

Hawaii

Climate Indicators Summary

August 2020

PMNM Climate Change Working Group

Dan A. Polhemus

U. S. Fish & Wildlife Service

Honolulu, HI

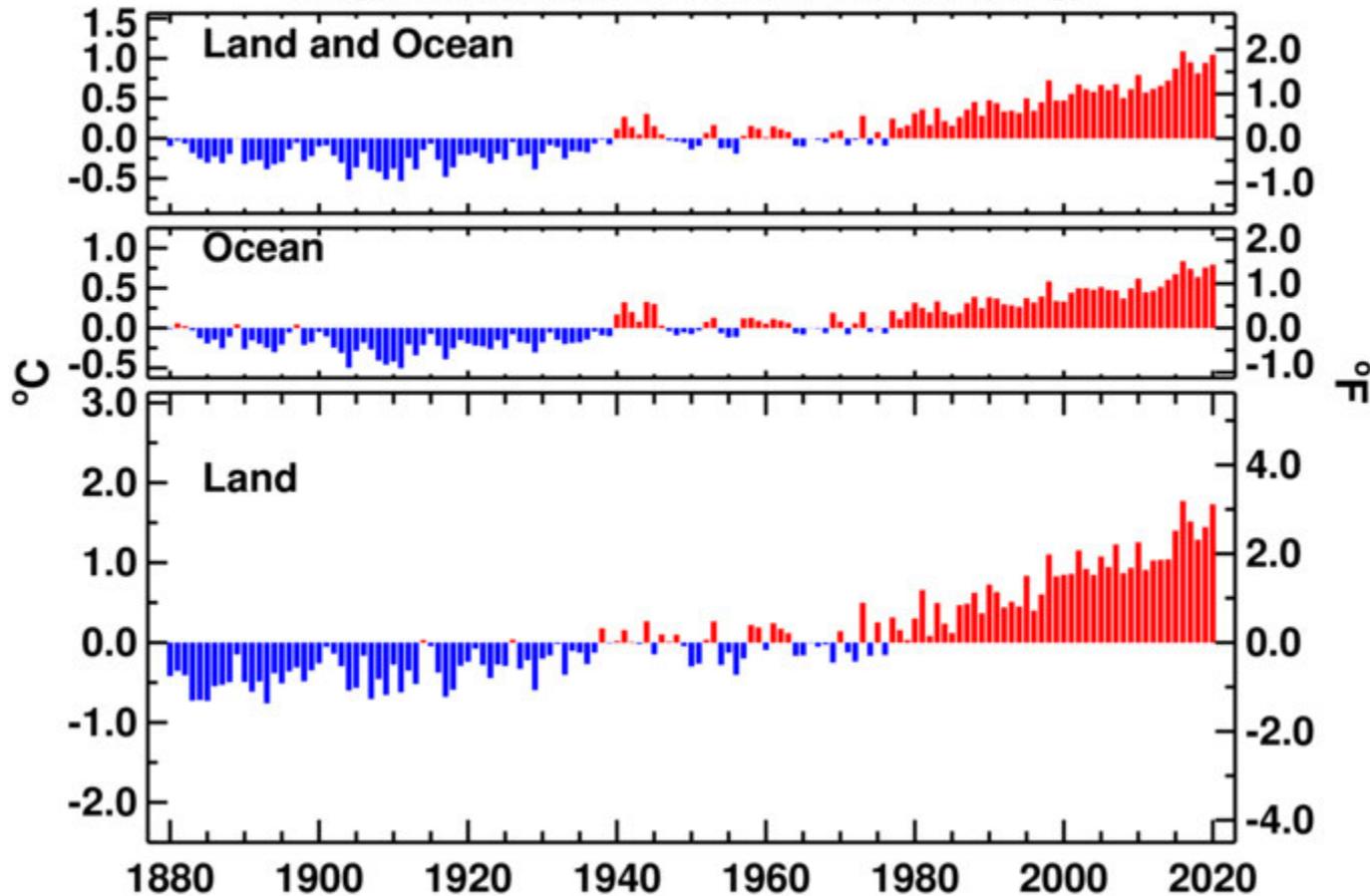
2020 is still in the running to be the hottest year on record
Very warm winter in the Northern Hemisphere, and now a hot summer as well



Jan-Jul Global Surface Mean Temp Anomalies

NCEI/NEODIS/NOAA

Analysis is based upon Smith et al. (2008) methodology.

