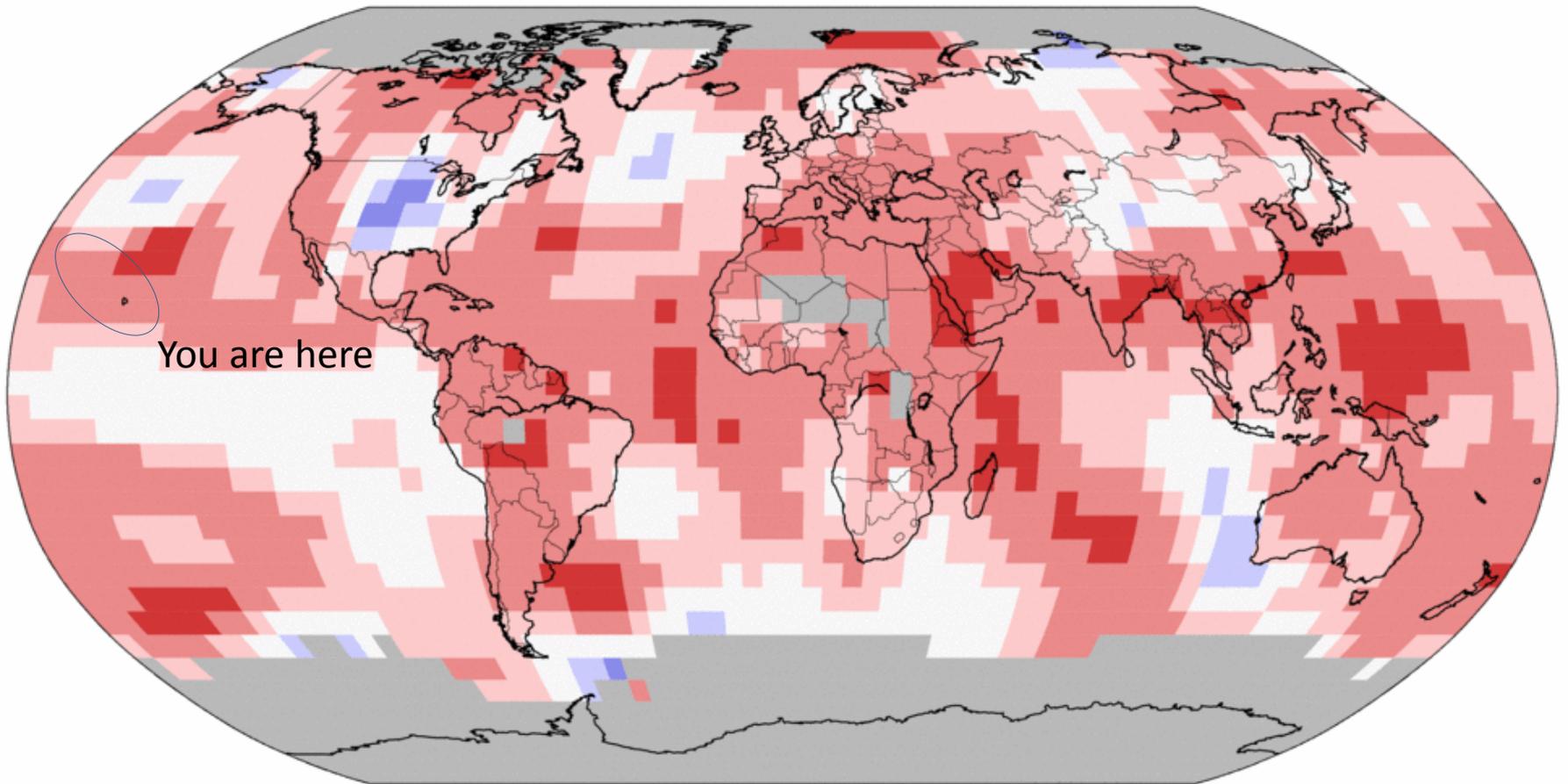
National Centers for Environmental Information
Wed Sep 13 07:28:56 EDT 2017

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

Land & Ocean Temperature Percentiles Aug 2017

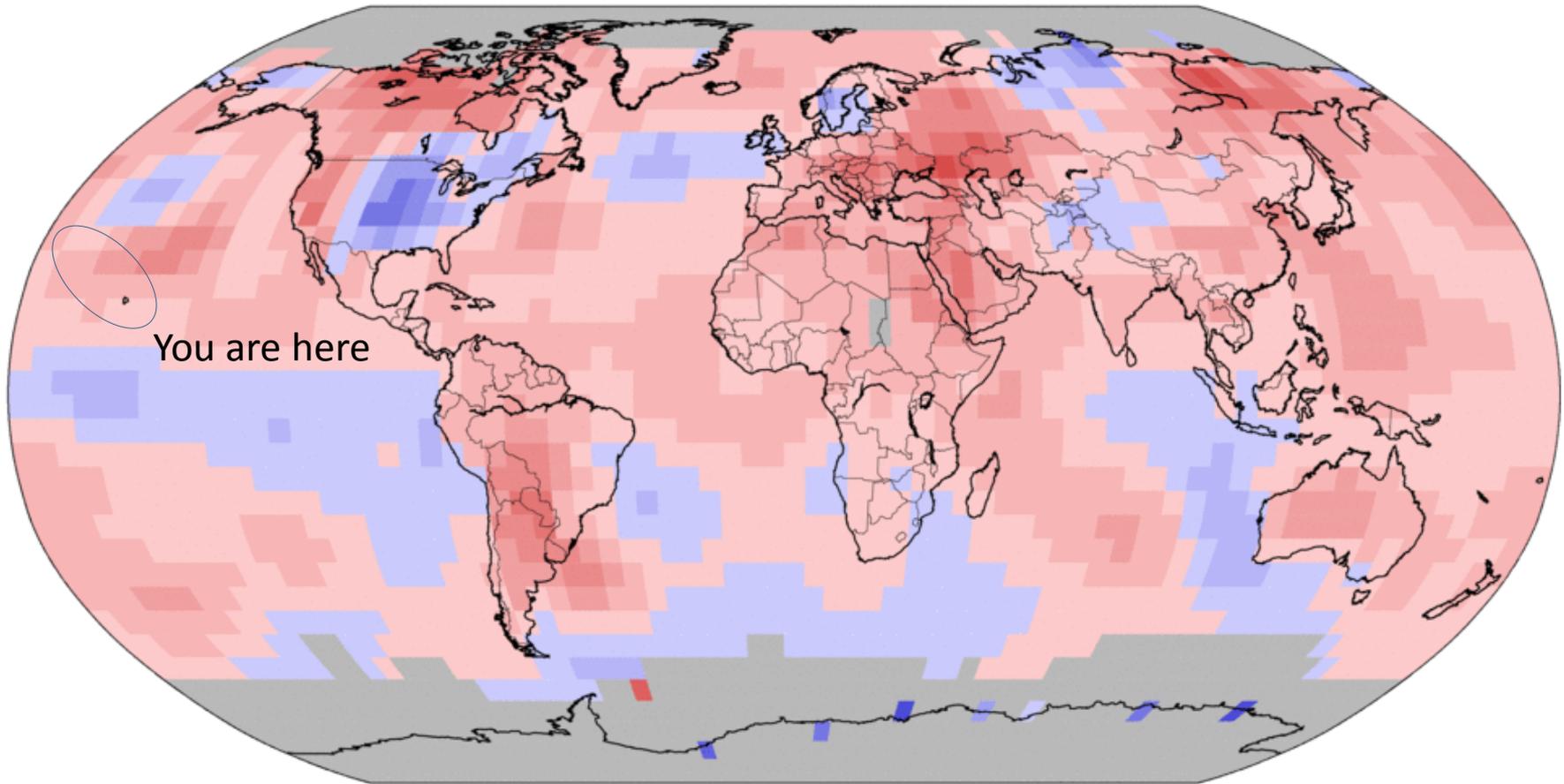
NOAA's National Centers for Environmental Information

