

Climate Indicators Summary

July 2016

PMNM Climate Change Working Group

Dan A. Polhemus

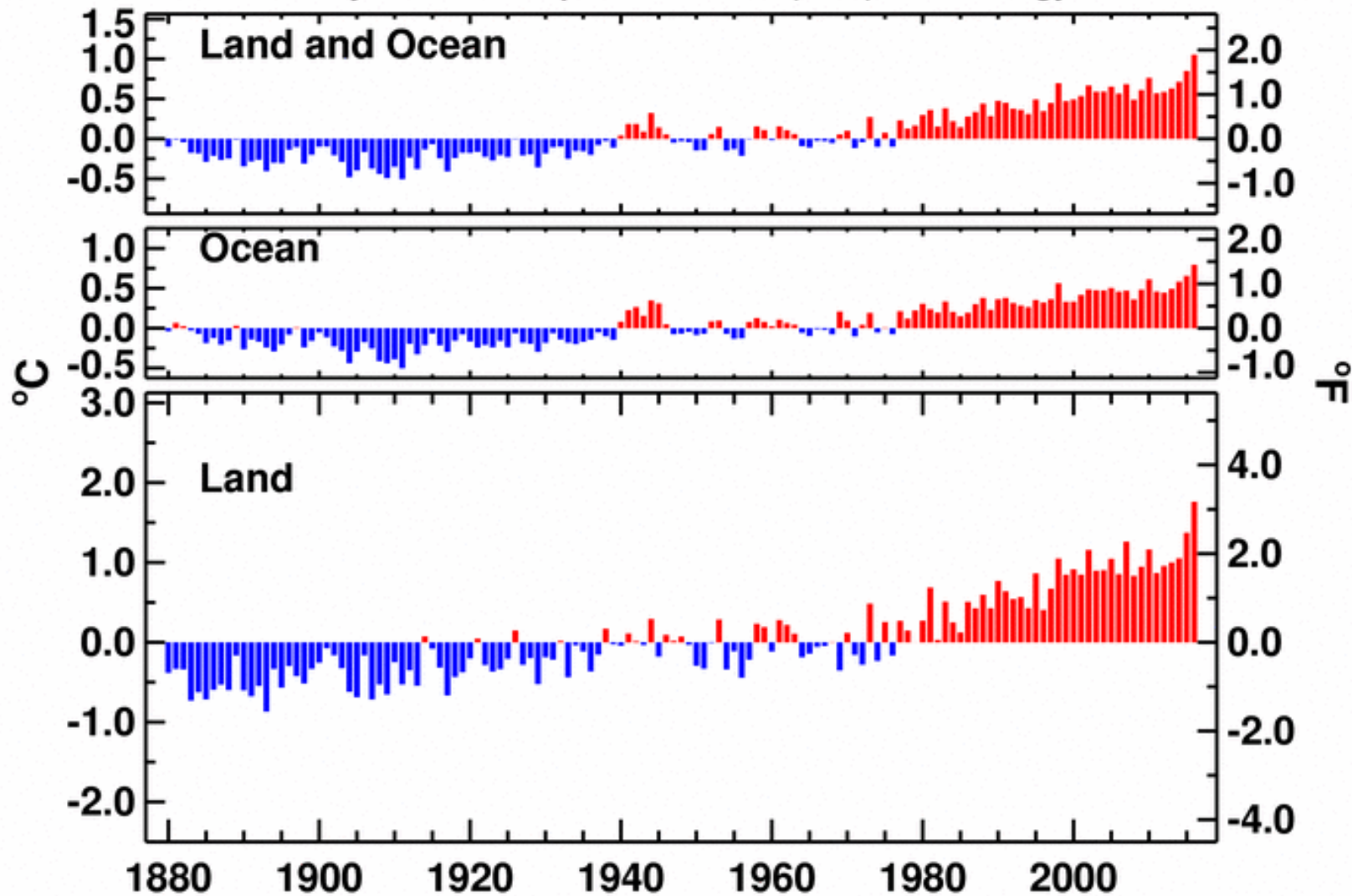
U. S. Fish & Wildlife Service

Honolulu, HI

Jan-Jun Global Surface Mean Temp Anomalies

NCEI/NESDIS/NOAA

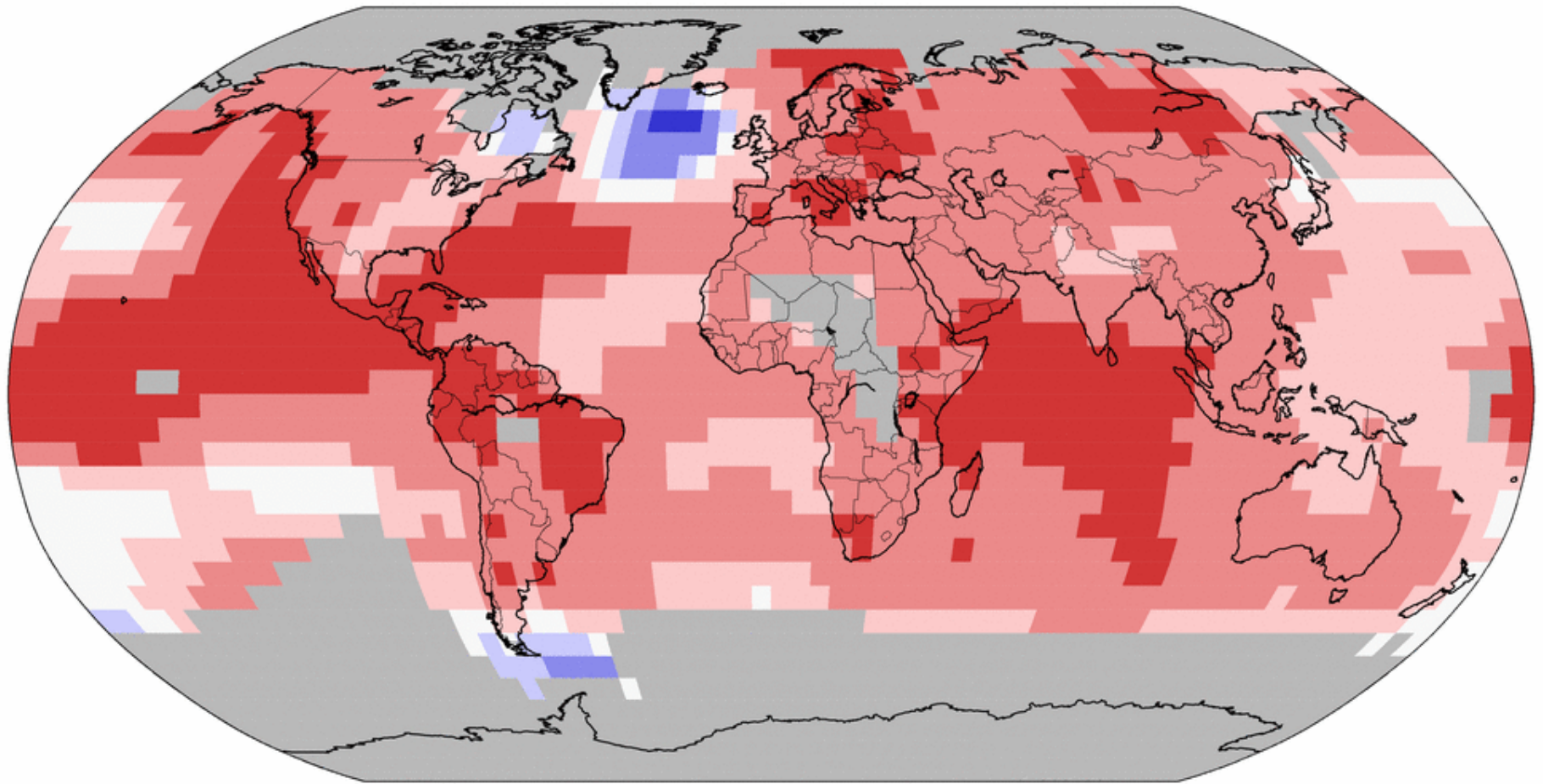
Analysis is based upon Smith et al. (2008) methodology.