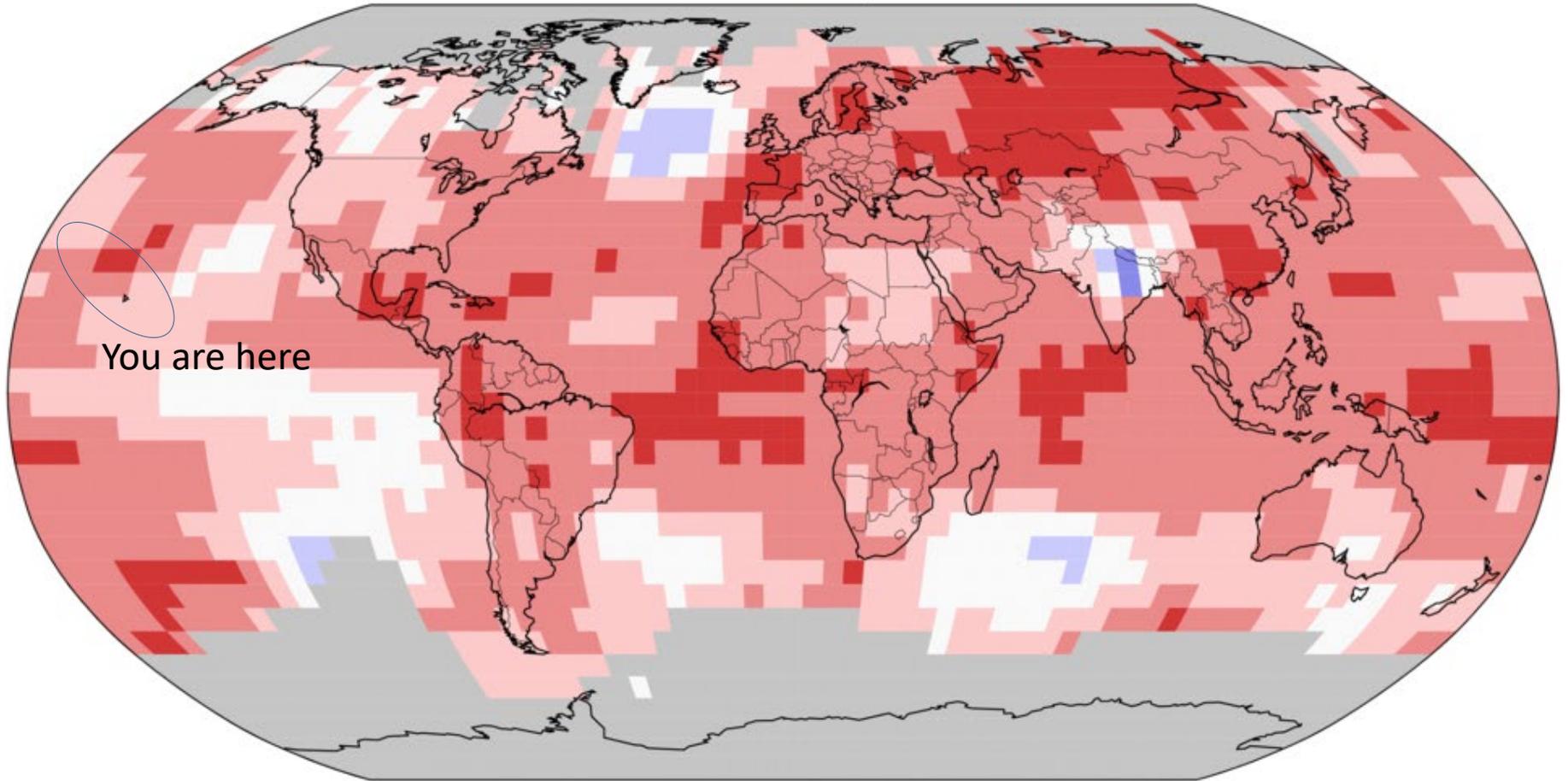


After 3 slightly cooler years, the heat is back

Land & Ocean Temperature Percentiles Jan–Jul 2020

NOAA's National Centers for Environmental Information

Data Source: NOAA GlobalTemp v5.0.0–20200808



You are here


**Record
Coldest**


**Much
Cooler than
Average**


**Cooler than
Average**


**Near
Average**


**Warmer than
Average**

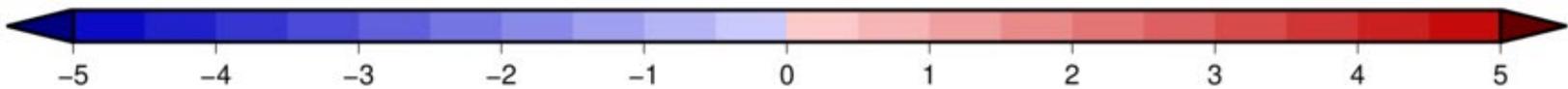
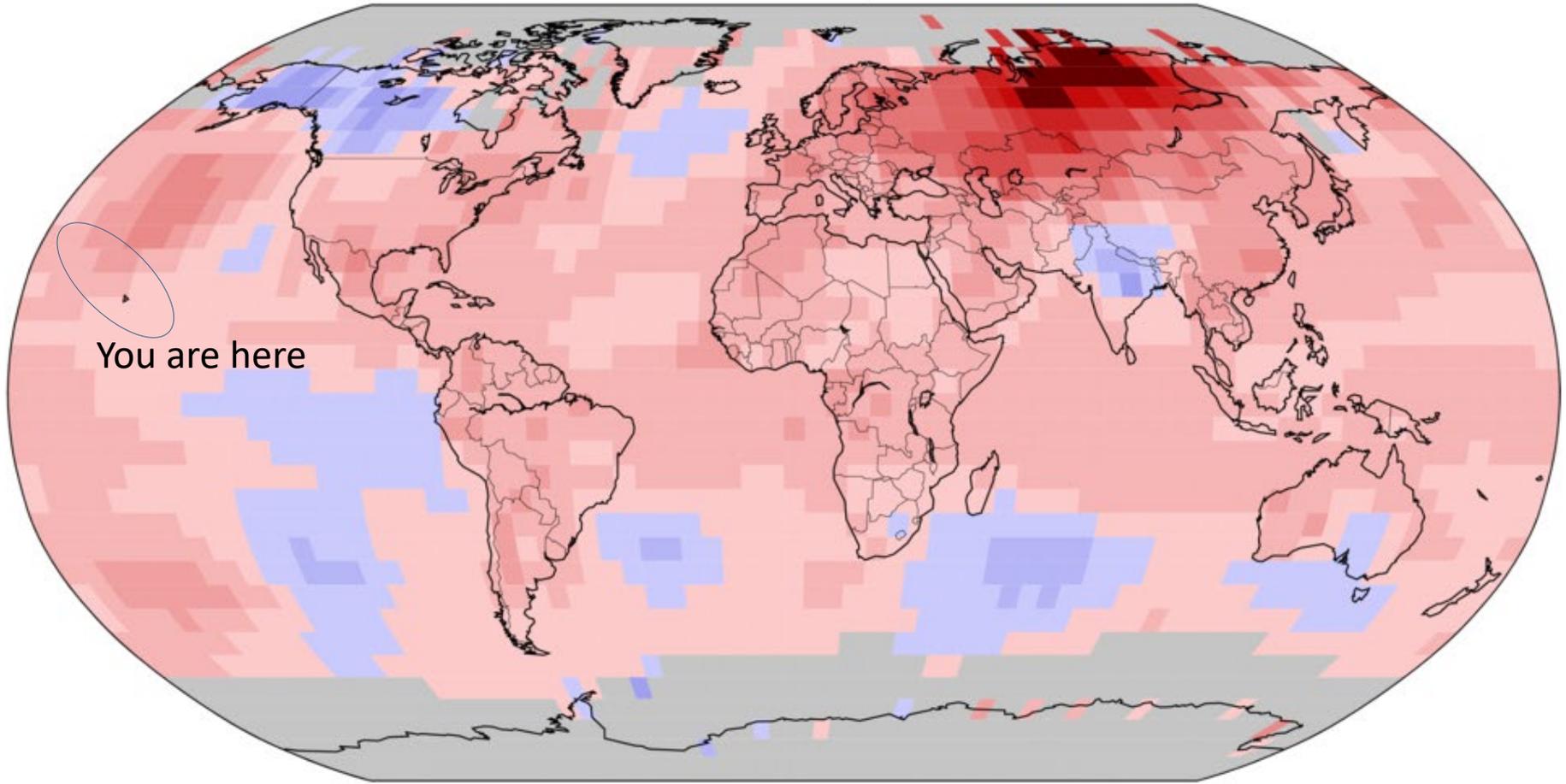

**Much
Warmer than
Average**


**Record
Warmest**



Land & Ocean Temperature Departure from Average Jan–Jul 2020 (with respect to a 1981–2010 base period)

Data Source: NOAA GlobalTemp v5.0.0–20200808



Degrees Celsius



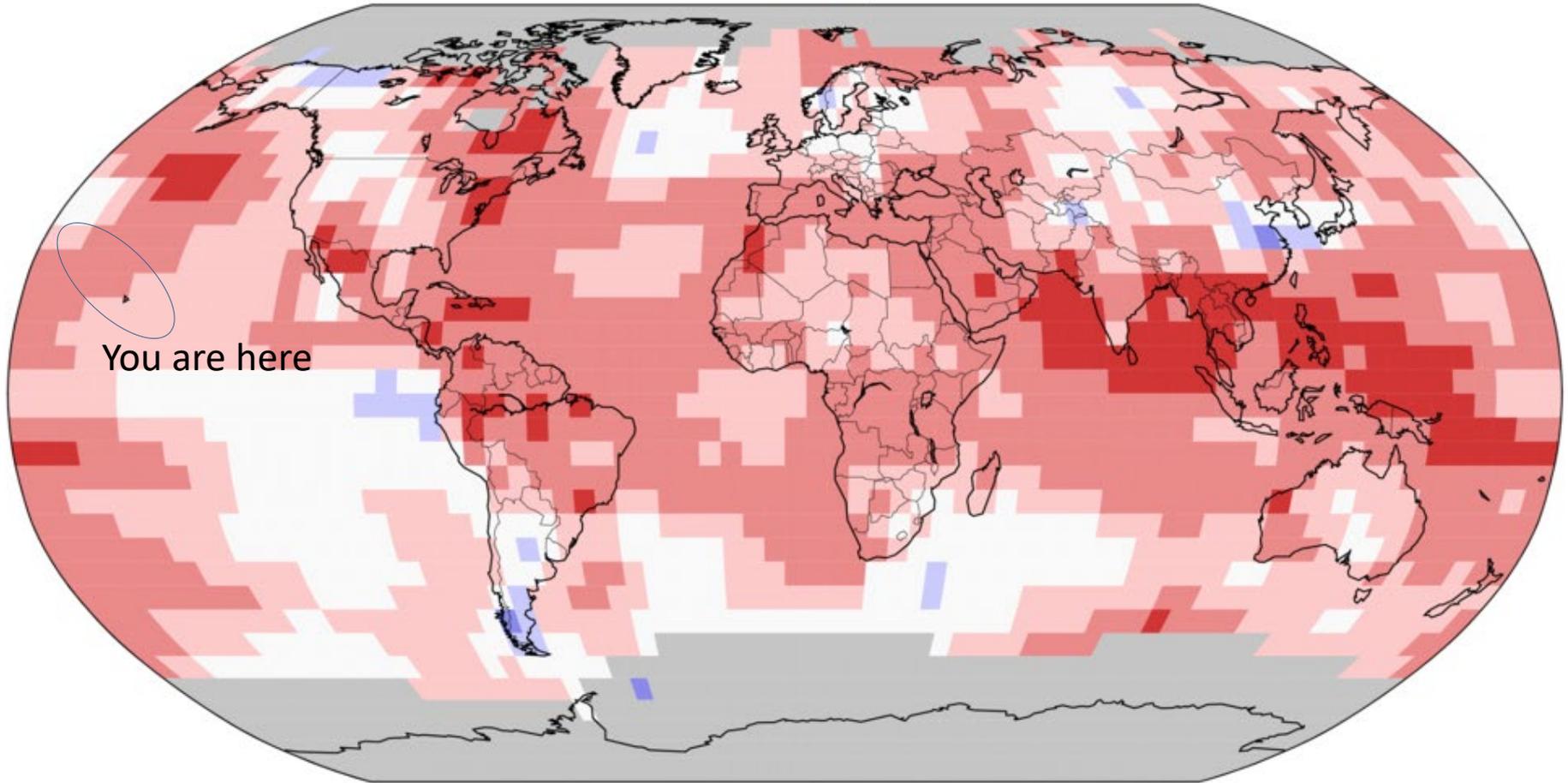
National Centers for Environmental Information
GHCNM v4.0.1.20200807.qfe

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

Land & Ocean Temperature Percentiles Jul 2020

NOAA's National Centers for Environmental Information

Data Source: NOAAGlobalTemp v5.0.0-20200808



You are here



Record Coldest



Much Cooler than Average



Cooler than Average



Near Average



Warmer than Average



Much Warmer than Average

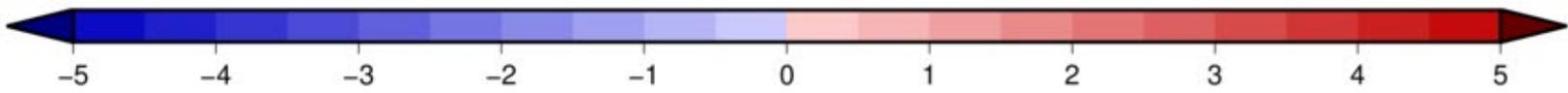
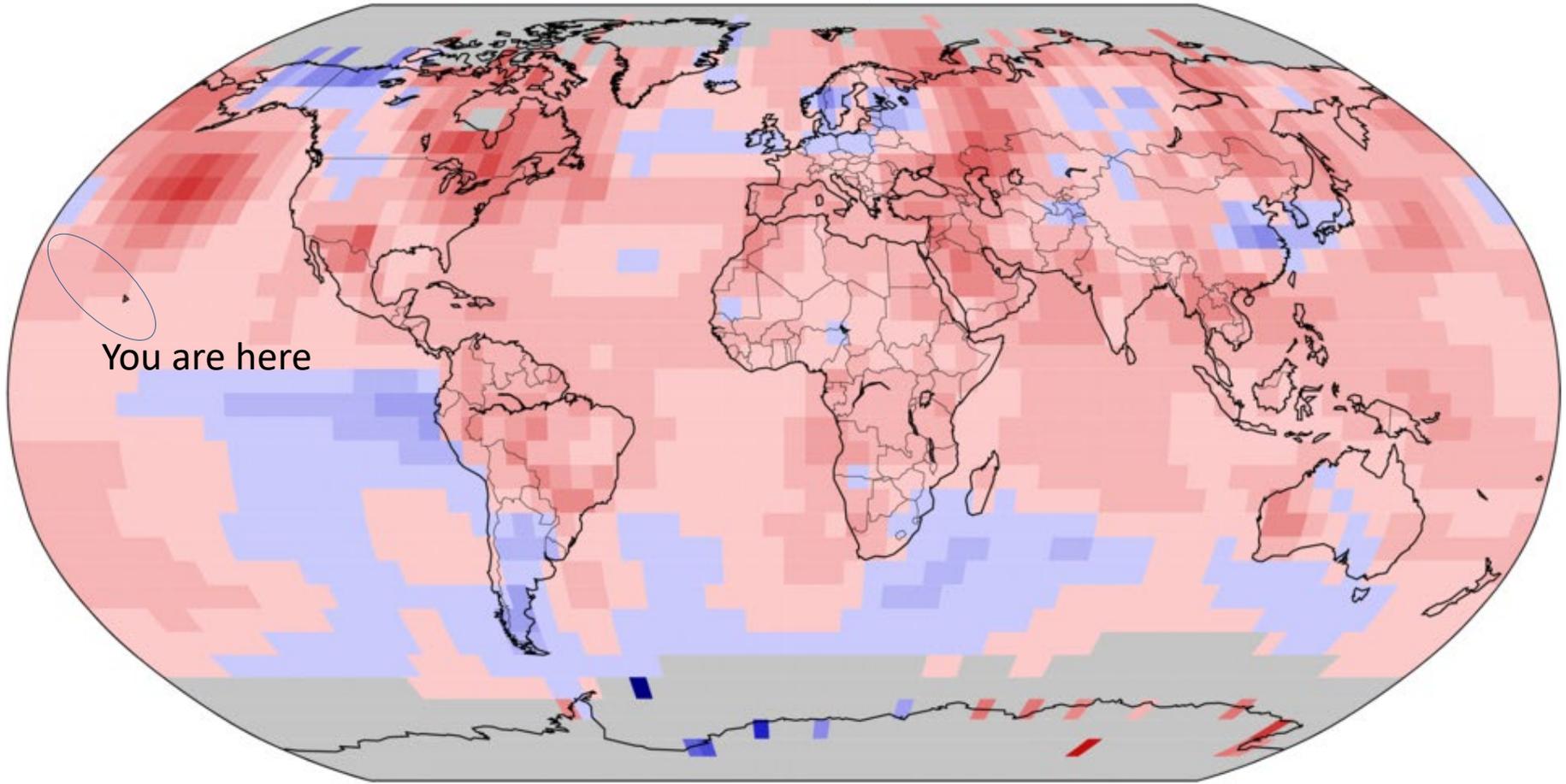