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



Land & Ocean Temperature Departure from Average Aug 2017 (with respect to a 1981–2010 base period)

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



Degrees Celsius

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

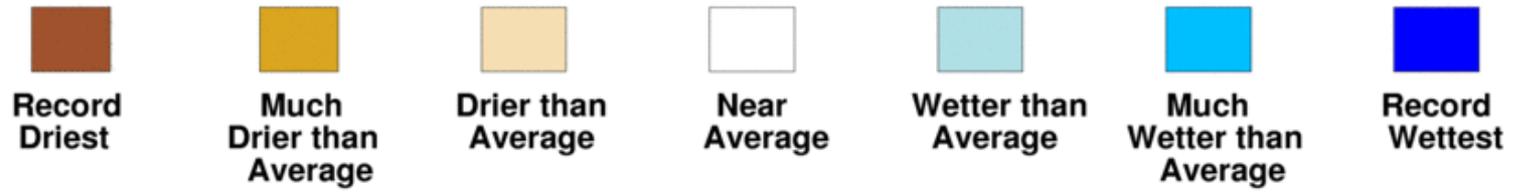
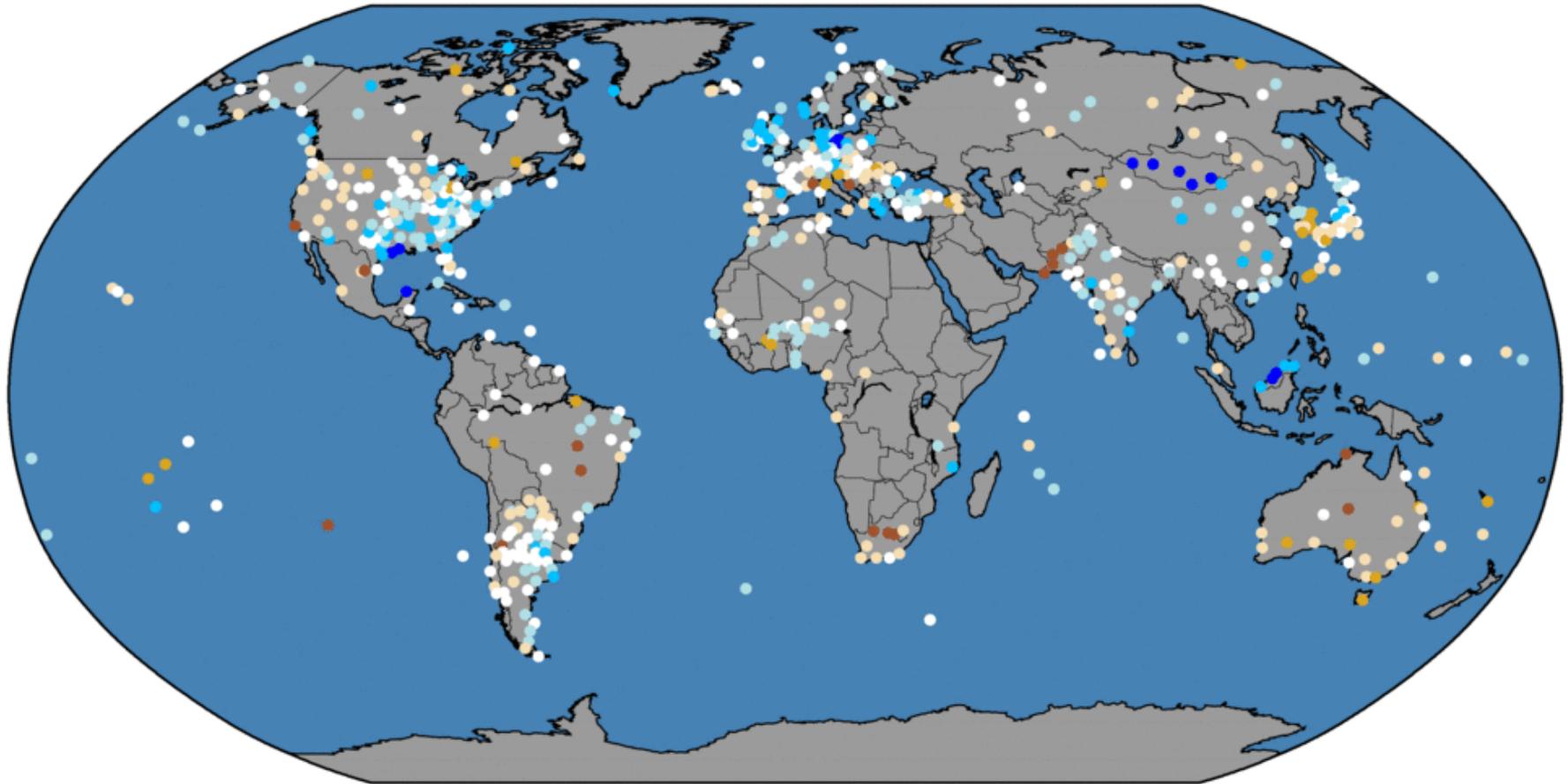


