Climate Indicators Summary
February 2017
PMNM Climate Change Working Group

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Land & Ocean Temperature Percentiles Jan–Dec 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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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 Dec 2016
(with respect to a 1981–2010 base period)

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

You are here

Degrees Celsius

Please Note: Gray areas represent missing data
Map Projection: Robinson
Digression #1 – The Arctic Has Been Unusually Warm

Temperature anomalies from 1 Nov. 2015 to 1 Jan. 2017
Note the two successive very warm winters in the Arctic
Full-year Arctic Air Temperature Anomaly for 2016

Arctic Air Temperature Difference
January to December 2016

NOAA/ESRL Physical Sciences Division

NSIDC courtesy NOAA/ESRL Physical Sciences Division
As a result, Arctic sea ice is at a record low

Approximately 3 standard deviations below long-term mean
Global sea ice extent is also at a record low

This reflects both Arctic and Antarctic record sea ice lows for their respective seasons
Current trend in context of past 40 years

No analog for current sea ice trajectory
New research also indicates a direct correlation between Arctic sea ice extent and atmospheric CO$_2$.

Global Sea Surface Temperature Anomaly - 1 August 2016
Global Sea Surface Temperature Anomaly – 30 January 2017
Sea Surface Temperature Anomaly, Hawaii Sector - 2 August 2016

NOAA Coral Reef Watch Daily 5-km Geo-Polar Blended Night-Only SST Anomalies 2 Aug 2016
Sea Surface Temperature Anomaly, Hawaii Sector – 31 January 2017
Sea Surface Temperature Anomaly, Hawaii Sector - 8 Jan. 2017
Degree Heating Weeks - 30 January 2017
Looking Forward

An ensemble of 25 climate models predicts La Niña or ENSO neutral conditions through summer 2017.
Conclusions

2016 was the warmest year on record globally, both on land and in the ocean. The Monument was spared the worst of this heat.

La Niña conditions currently prevail, but may relax to ENSO-neutral by summer. This generally means cooler ocean temperatures and fewer hurricanes.

There is no expectation of coral bleaching in the NWHI through May 2017. But the ocean does appear to be carrying some excess heat content through winter in this sector.

Cyclogenesis should not be an issue between now and early May 2017. Eastern North Pacific hurricane season runs from 15 May to 30 November.

Sea level continues to rise at 3-5 mm per year. Inundation is a long-term problem that will not go away.
Questions?