Turf Management in a Changing Climate

Recent extremes and what's coming next…

Rich Apuzzo
Meteorologist
Skyeye Weather LLC
www.skyeyeweather.com

SportsTurf MANAGERS ASSOCIATION

Turf Management in a Changing Climate

- I'm not talking about "Climate Change"!
  - That was a hoax from the start…
- Climate is Dynamic, not Static.
  - It has been changing since the earth was formed.
- Computer Models don't grow grass…
  - but rainfall, sunshine, favorable temperatures and CO2 do…
- Preparation is Key to Success!

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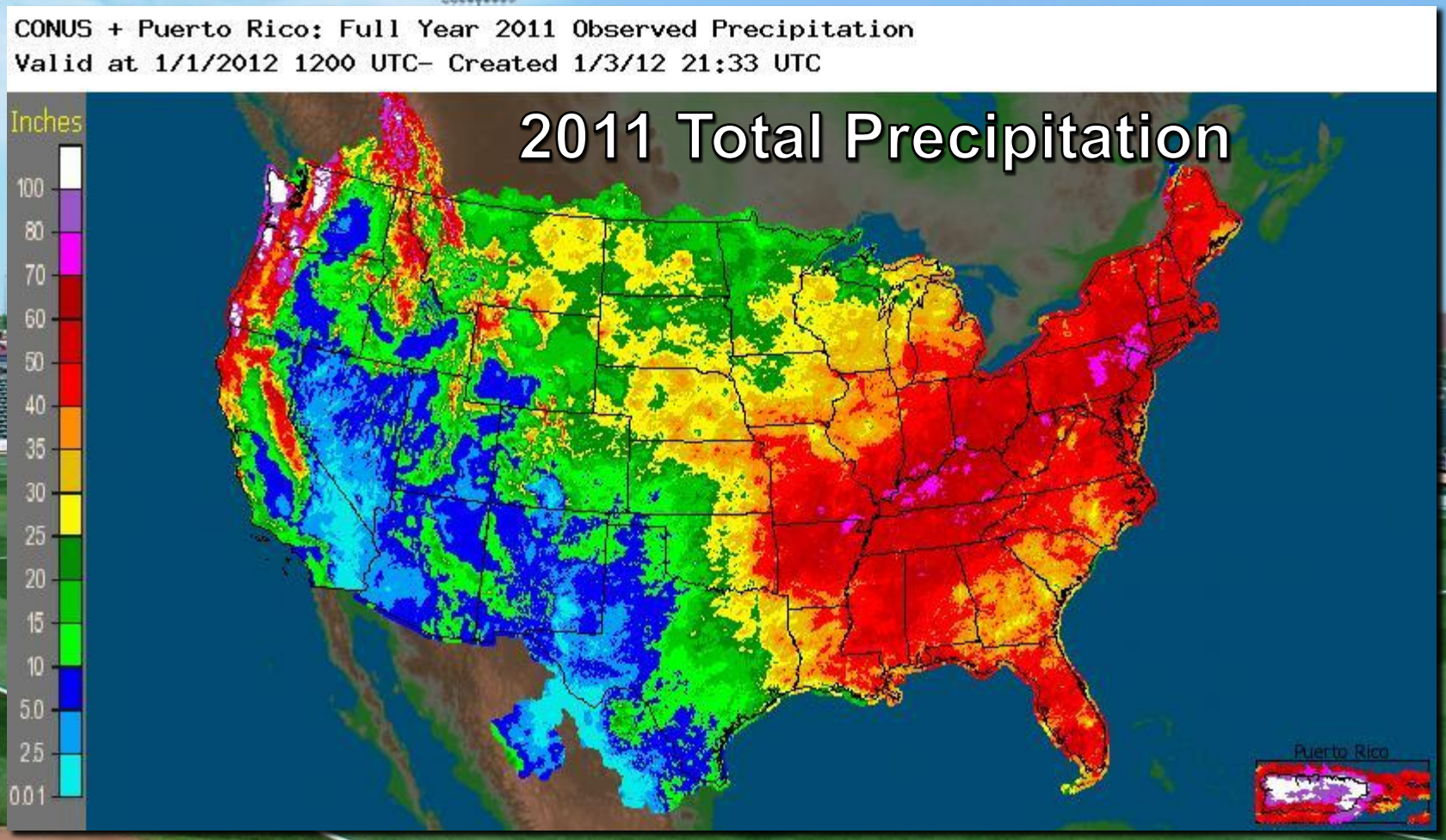
The Extremes of 2011