National Centers for Environmental Information
Wed Sep 13 07:28:56 EDT 2017

Land-Only Precipitation Percentiles Jun 2017–Aug 2017

NOAA's National Centers for Environmental Information

Data Source: GHCN-M version 2

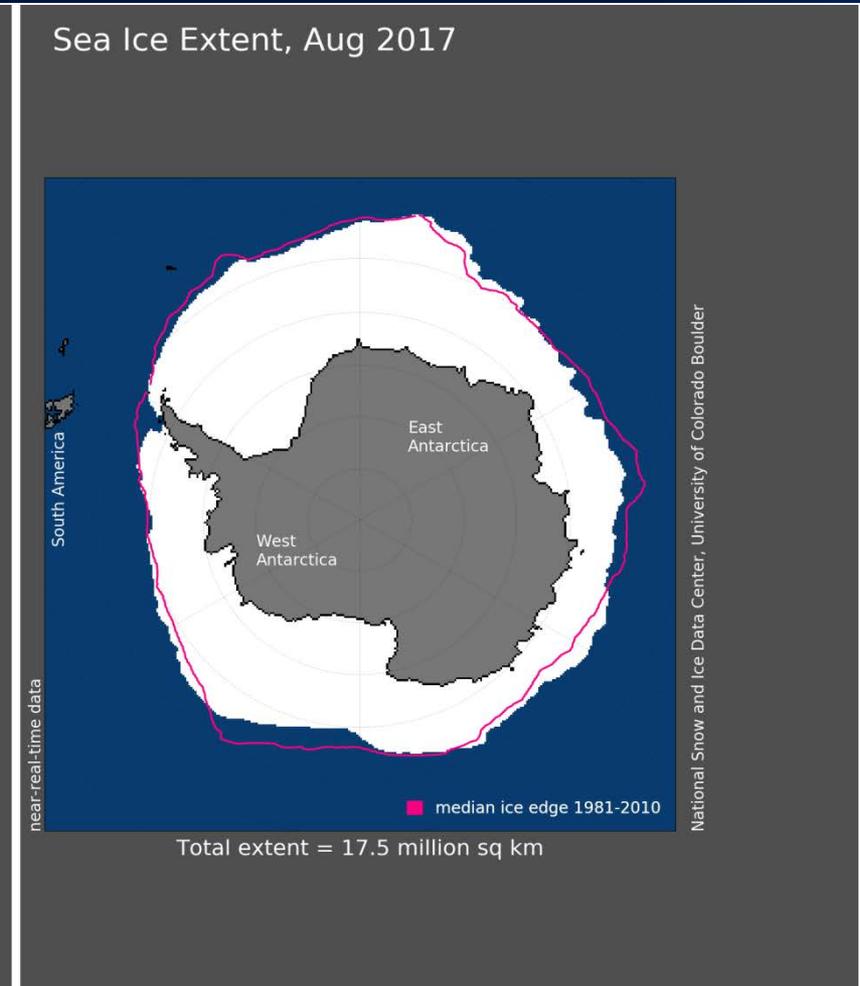
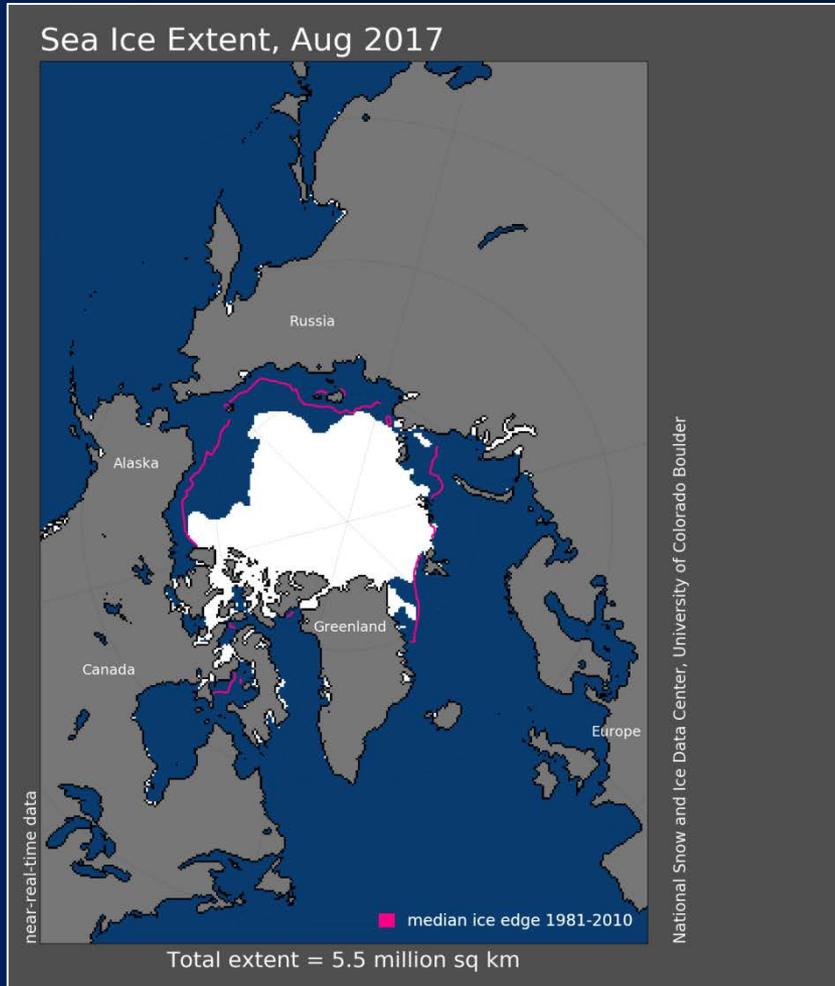


Digression #1 – The West is burning



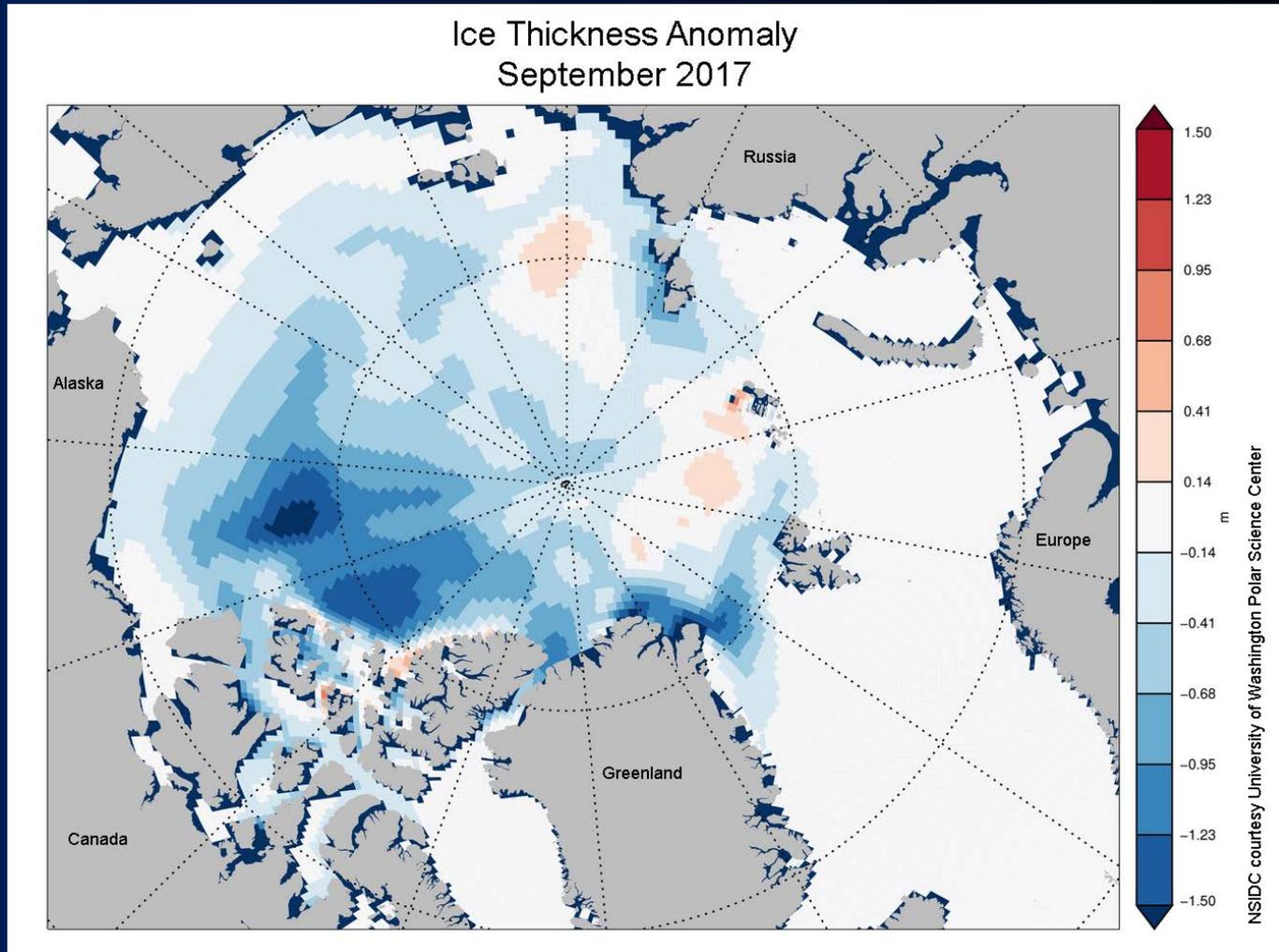
September smoke plume from Montana fires reaches to Lake Erie
Larger fires are linked to long-term U.S. trend of drier West and wetter East