Record Warmest



Land & Ocean Temperature Departure from Average Jul 2020 (with respect to a 1981–2010 base period)

Data Source: NOAA GlobalTemp v5.0.0–20200808



Degrees Celsius

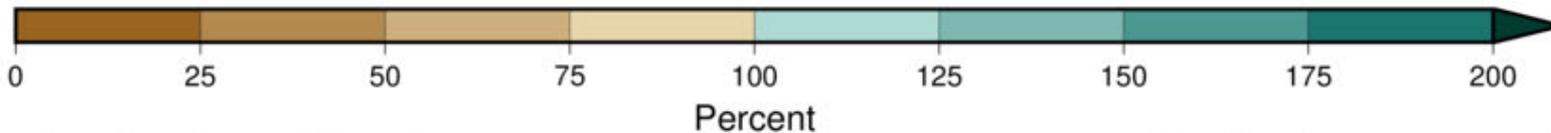
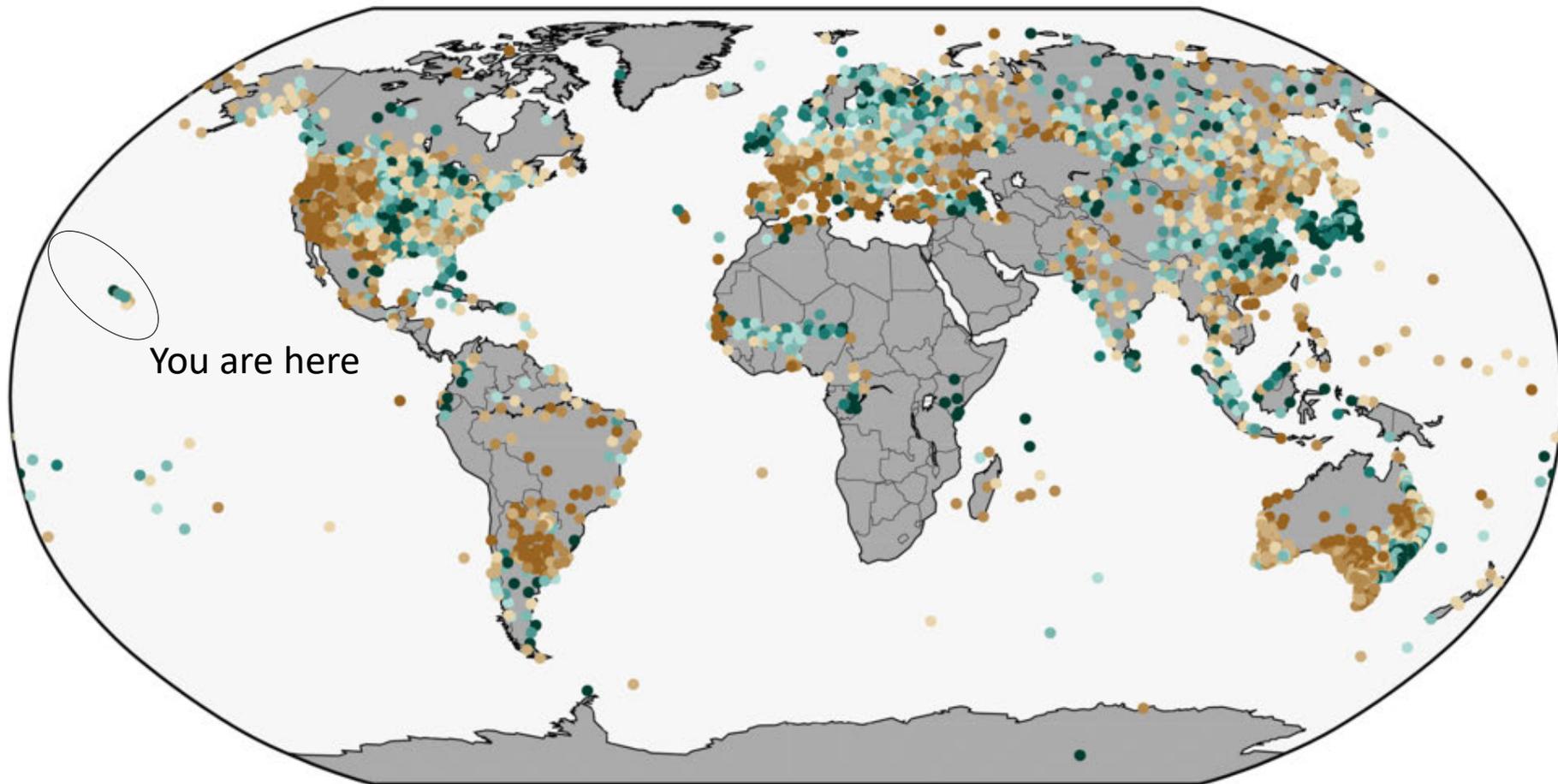


National Centers for Environmental Information
GHCNM v4.0.1.20200807.qfe

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

Land-Only Percent of Normal Precipitation Jul 2020 (with respect to a 1961–1990 base period)

Data Source: GHCN-M version 4beta

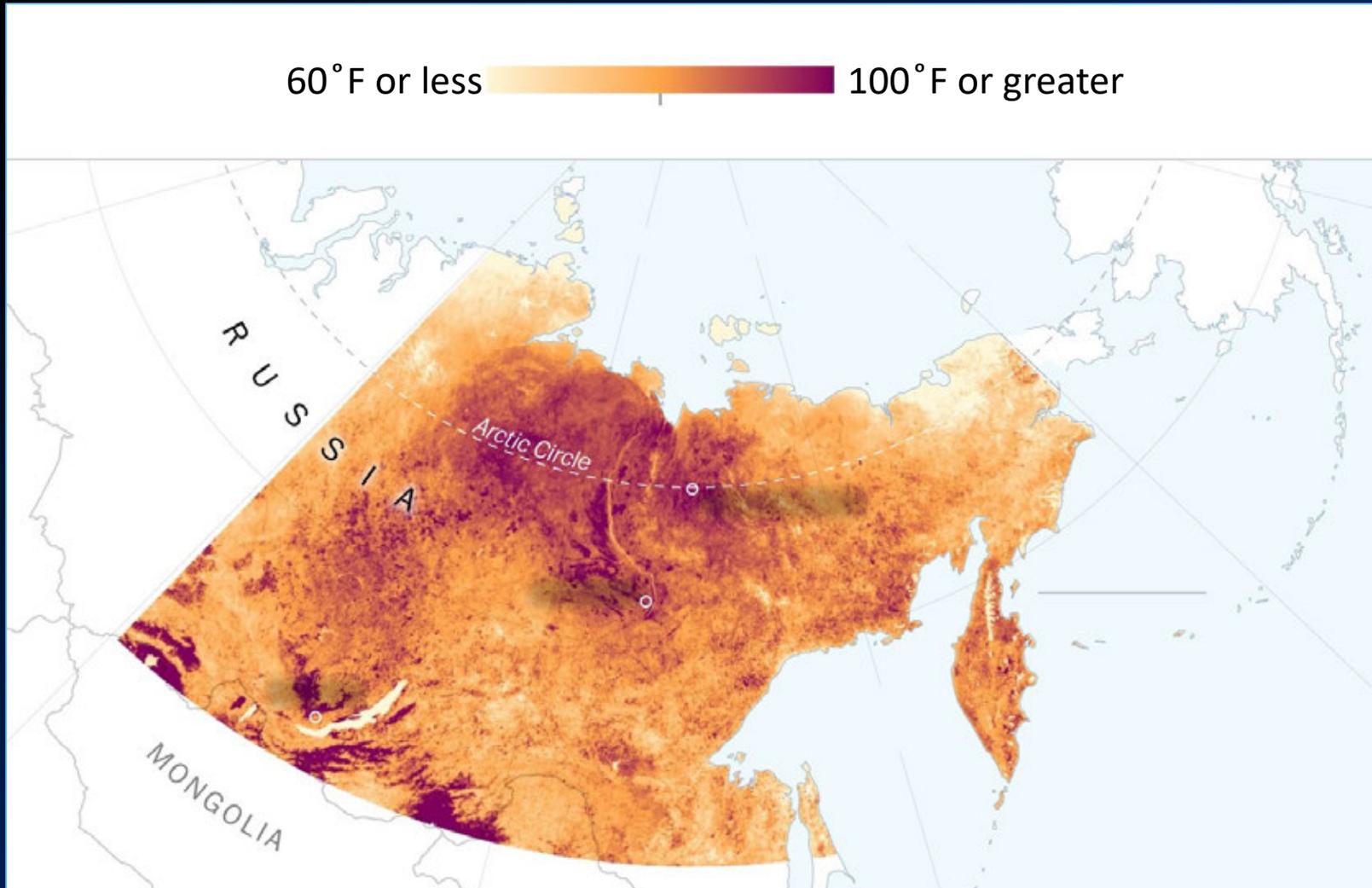


National Centers for Environmental Information

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

Digression #1

Siberia is burning up, both figuratively...