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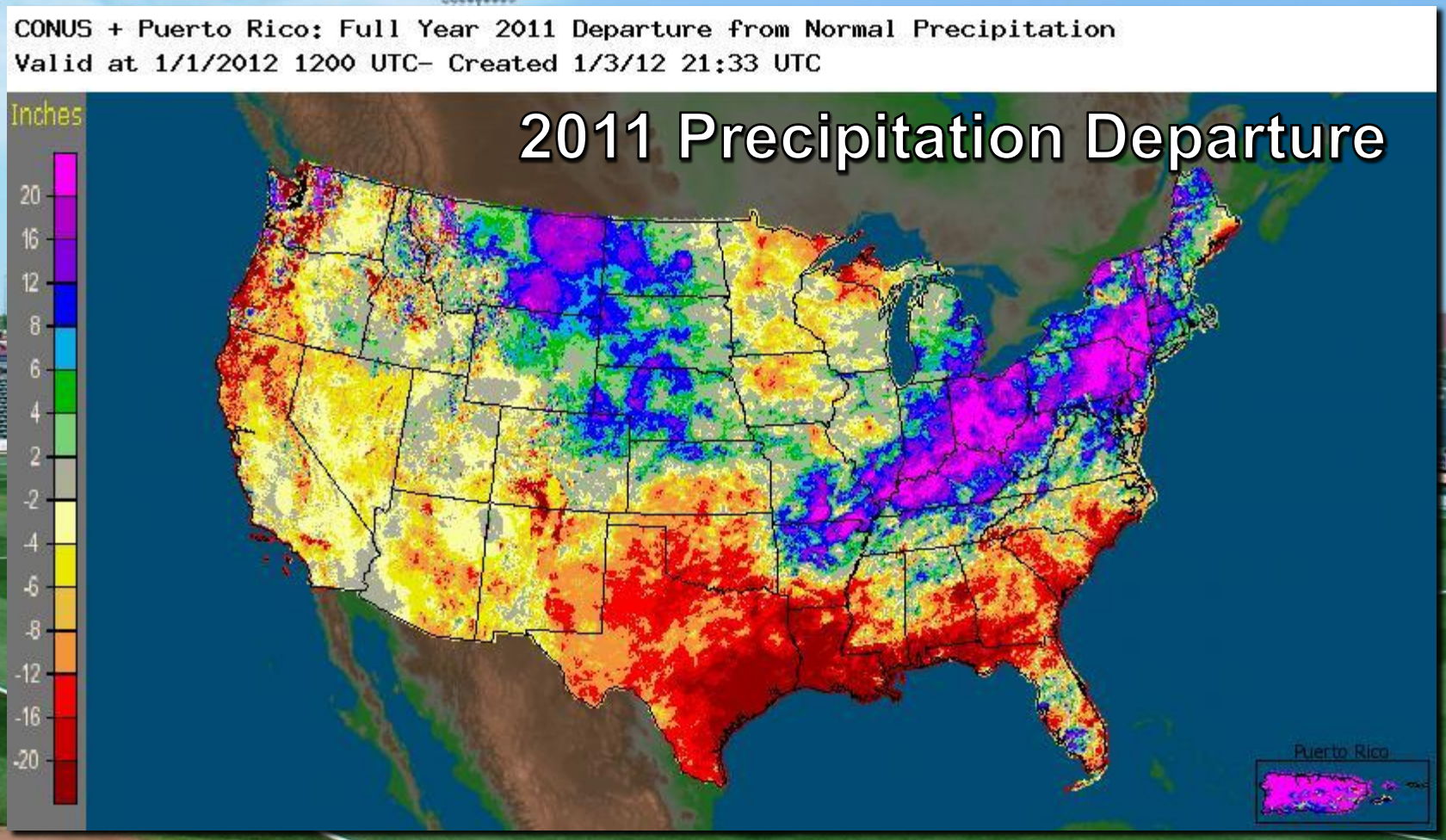
The Extremes of 2011