Land & Ocean Temperature Percentiles Jan–Dec 2015

NOAA's National Centers for Environmental Information

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




**Record
Coldest**


**Much
Cooler than
Average**


**Cooler than
Average**


**Near
Average**


**Warmer than
Average**

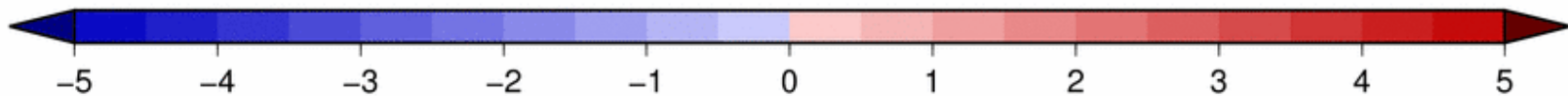
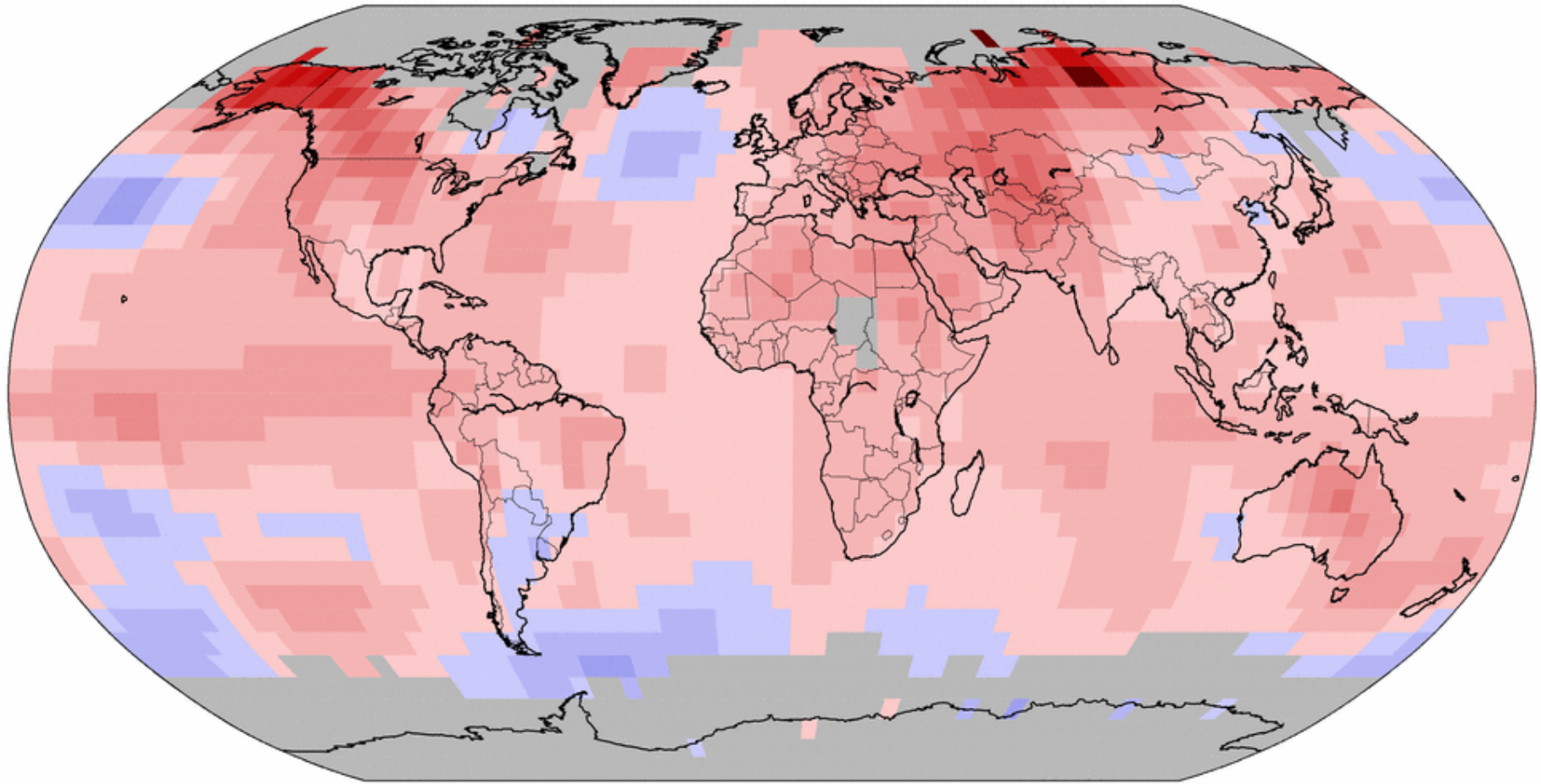

**Much
Warmer than
Average**


**Record
Warmest**



Land & Ocean Temperature Departure from Average Jan–Jun 2016 (with respect to a 1981–2010 base period)