Average daytime land surface high temp for 20-30 June 2020

On 20 June 2020 Verkhoyansk had the warmest temperature ever recorded in the Arctic: 100° F

...and literally

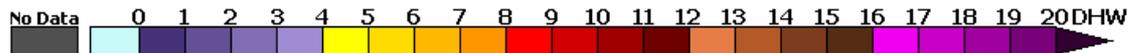
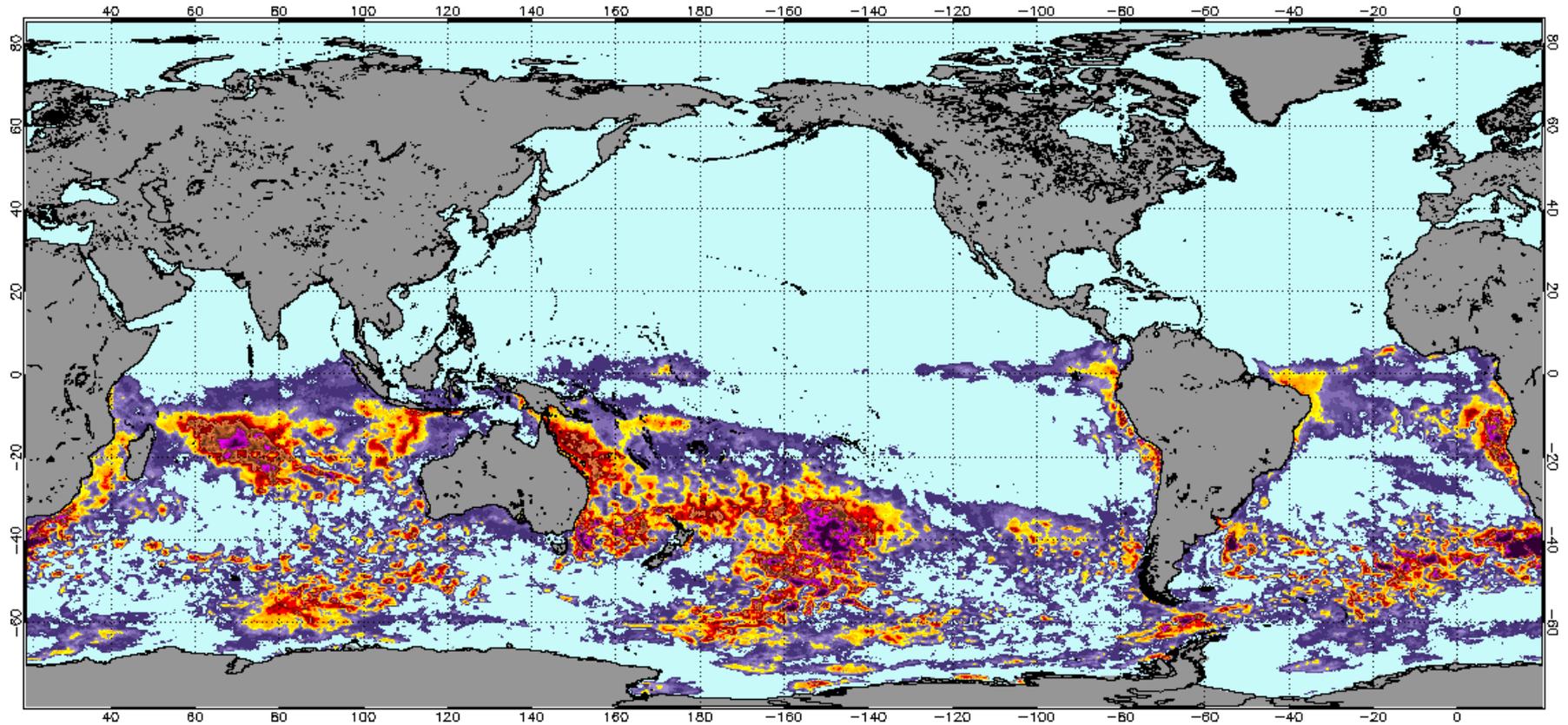
Lower smoke concentration  Higher smoke concentration



Smoke-detected fires via satellite in Siberia – 6 August 2020

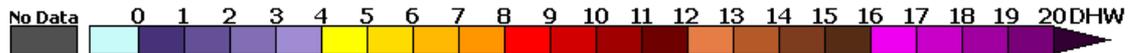
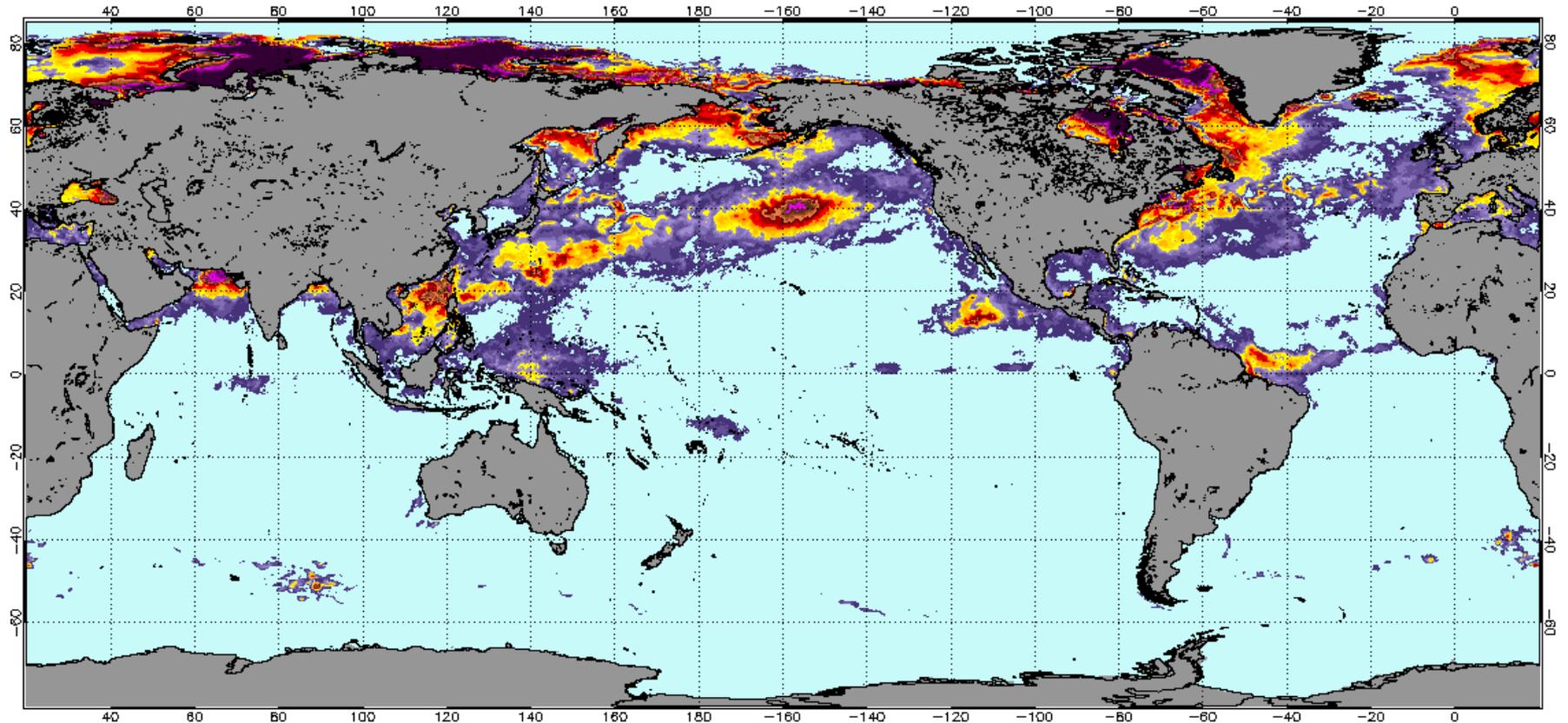
Degree Heating Weeks – 1 April 2020