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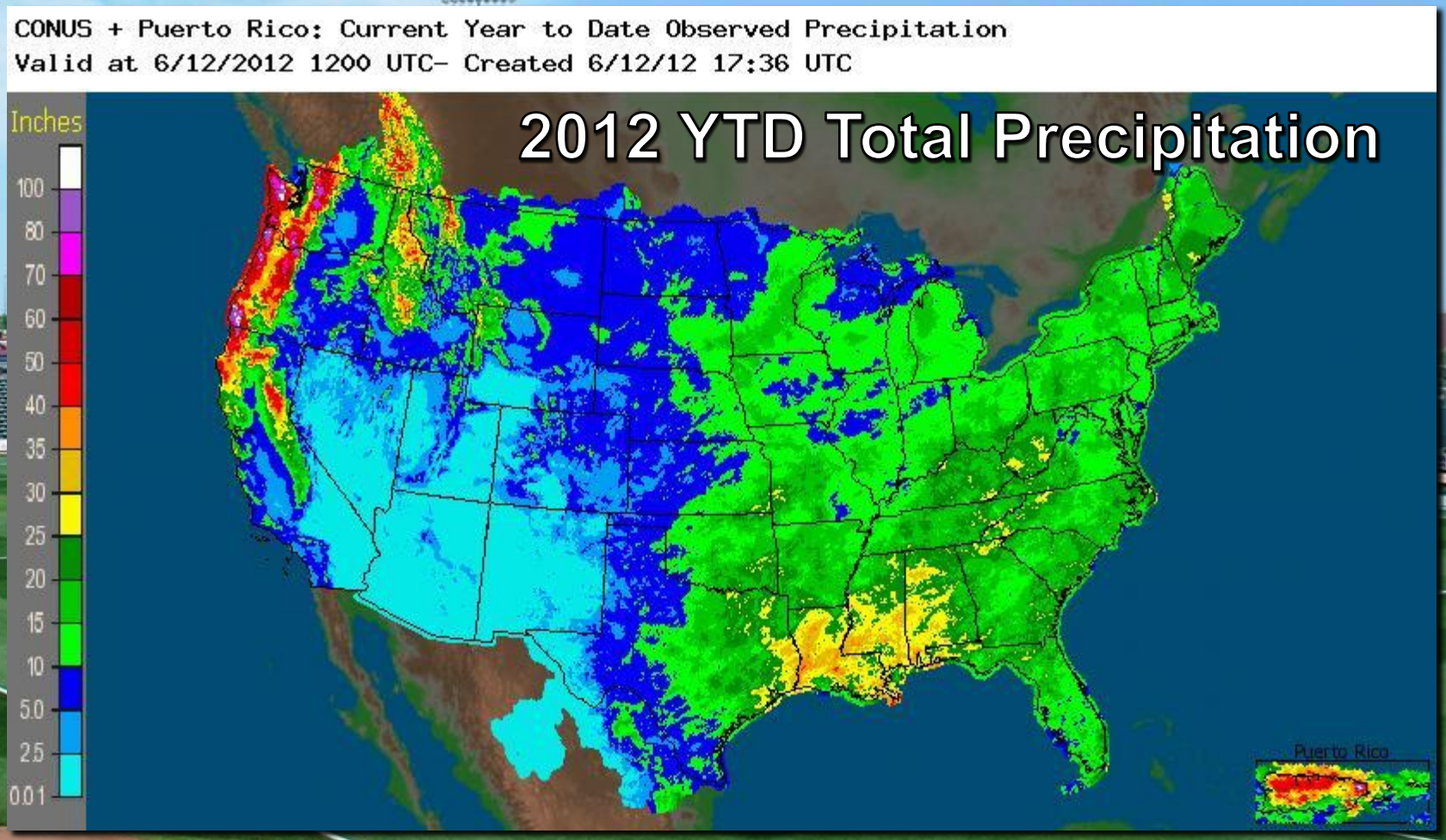
A Change in 2012