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



Degrees Celsius

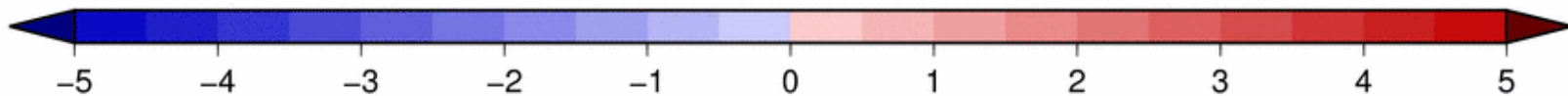
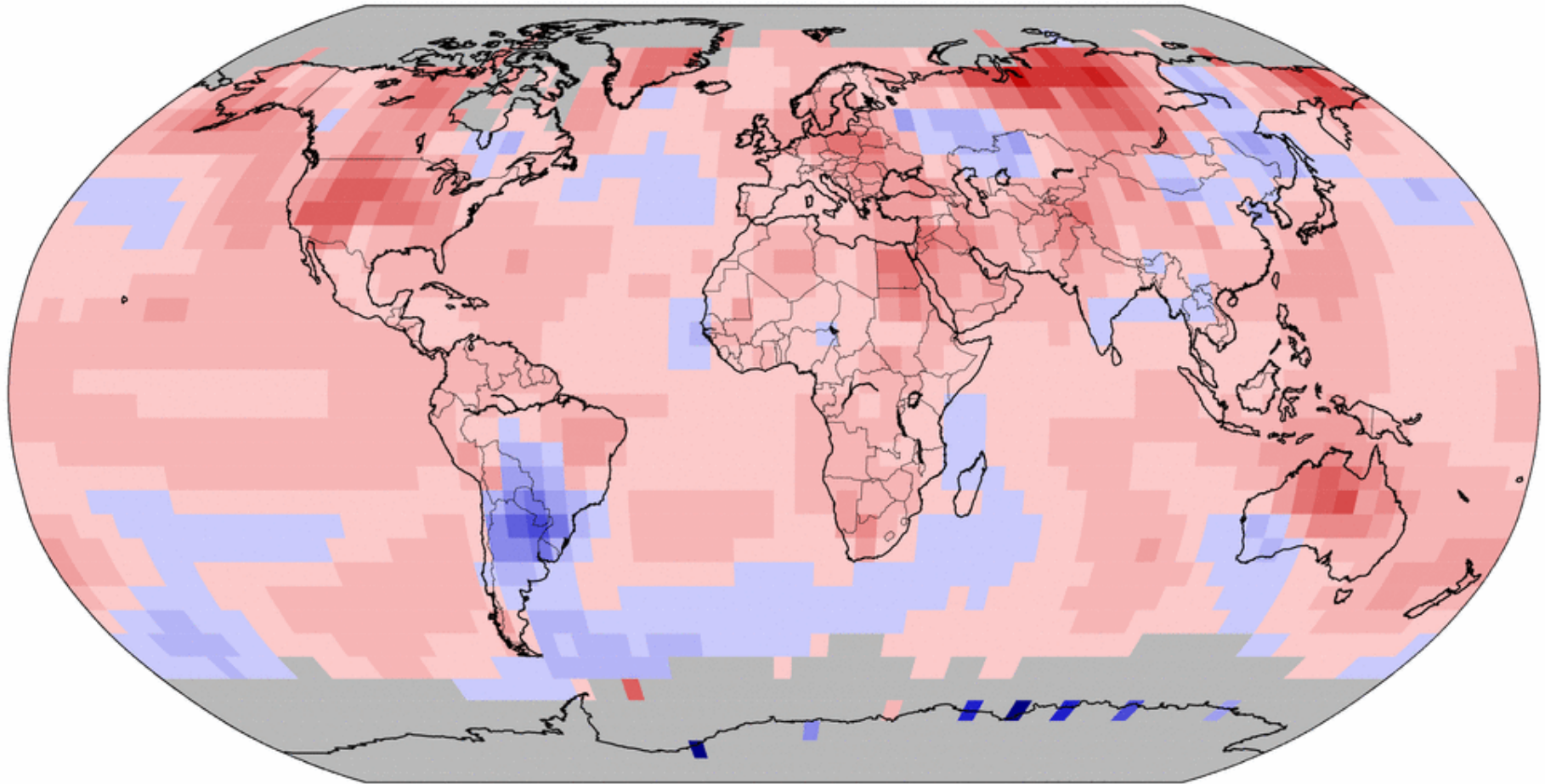
Please Note: Gray areas represent missing data
Map Projection: Robinson



National Centers for Environmental Information
Wed Jul 13 07:05:42 EDT 2016

Land & Ocean Temperature Departure from Average Jun 2016 (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