NOAA Coral Reef Watch Daily 5km Degree Heating Weeks (Version 3.1) 1 Apr 2020



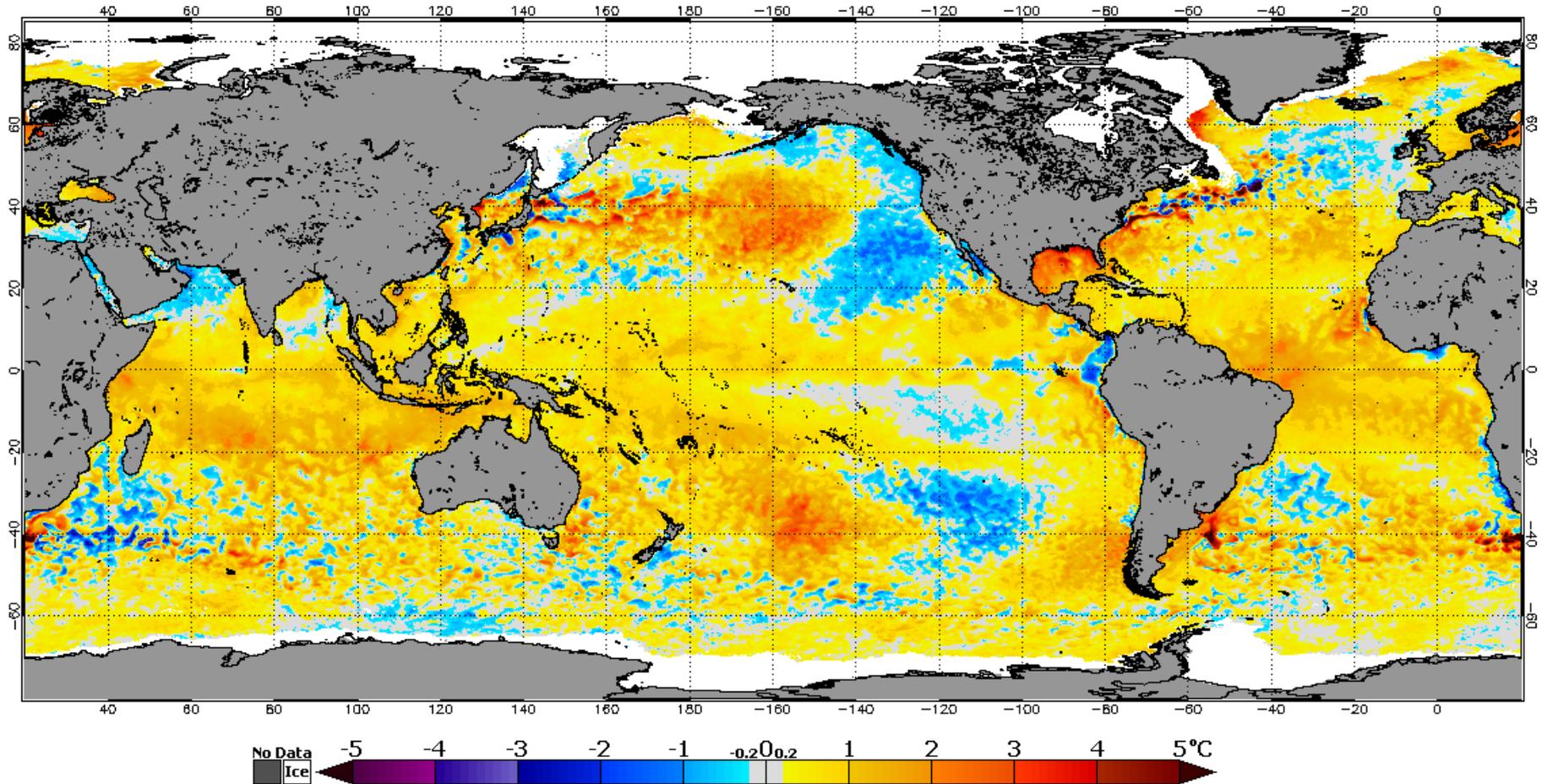
Degree Heating Weeks – 16 August 2020

NOAA Coral Reef Watch Daily 5km Degree Heating Weeks (Version 3.1) 16 Aug 2020



Global Sea Surface Temperature Anomaly – 1 April 2020

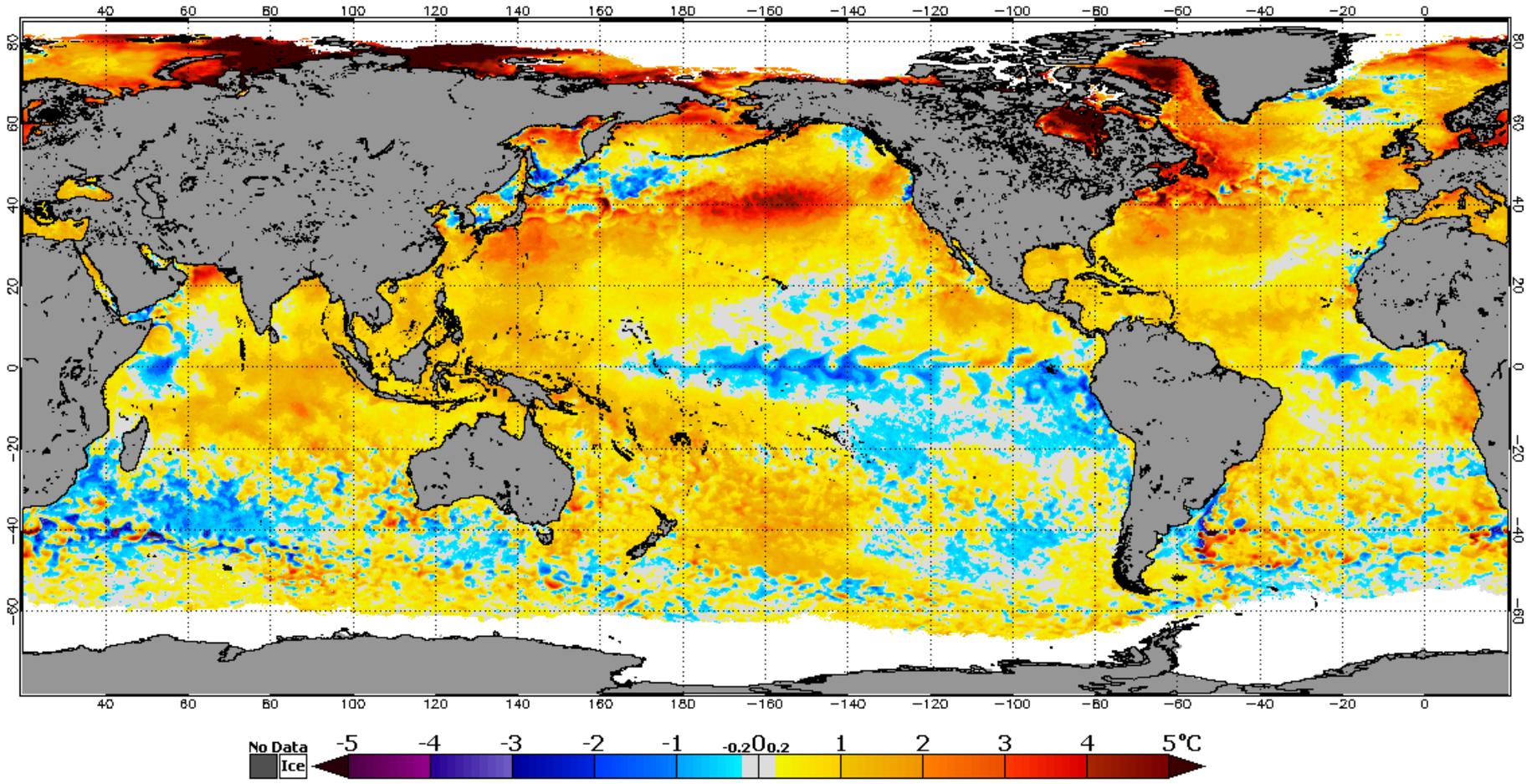
NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 1 Apr 2020



An area of higher ocean heat content was present northeast of Hawaii in April

Global Sea Surface Temperature Anomaly – 16 August 2020

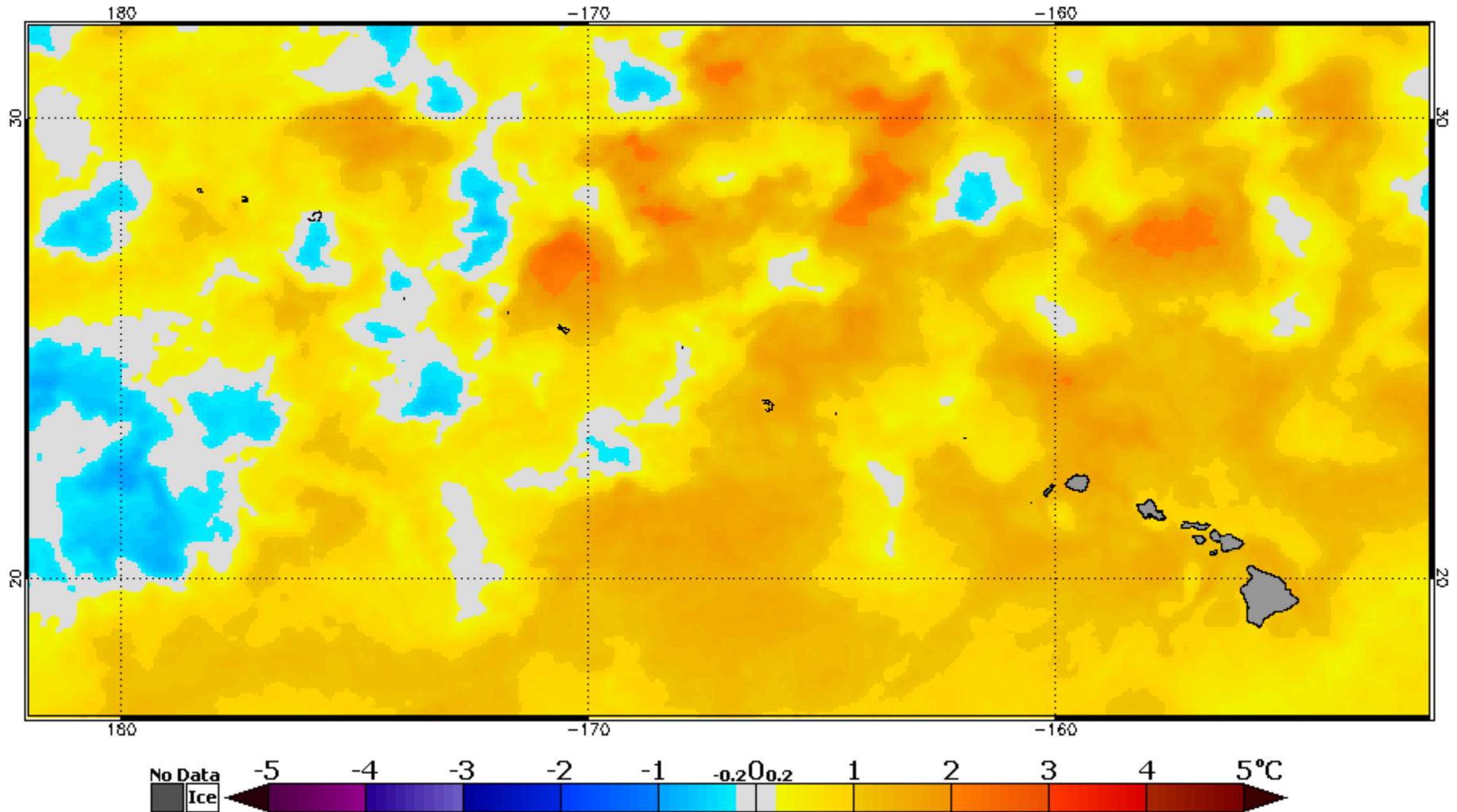
NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 16 Aug 2020



This ocean hot spot is still there in August
The Monument has gone from a mosaic of warm and cool areas to solidly warm