Meanwhile, summer sea ice extent at both poles tracks near the lowest values ever seen in the satellite record



3rd lowest extent ever recorded in the Arctic, 2nd lowest extent in the Antarctic

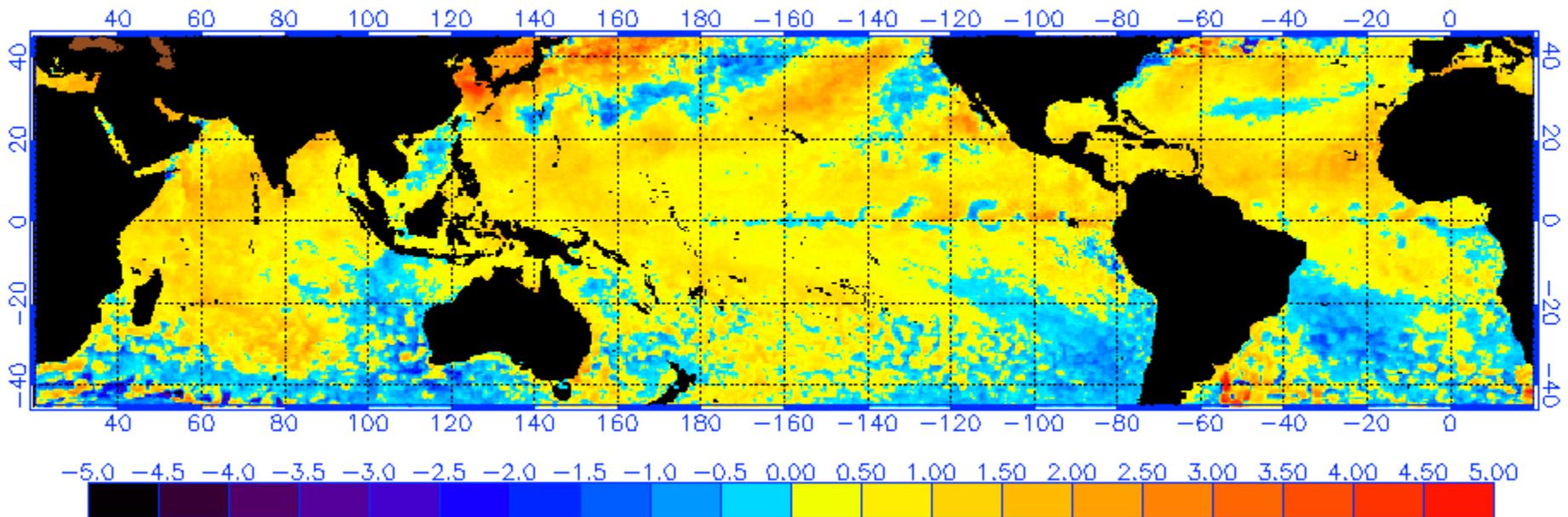
Arctic sea ice thickness is also anomalously low, facilitating loss by melt



Darker blue color indicates thinner ice pack
The implications for the Monument, if any, are unknown

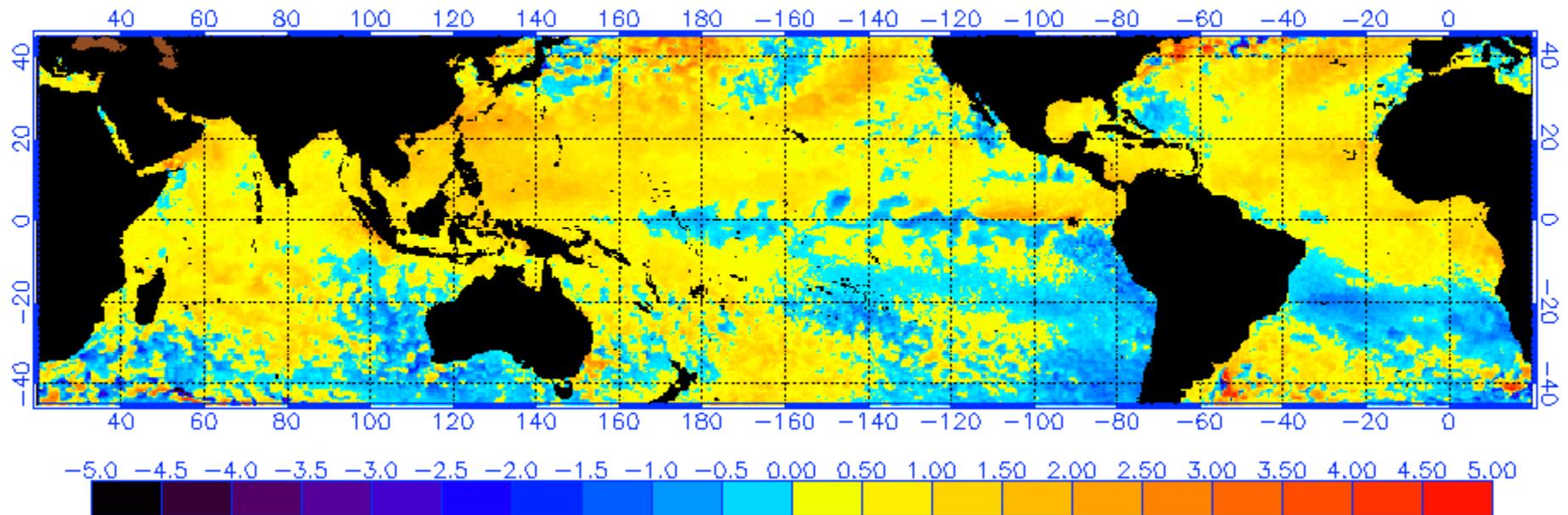
Global Sea Surface Temperature Anomaly – 3 August 2017