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

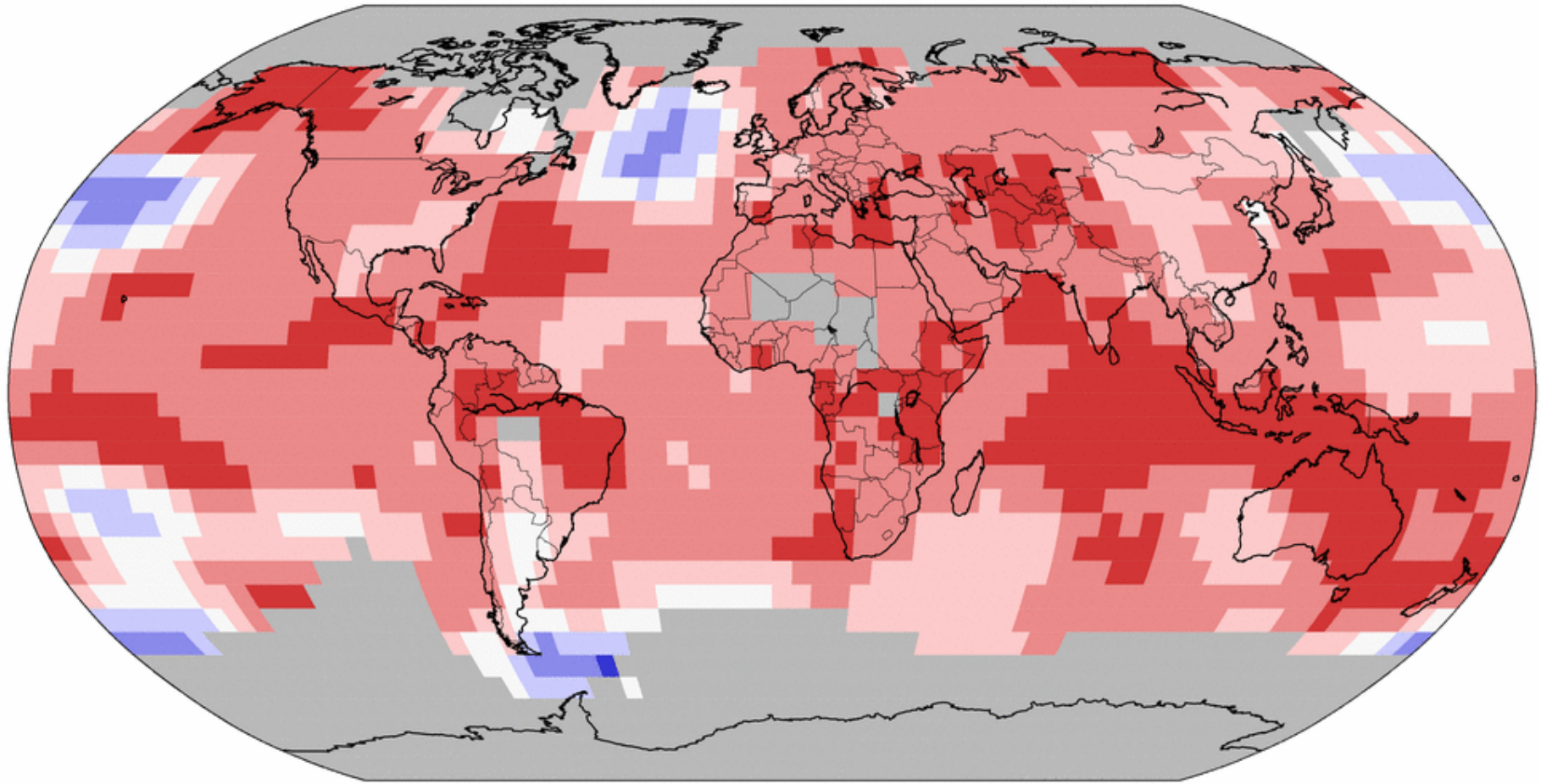


National Centers for Environmental Information
Wed Jul 13 07:05:42 EDT 2016

Land & Ocean Temperature Percentiles Jan–Jun 2016

NOAA's National Centers for Environmental Information

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




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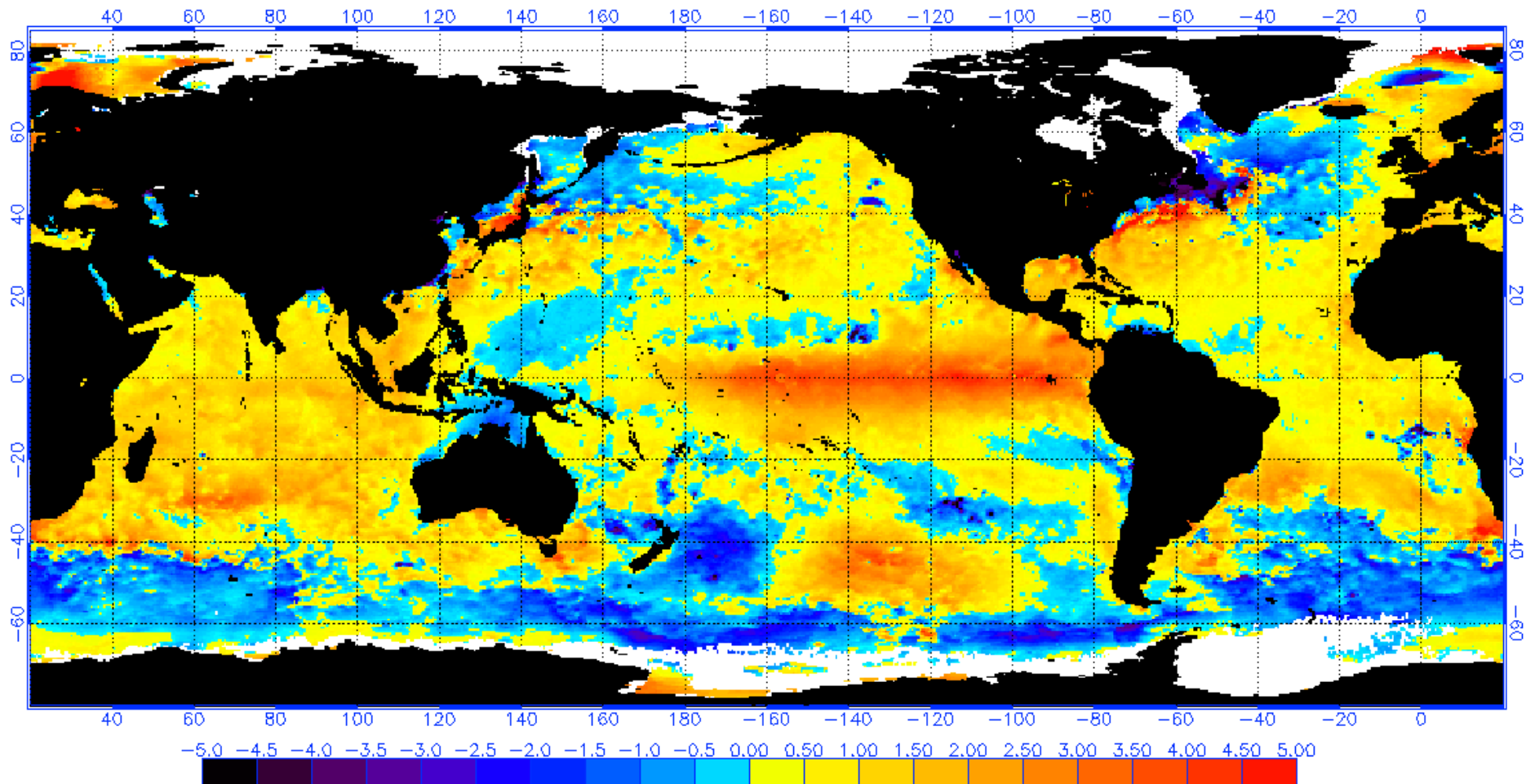