Sea Surface Temperature Anomaly, Hawaii Sector – 5 January 2020

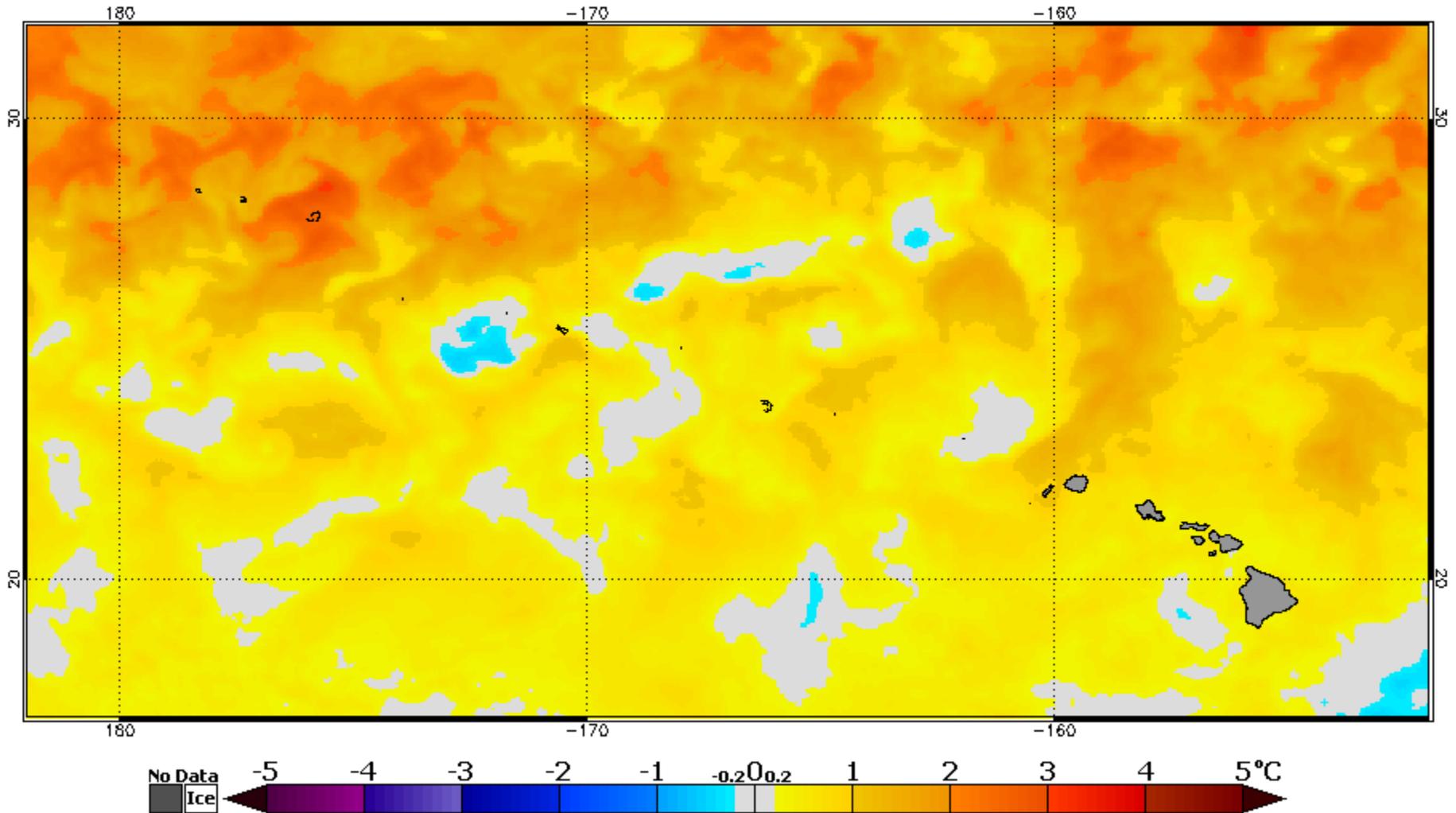
NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 5 Jan 2020



Winter 2019-2020 saw a mix of warm and cool areas in the Monument

Sea Surface Temperature Anomaly, Hawaii Sector – 13 May 2020

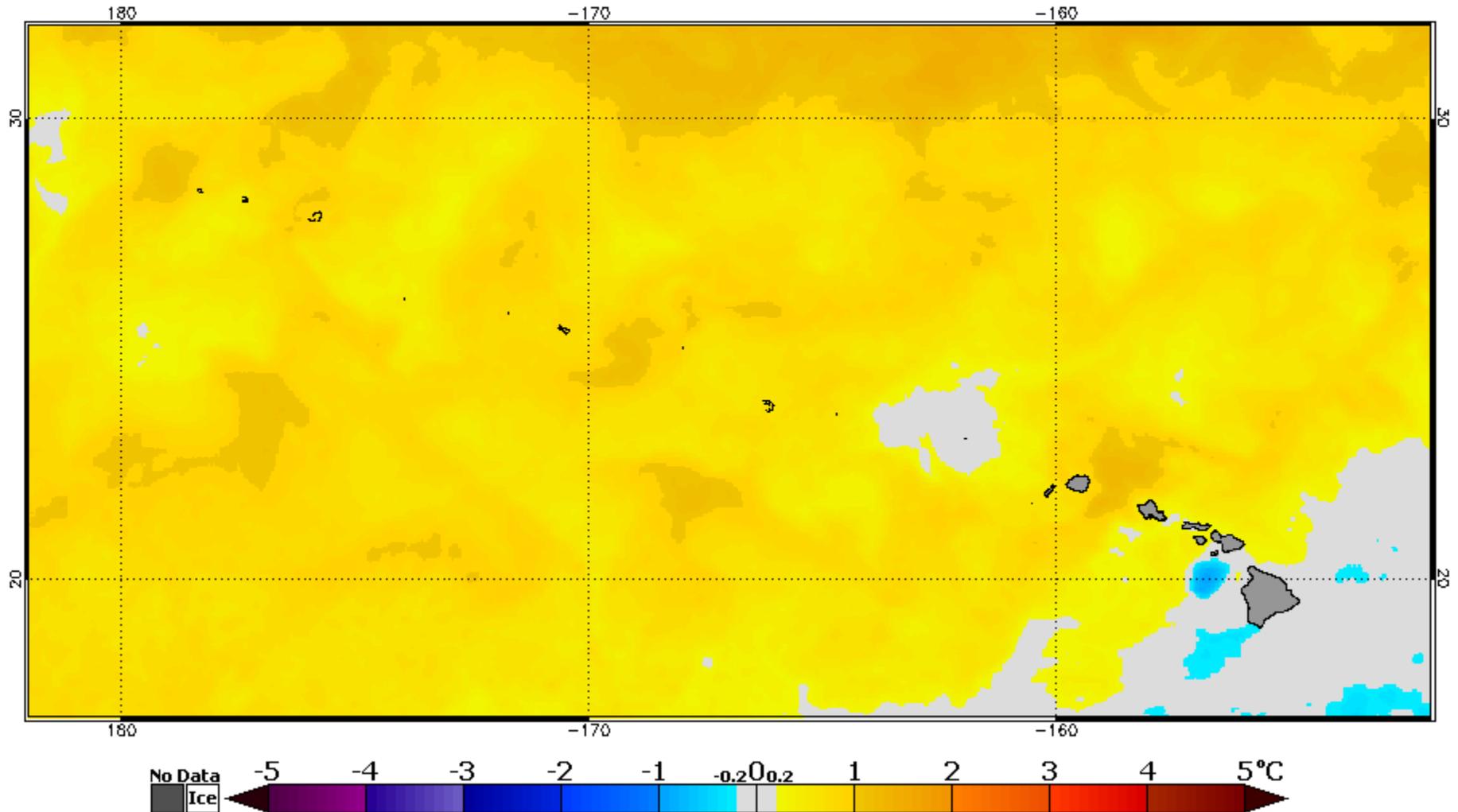
NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 13 May 2020



In spring a zone of excess heat lay to the north, possibly linked to this winter's strong polar vortex pattern

Sea Surface Temperature Anomaly, Hawaii Sector – 16 August 2020

NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 16 Aug 2020

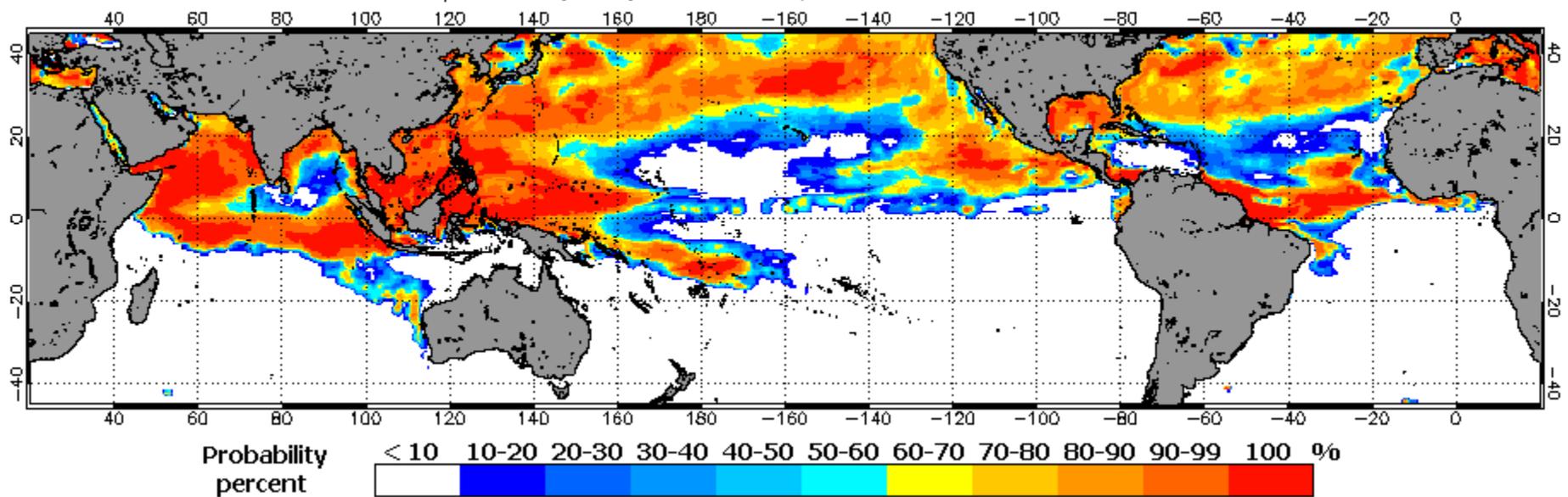


Now in summer, there are no extreme hot spots, but the entire Monument is now warmer than average