NOAA/NESDIS SST Anomaly (degrees C), 8/3/2017



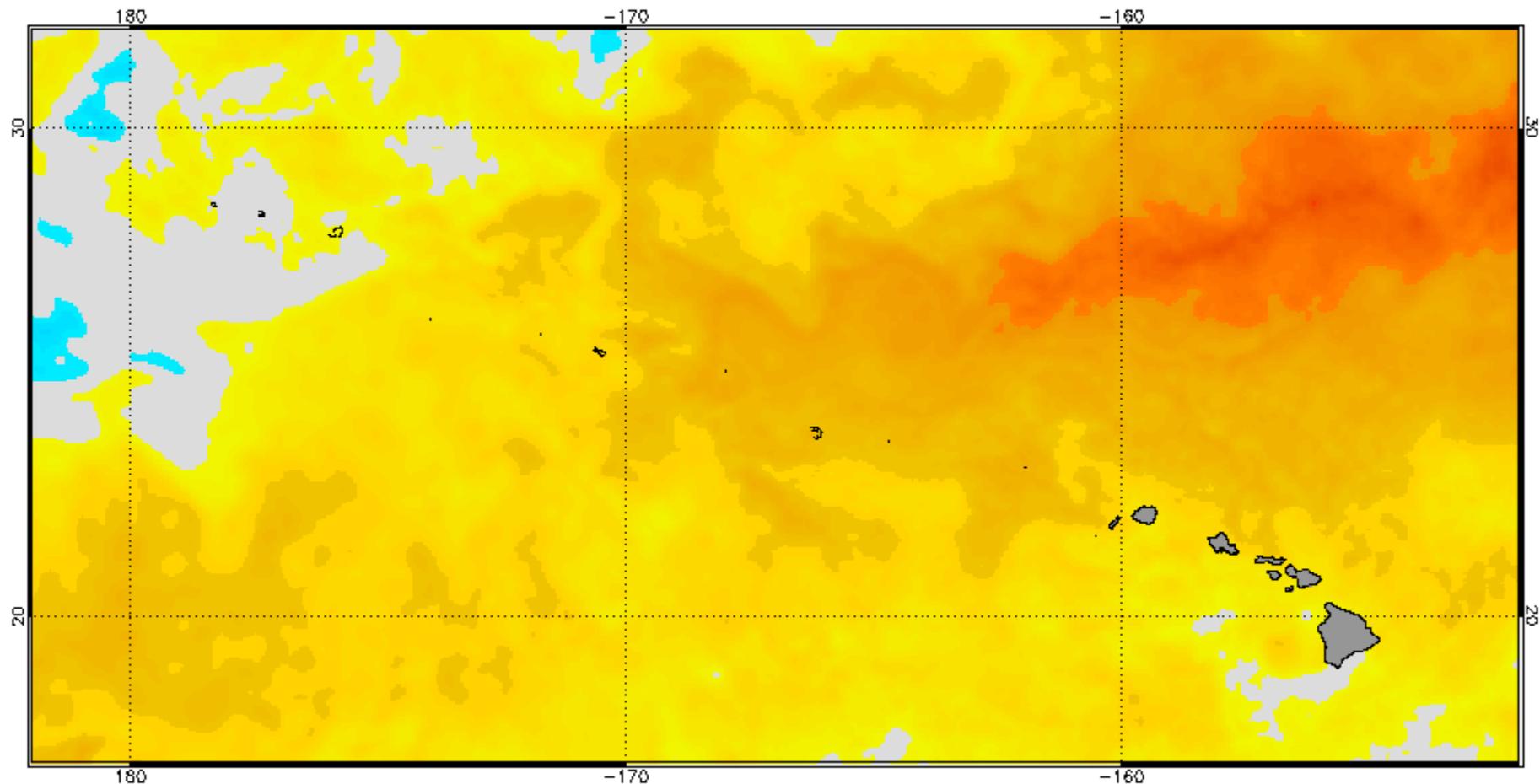
Global Sea Surface Temperature Anomaly – 10 October 2017

NOAA/NESDIS SST Anomaly (degrees C), 10/9/2017



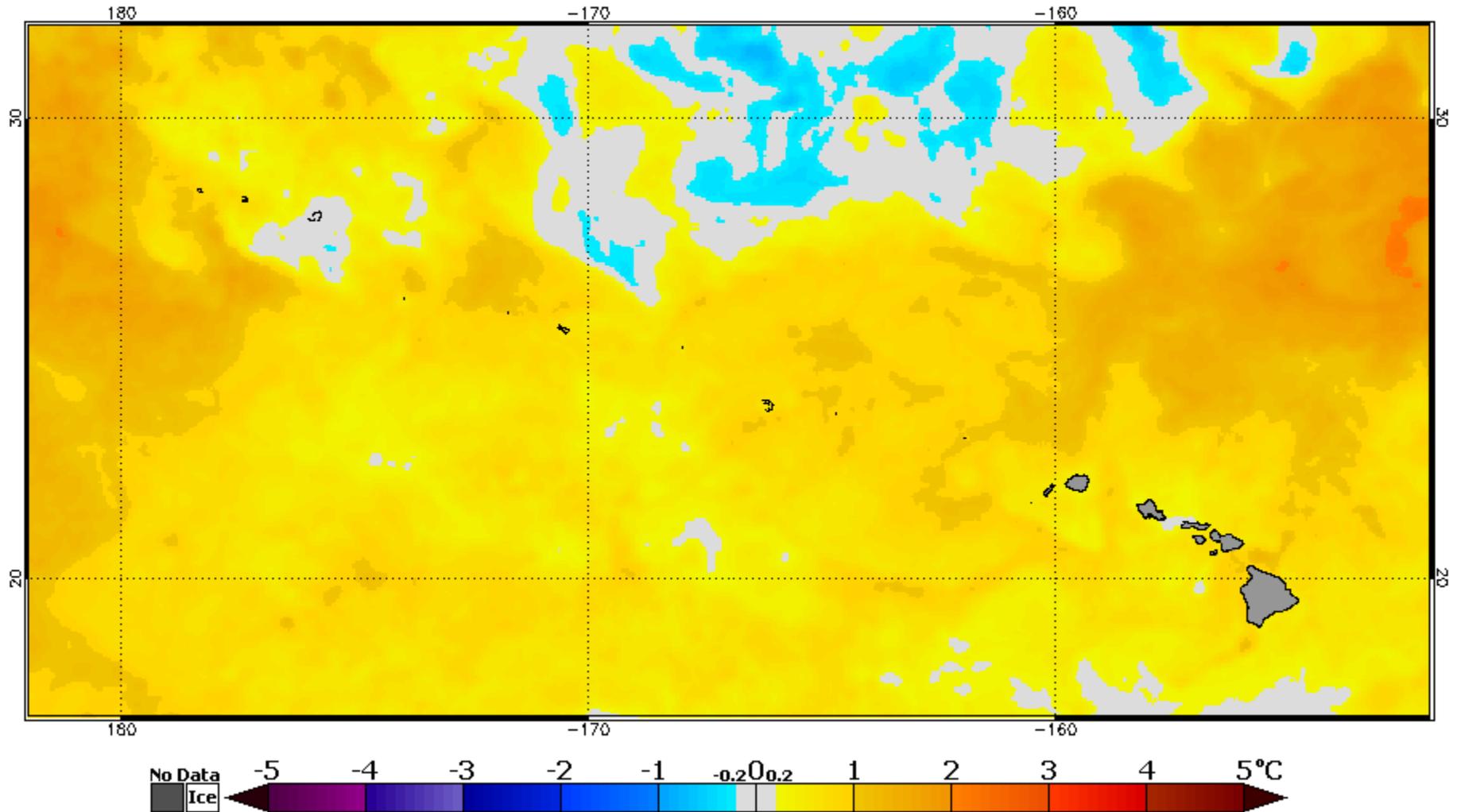
Sea Surface Temperature Anomaly, Hawaii Sector – 3 August 2017

NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3) 3 Aug 2017



Sea Surface Temperature Anomaly, Hawaii Sector – 10 October 2017

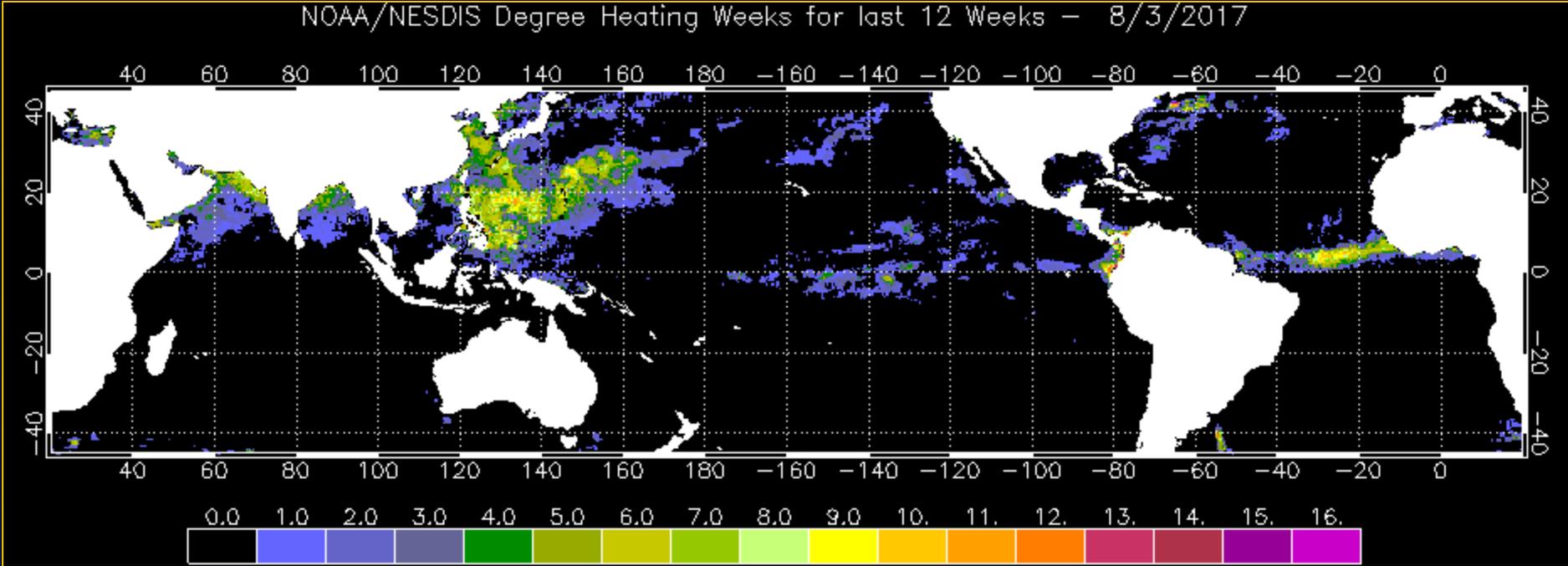
NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3) 10 Oct 2017