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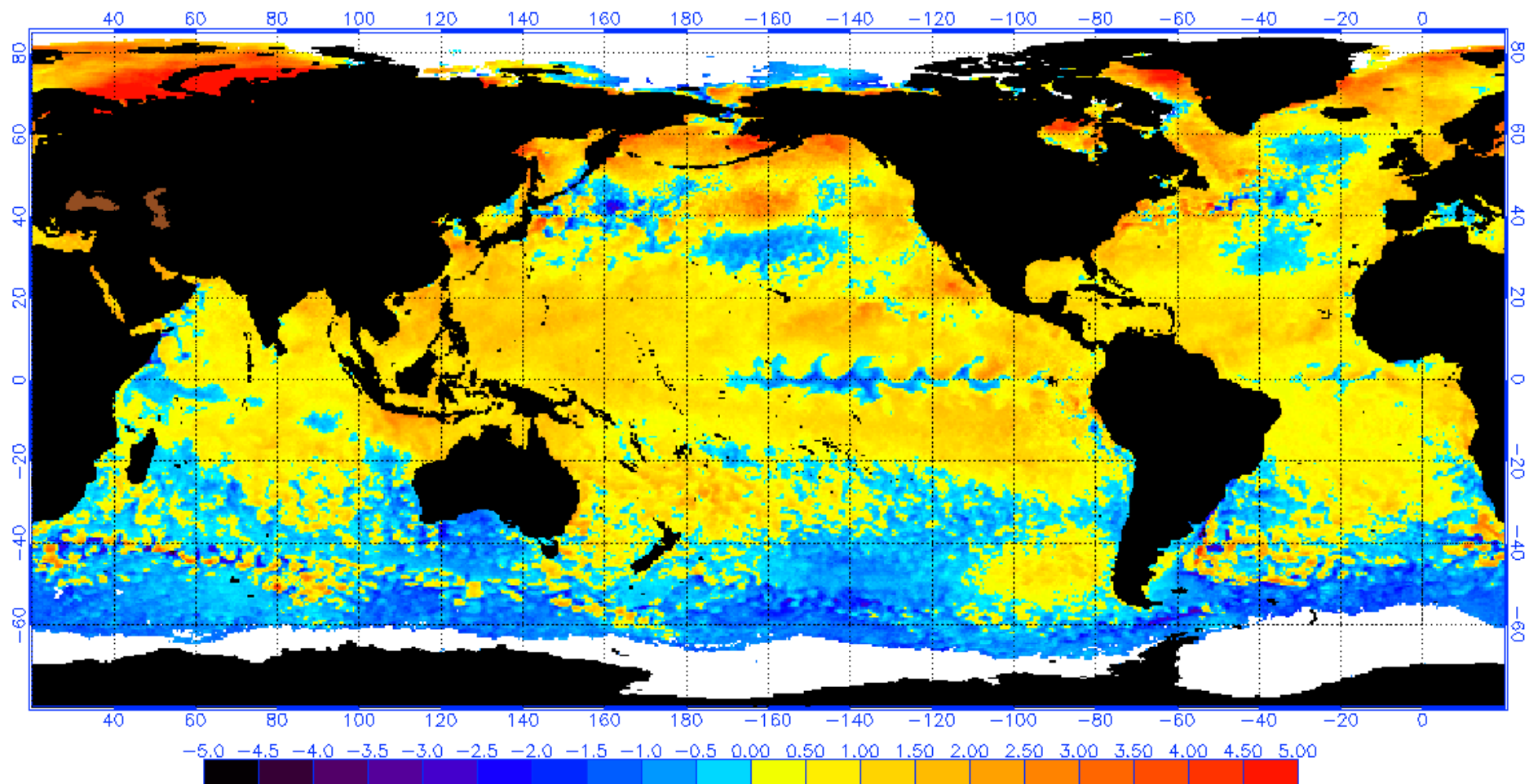
Global Sea Surface Temperature Anomaly 4 January 2016

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 1/4/2016
(white regions indicate sea-ice)



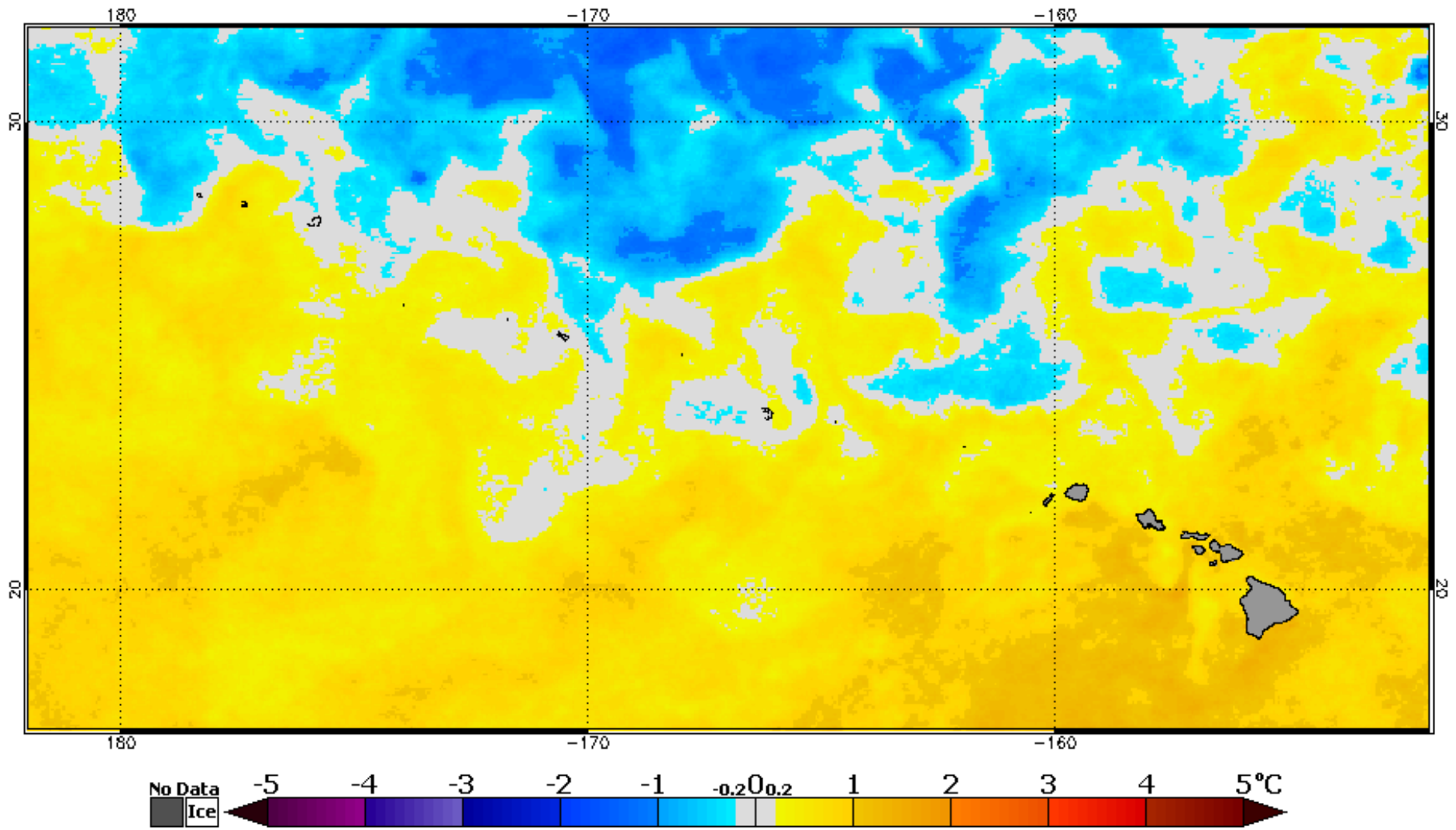
Global Sea Surface Temperature Anomaly 25 July 2016