Bleaching Stress Probability – May-Aug. 2020

Prediction as of 12 May 2020

2020 May 12 NOAA Coral Reef Watch Bleaching Heat Stress Probabilities (Warning & Higher) for May–Aug 2020
Experimental, v5.0, CFSv2–based, 28 to 112 Ensemble Members

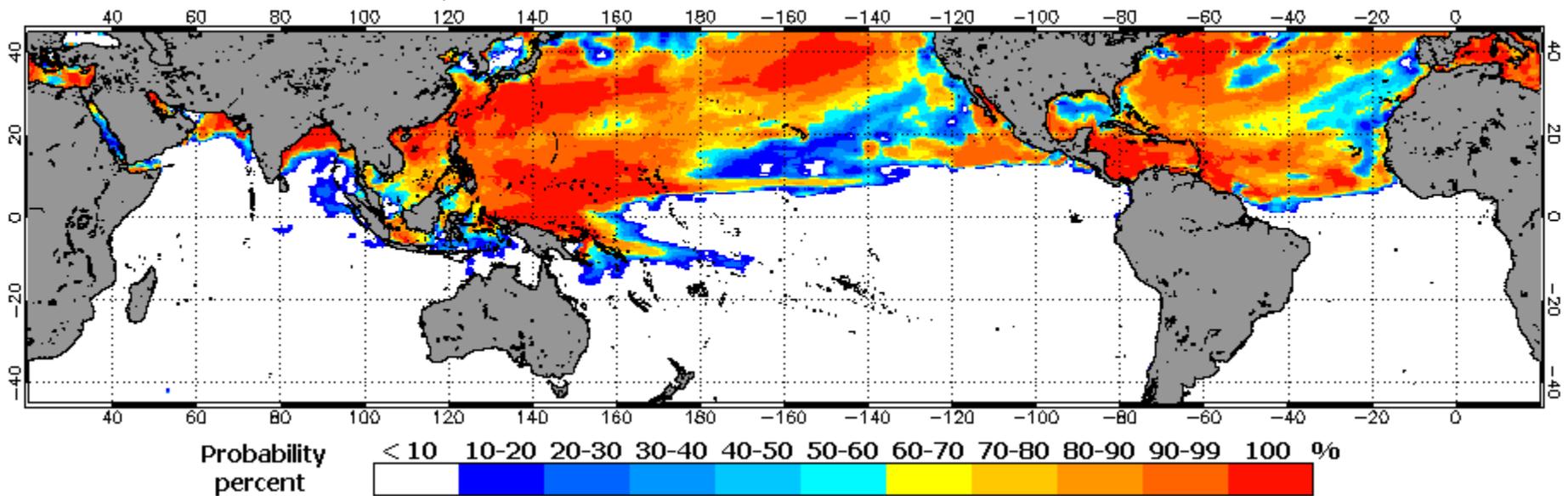


In the spring, an experimental product indicated that thermal stress was likely into late summer for the Pearl & Hermes – Midway – Kure sector of the Monument (but there was a low likelihood of bleaching elsewhere)

Bleaching Stress Probability – May-Aug. 2020

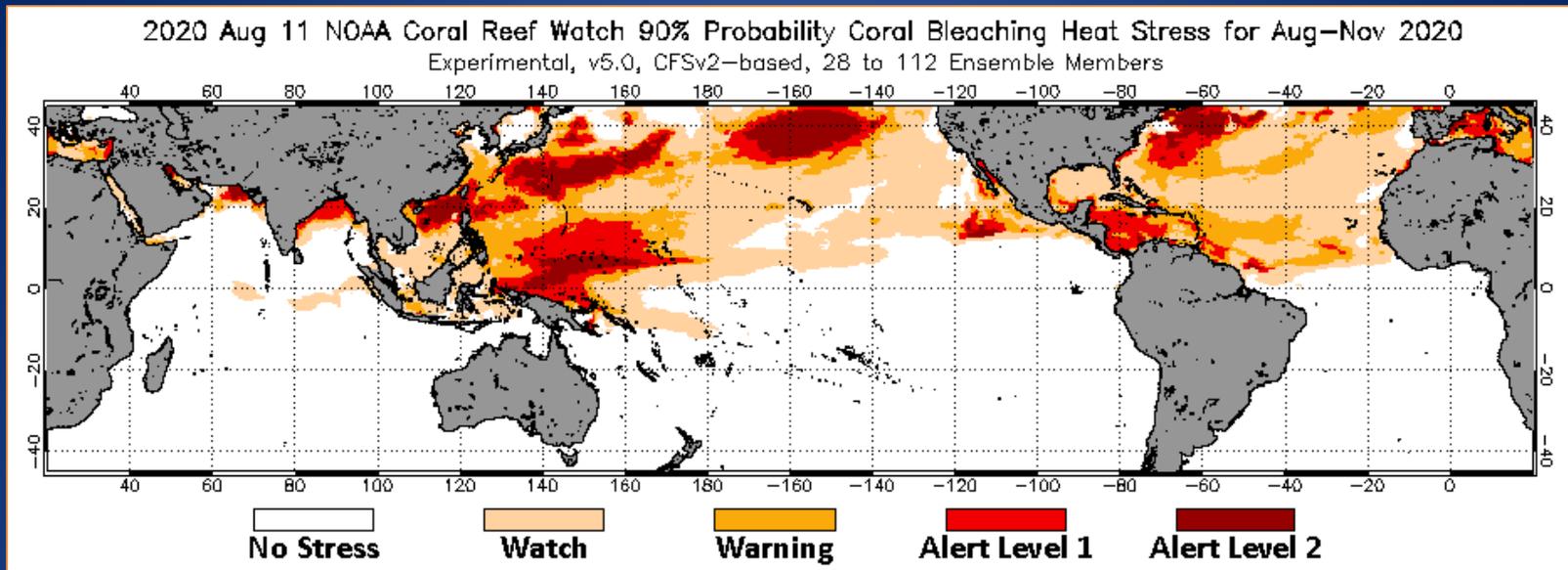
Prediction as of 16 August 2020

2020 Aug 11 NOAA Coral Reef Watch Bleaching Heat Stress Probabilities (Warning & Higher) for Aug–Nov 2020
Experimental, v5.0, CFSv2-based, 28 to 112 Ensemble Members

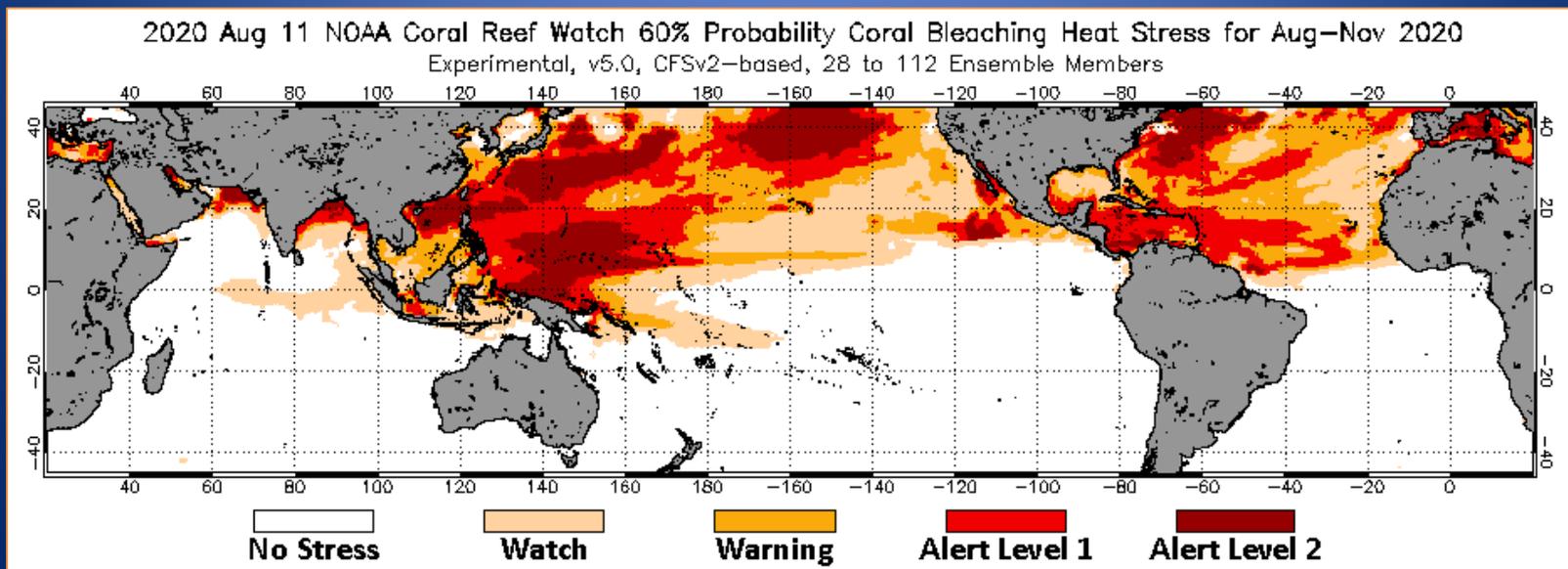


Now in summer, this product indicates a 90-100 percent change of heat stress for reefs throughout the Hawaiian Islands