Currently running 1-2 °C above average throughout the archipelago

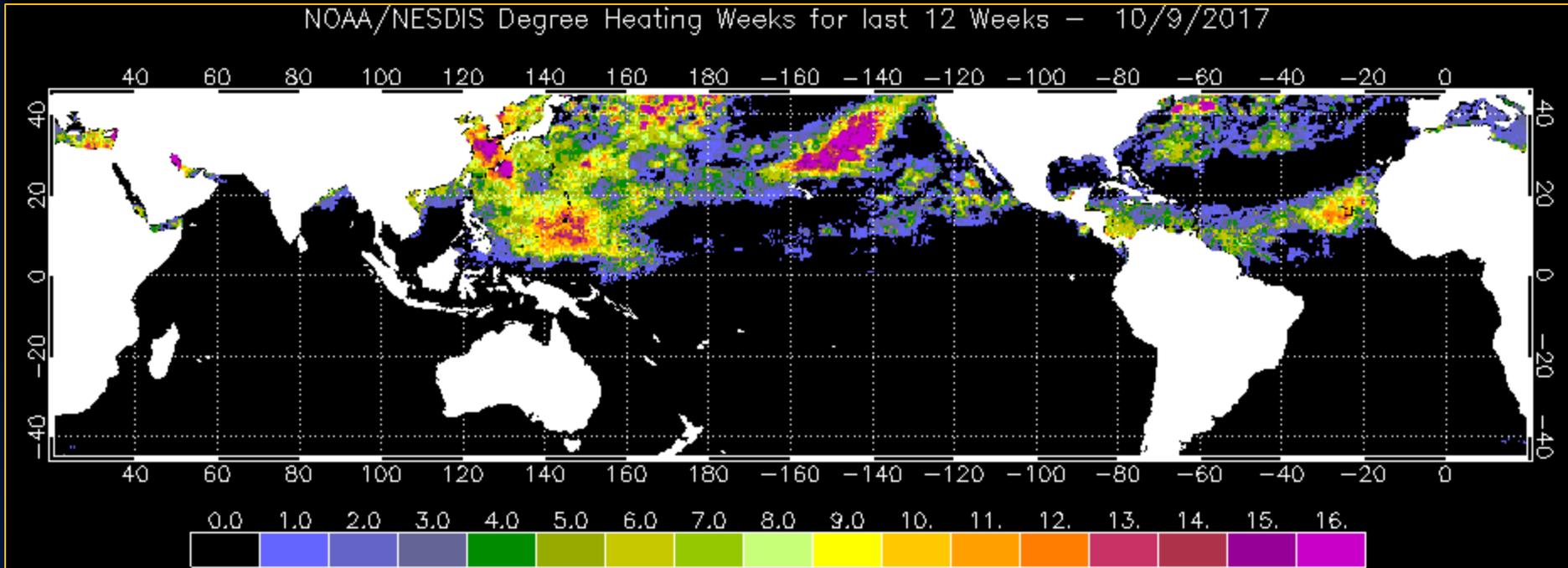
Degree Heating Weeks – 3 August 2017

NOAA/NESDIS Degree Heating Weeks for last 12 Weeks – 8/3/2017



Degree Heating Weeks – 9 October 2017

NOAA/NESDIS Degree Heating Weeks for last 12 Weeks – 10/9/2017



Note the concentration of ocean heat northeast of the Hawaiian Islands

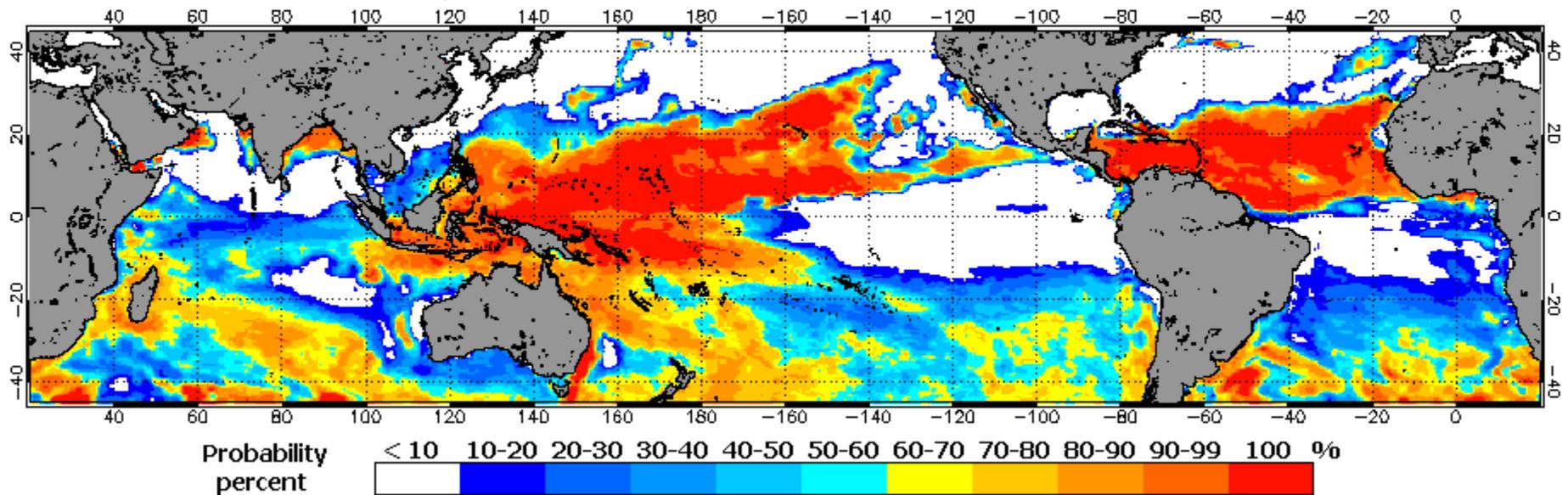
This was predicted by NOAA models

Bleaching Stress Probability – October 2017-January 2018

Prediction as of 9 October 2017

2017 Oct 10 NOAA Coral Reef Watch Probabilistic Bleaching Thermal Stress Watch for Oct–Jan 2018

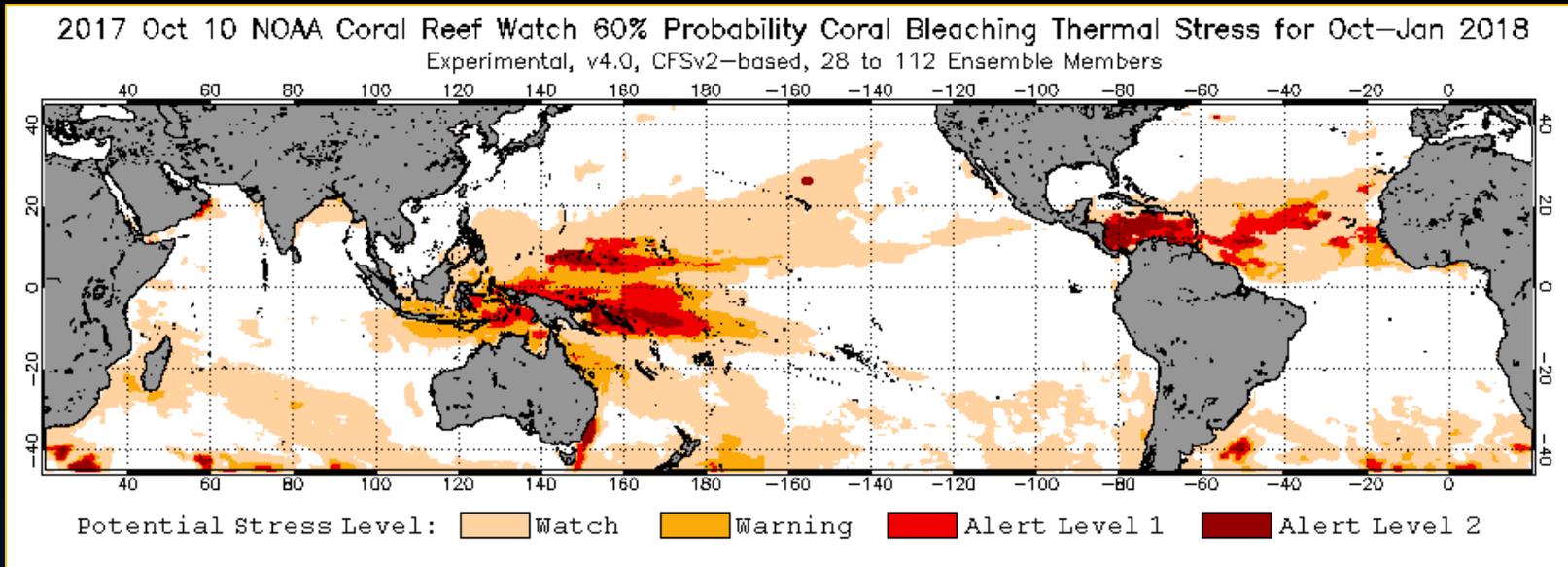
Experimental, v4.0, CFSv2-based, 28 to 112 Ensemble Members



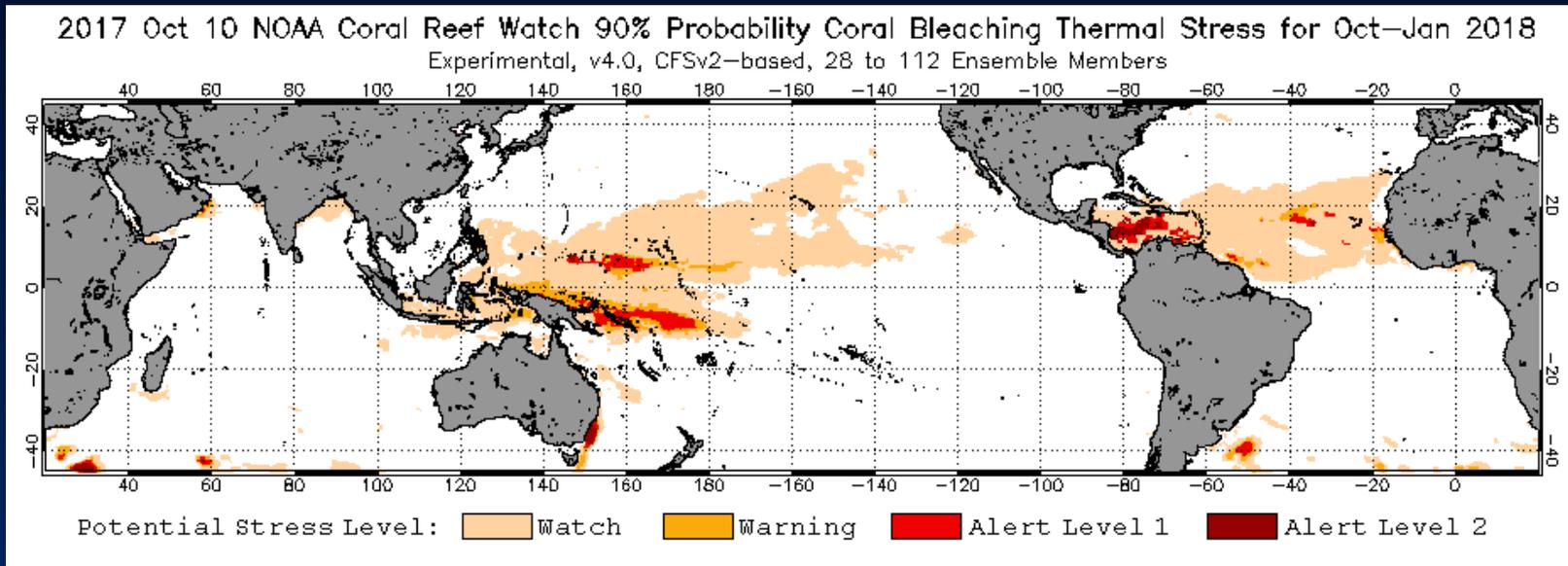
Experimental product indicates a 100% chance of some degree of thermal stress for reefs in the southeast portion of the Monument through the end of the year, as well as for the main Hawaiian Islands