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 7/25/2016
(white regions indicate sea-ice)



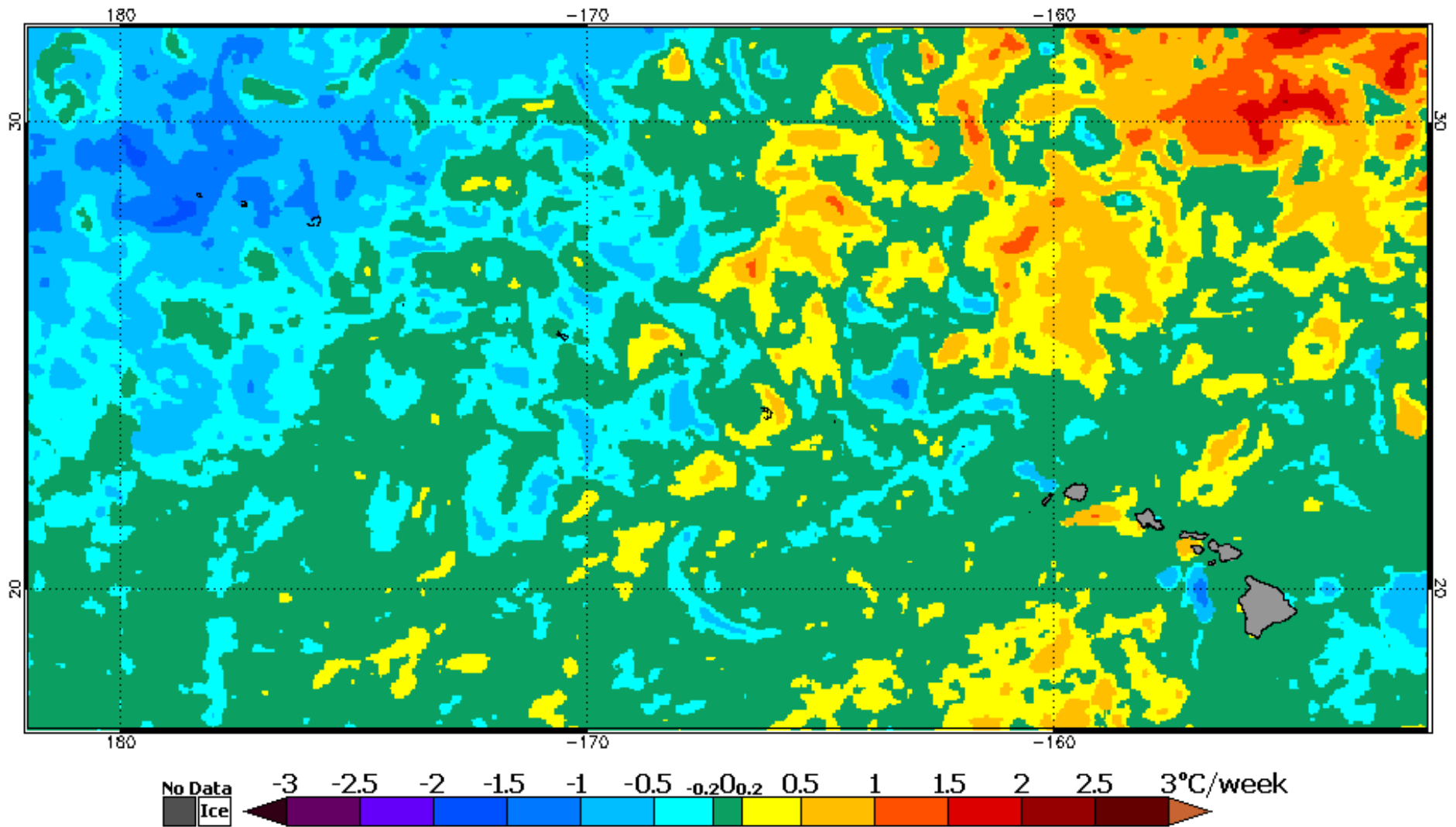
Sea Surface Temperature Anomaly, Hawaii Sector, 26 July 2016

NOAA Coral Reef Watch Daily 5-km Geo-Polar Blended Night-Only SST Anomalies 26 Jul 2016



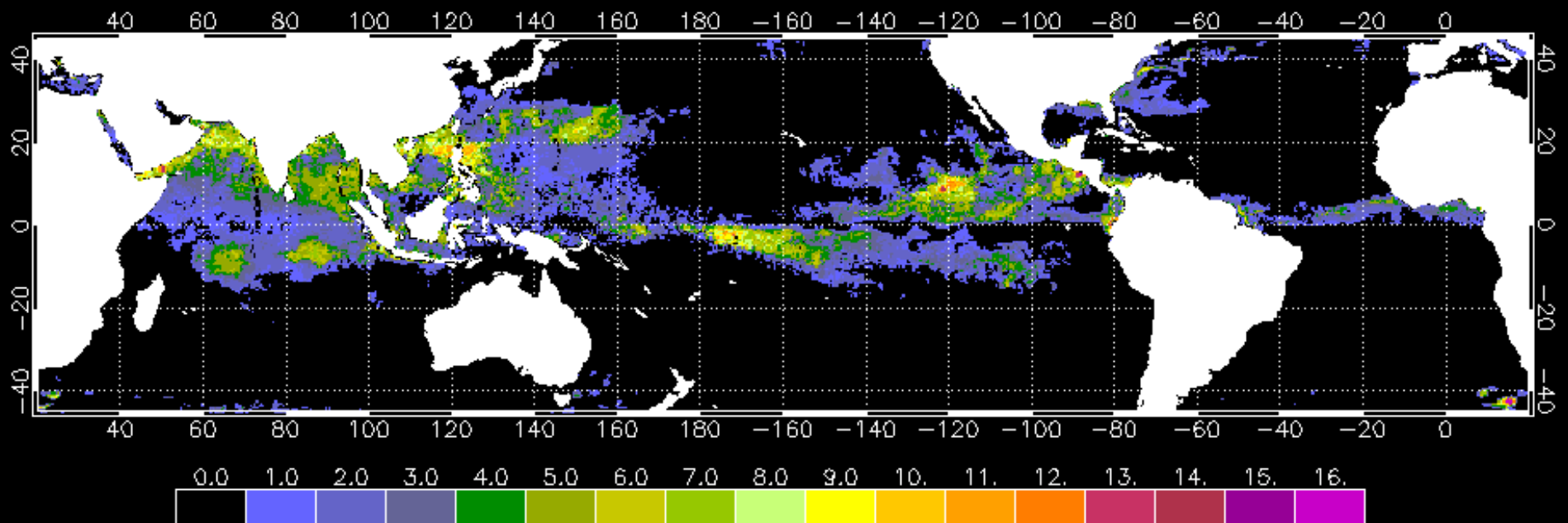
Projected SST Trend, Hawaii Sector, 26 July 2016