90% Stress Level Probability – August–November 2020



60% Stress Level Probability – August–November 2020

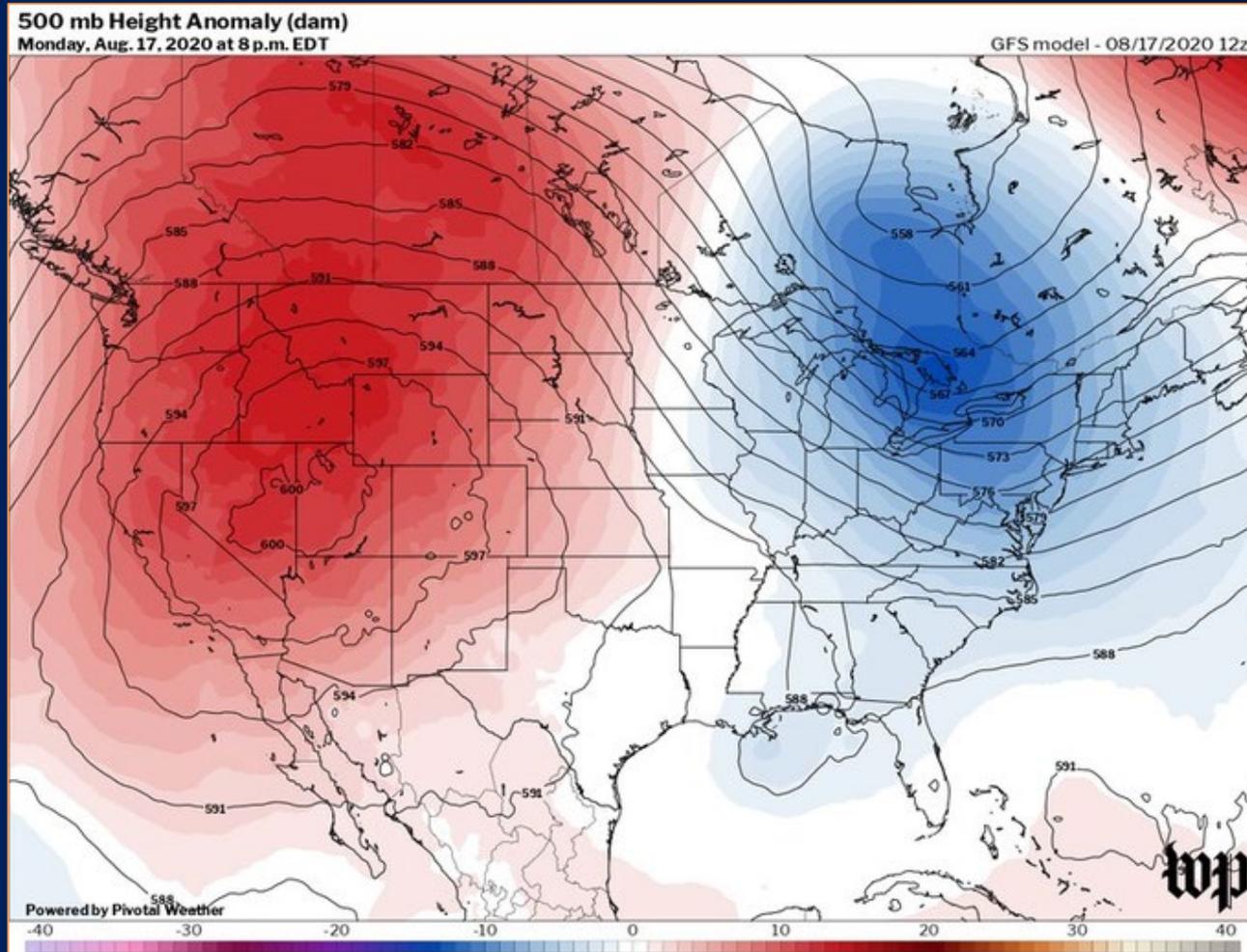


There is a 60 percent probability of bleaching warning conditions in the Monument later this summer

Digression #2

No place to hide...

The western United States is also experiencing record heat



Heat dome over western US on 17 August 2020

Digression #2

No place to hide...



August 15, 2020 Record Highs

National Weather Service Austin / San Antonio

Austin Mabry 107 (105 In 2011) Period of Record: 1891-2020	Austin Bergstrom 105 (104 In 1956) Period of Record: 1942-2020
San Antonio 104 (102 In 2013) Period of Record: 1885-2020	Del Rio 108 (105 In 2001) Period of Record: 1905-2020

High Temperatures for Today, August 15th, 2020
Existing Records in Red

@NWSSanAntonio weather.gov/ewx



Summer
In

Records fall all over Texas...

HOTTEST MONTH ON RECORD

PHOENIX, AZ

PREVIOUS RECORD JULY 2009 & AUG 2011	NEW RECORD JULY 2020
98.3°	99.0°

*PRELIMINARY DATA
*BASED ON AVERAGE TEMPERATURE

Record August Heat Continues!

Death Valley, CA 126° F Previous Record: 124° F (2002)	Needles, CA 123° F Previous Record: 118° F (2019) <i>NEW MONTHLY RECORD!</i> (122 on August 29 th , 1924)	Barstow, CA 113° F Previous Record: 112° F (2002)
Las Vegas, NV 113° F Previous Record: 111° F (2002)	Kingman, AZ 111° F Previous Record: 106° F (1933) <i>TIES MONTHLY RECORD!</i> (111 on August 12 th , 1933)	

NATIONAL WEATHER SERVICE

...and in the desert Southwest

Digression #2

And the winner is...

DEATH VALLEY, AT 130°F!



Death Valley National Park
Furnace Creek Visitor Center (DEVC1)



Today's Observations

Conditions at 4:00pm

Temp: **127°F**
Humidity: **7%**
Wind: **NW 2, Gust 6 MPH**
Rain (1hr): **0.00 in.**

Daily Stats So Far

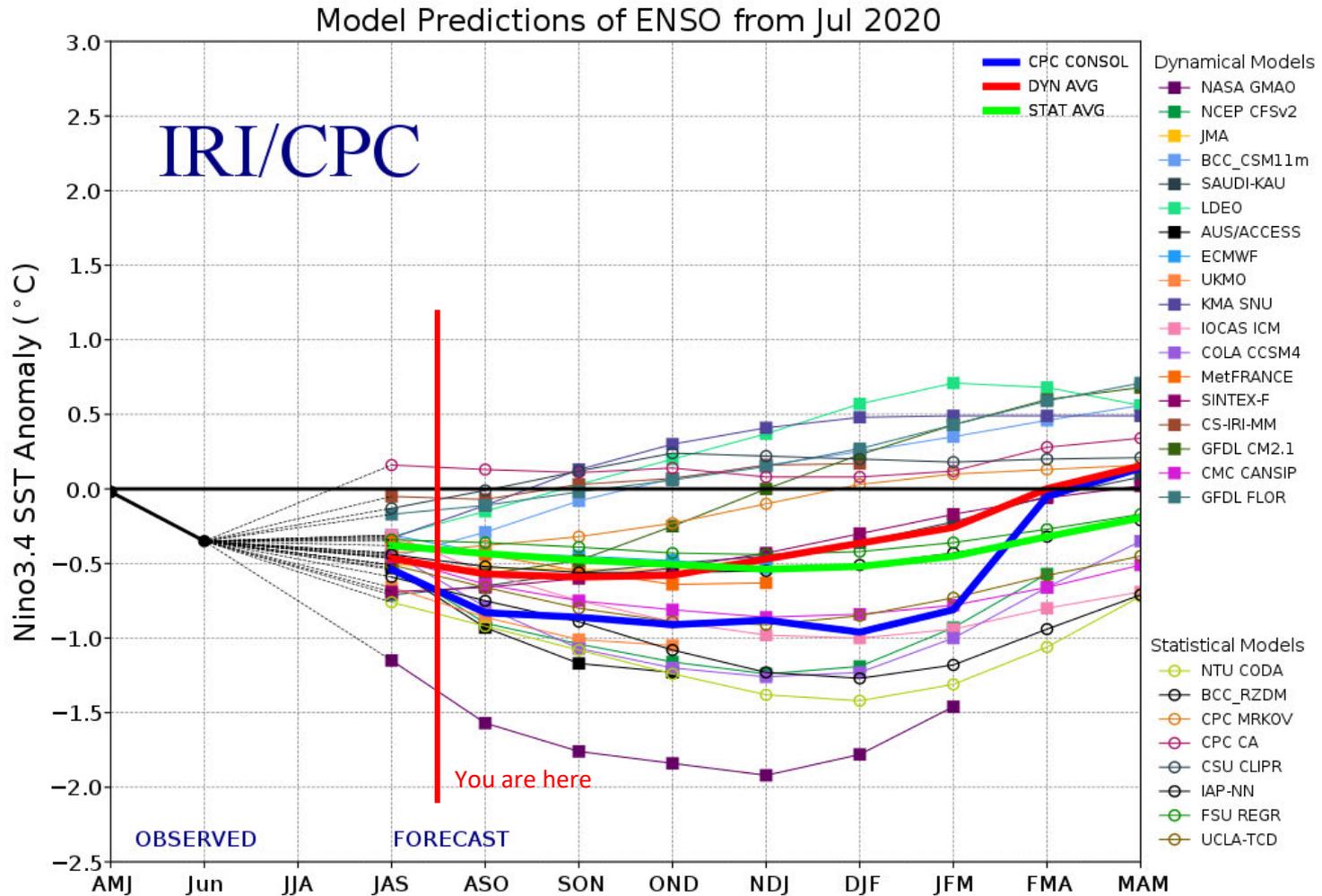
Max Temp: **130°F @ 3:41pm**
Min Temp: **96°F @ 5:52am**
Max Gust: **8 MPH @ 1:00am**
Total Rain: **0.00 in.**

Summary statistics for 16 August 2020, courtesy the National Park Service

Hottest temperature recorded in North America in over 100 years
At least it finally cooled down to 95°F by dawn

Looking Forward

An ensemble of 27 climate models predicts ENSO-neutral trending to La Niña conditions through early winter 2020



Conclusions

2020 is currently the second hottest year on record, after one of the warmest winters on record in the Northern Hemisphere, followed by a hot summer in many areas

As a result, the Northern Pacific Ocean is carrying excess heat content

ENSO-neutral conditions are present, and expected to persist through summer 2020

There is a 60% chance of La Niña development this winter

There is a 90+% probability of thermal stress to Monument coral reefs this summer, with all areas of the Hawaiian Islands affected

There is a 60% probability that Monument reefs will reach Bleaching Watch status

Local tropical cyclone events have already occurred in Hawaii this year, despite the presence of an ENSO-neutral pattern trending into La Niña

This is not a favorable for Eastern Pacific cyclone formation, whereas high ocean heat content in the Atlantic creates increased risks for a severe season there

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 future melting trends in Greenland and Antarctica

Questions?