Some coral bleaching is currently being observed on Oahu

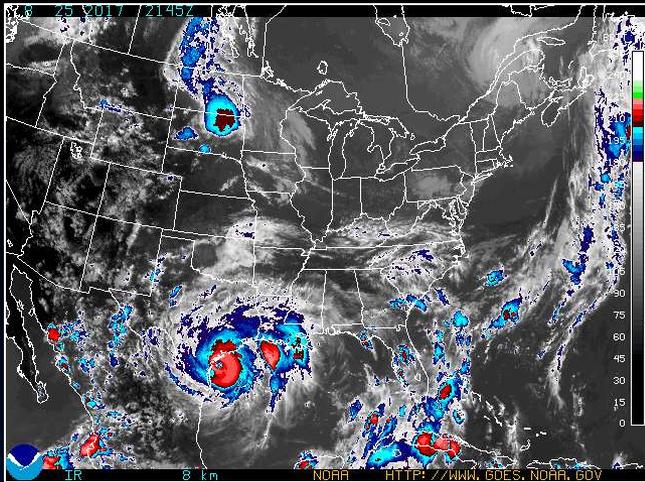
60% Stress Level Probability – October 2017 - January 2018



90% Stress Level Probability – October 2017 - January 2018



Digression #2 –An exceptionally active Atlantic hurricane season



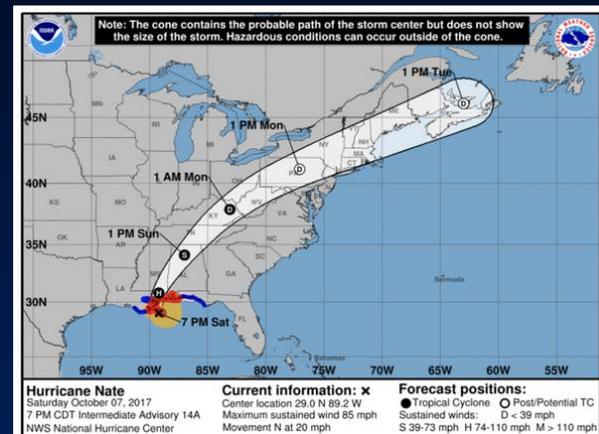
Hurricane Harvey



Hurricane Maria



Hurricane Irma

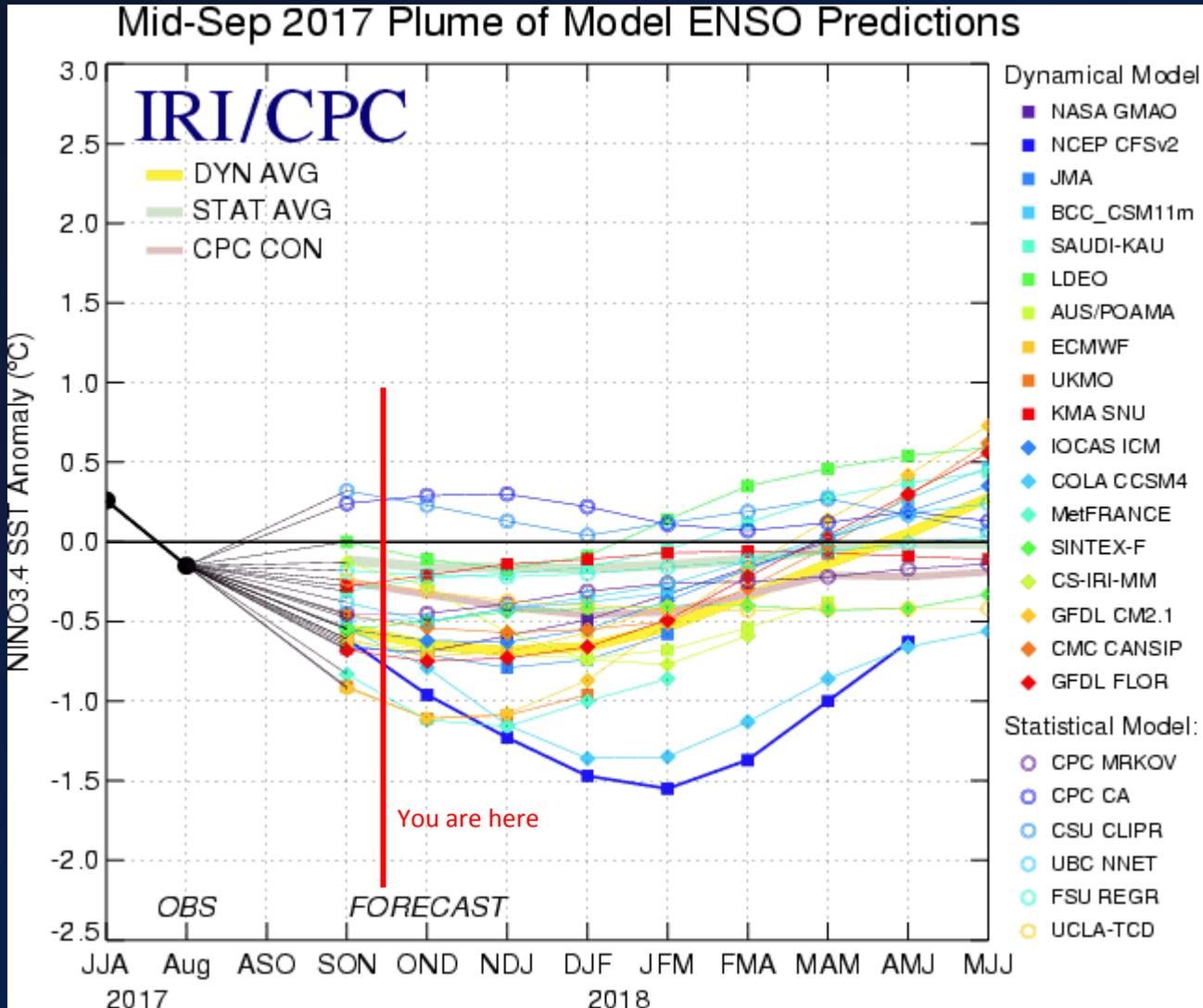


Hurricane Nate

By contrast, cyclone formation in the Pacific has been below average
El Nino years suppress cyclone formation in the Atlantic, enhance it in the Pacific

Looking Forward

An ensemble of 25 climate models predicts mild La Nina or ENSO neutral conditions through spring 2018



There is no current indication of an El Niño recurrence anytime soon

Conclusions

2017 shows some slight moderation from the global trend of record hot years, both on land and in the ocean, but is still the second-hottest year ever recorded

The years 2015-2017 were the three warmest on record, which may eventually exert cumulative thermal stress on the Monument's terrestrial ecosystems, potentially affecting seabird nesting

ENSO-neutral conditions currently prevail, and are predicted to continue

The risk of hurricanes is therefore less than in the past two years

Reefs in the Monument suffered thermal stress over the summer, and there is a 90% chance of minor thermal stress continuing from now through January 2018

The ocean surrounding the Monument retained more heat than anywhere else in the Pacific – but the extent coral of bleaching, if any, is not yet determined

Local cyclogenesis is unlikely through the remainder of 2017

Waning of El Nino resulted instead produced a strong Atlantic hurricane season

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

Inundation is a long-term problem that will not go away

Questions?



SEE ALL OF
Hawaii
BY PLANE OR STEAMER

INTER-ISLAND AIRWAYS, LTD.
INTER-ISLAND STEAM NAVIGATION CO., LTD.
HONOLULU, HAWAII, U.S.A.

EFFECTIVE SEPTEMBER 1, 1938 • CANCEL ALL PREVIOUS ISSUES

EFFECTIVE SEPTEMBER 1, 1938 • CANCEL ALL PREVIOUS ISSUES

The advertisement features a stylized illustration of a large, multi-engine airplane flying over a tropical landscape with green hills, a white sandy beach, and a small boat in the water. The text is arranged in a clear, bold font, with the word 'Hawaii' in a large, red, cursive script. The overall design is reminiscent of mid-20th-century travel posters.