NOAA Coral Reef Watch Daily 5-km Geo-Polar Blended Night-Only SST Trend (Past 7 Days) 26 Jul 2016



Degree Heating Weeks, 25 July 2016

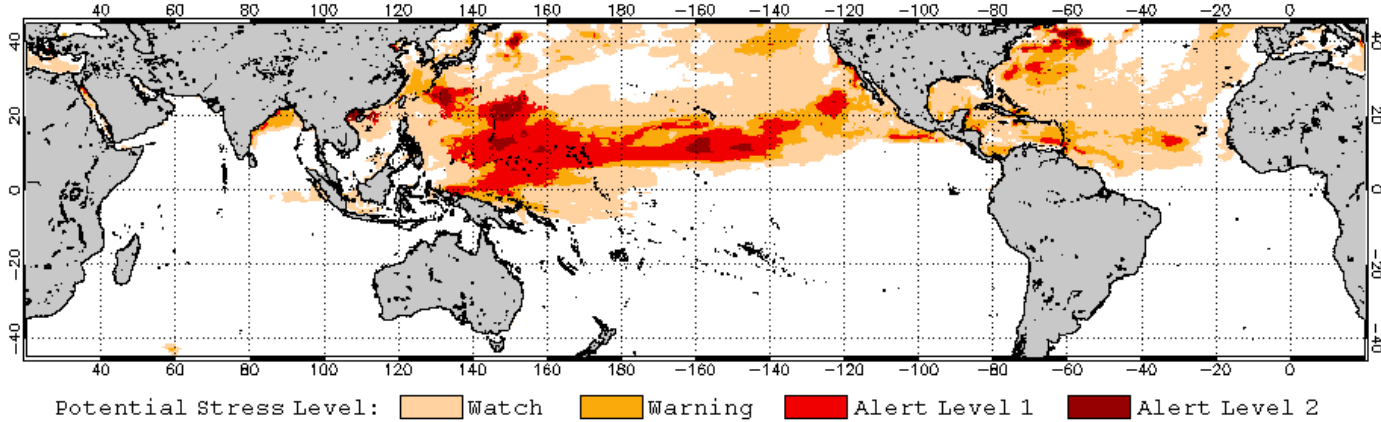
NOAA/NESDIS Degree Heating Weeks for last 12 Weeks - 7/25/2016



Bleaching Probabilities, 26 July 2016

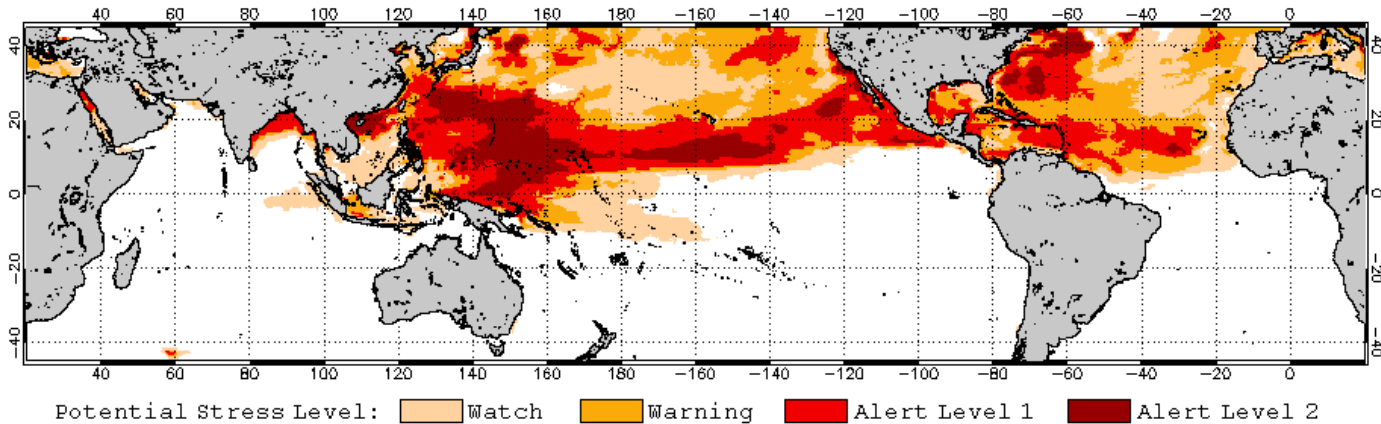
90%

2016 Jul 26 NOAA Coral Reef Watch 90% Probability Coral Bleaching Thermal Stress for Aug–Nov 2016
Experimental, v3.0, CFSv2–based, 28–member Ensemble Forecast



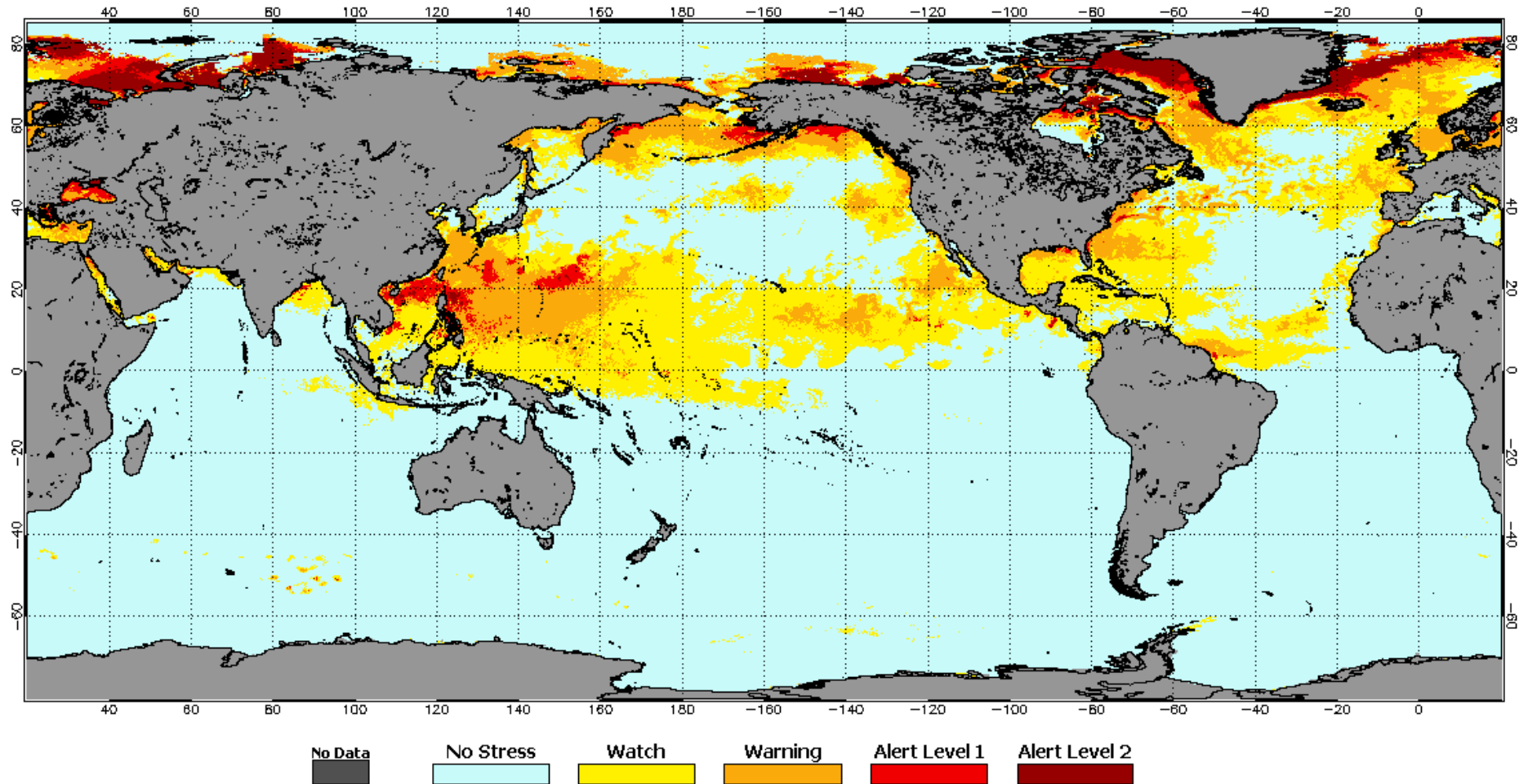
60%

2016 Jul 26 NOAA Coral Reef Watch 60% Probability Coral Bleaching Thermal Stress for Aug–Nov 2016
Experimental, v3.0, CFSv2–based, 28–member Ensemble Forecast



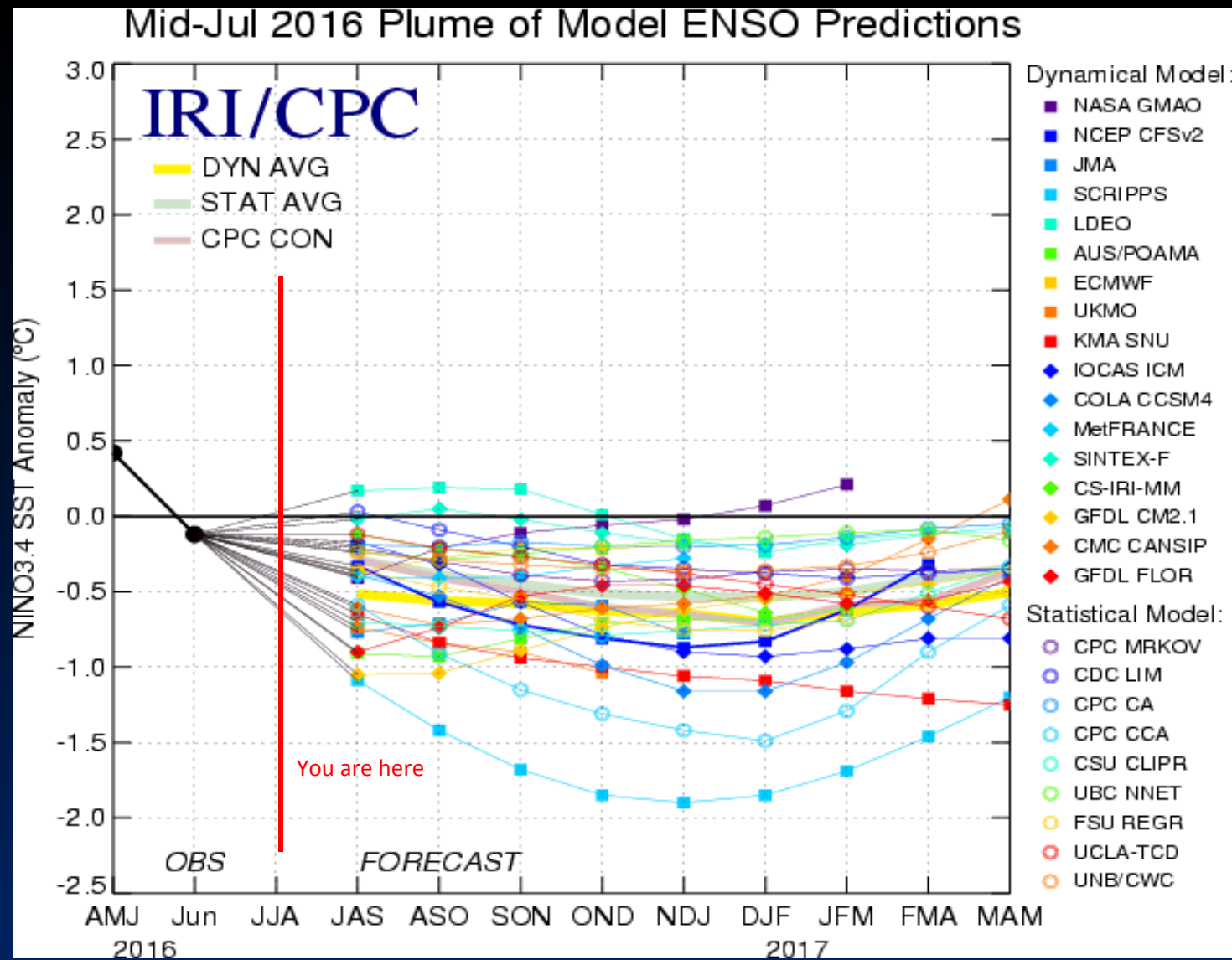
Bleaching Stress Alert Levels, 26 July 2016

NOAA Coral Reef Watch Daily 5-km Geo-Polar Blended Night-Only Bleaching Alert Area 7d Max 26 Jul 2016



Looking Forward

An ensemble of 25 climate models predicts La Nina conditions by late 2016



Conclusions

2016 will be the warmest year on record globally, both on land and in the ocean

El Nino has dissipated, and La Nina conditions will likely appear by late 2016

Forecast projections indicate potential additional bleaching in the NWHI in 2016

If it occurs, this should not be on the scale of the 2014 bleaching event

Recovery from recent bleaching continues to be monitored

Lisianski suffered up to 90% coral mortality on the SE side

Cyclogenesis has been anomalously high in the Eastern Pacific so far this year

But no storms have reached the NWHI

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

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