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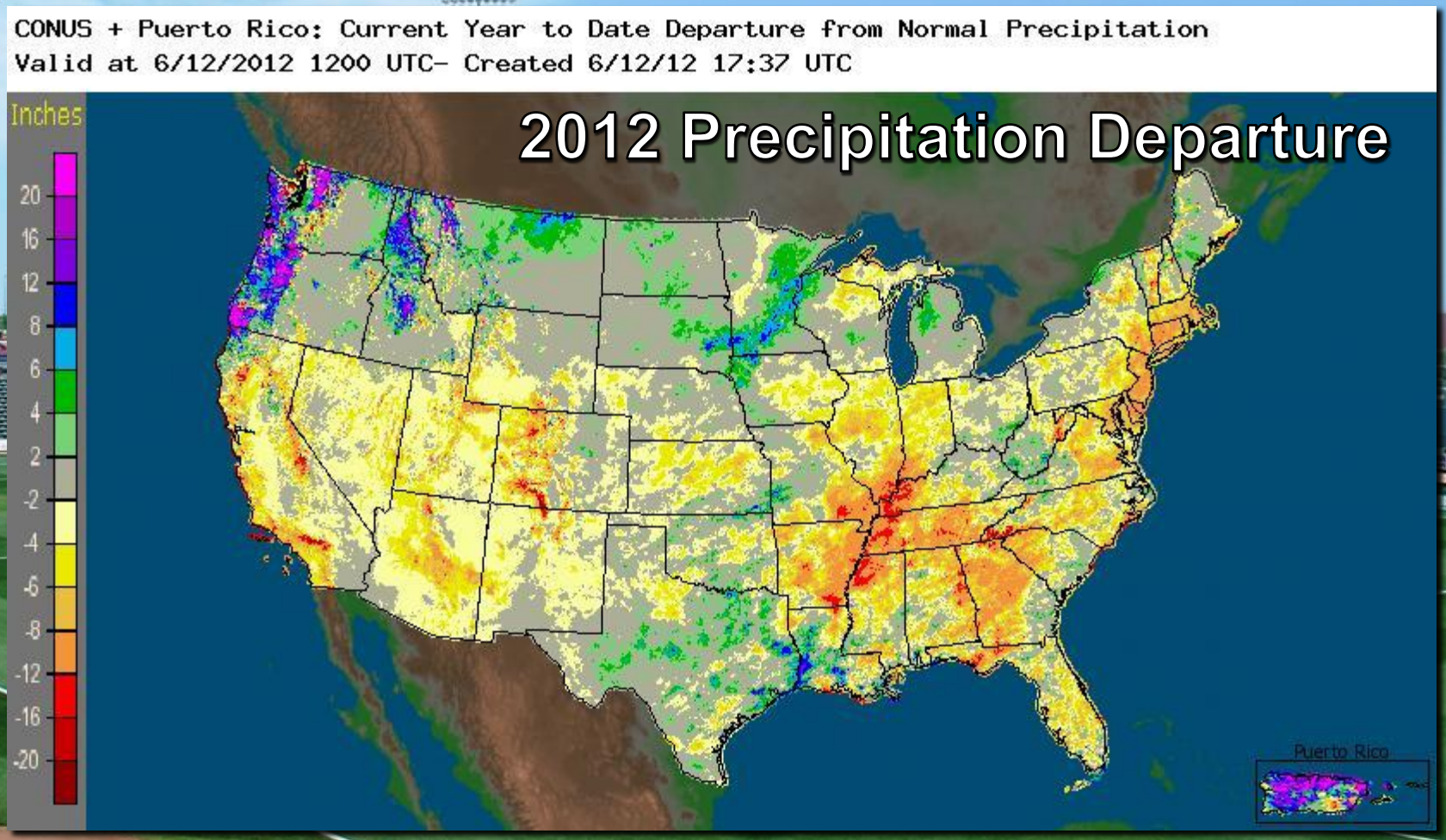
A Change in 2012



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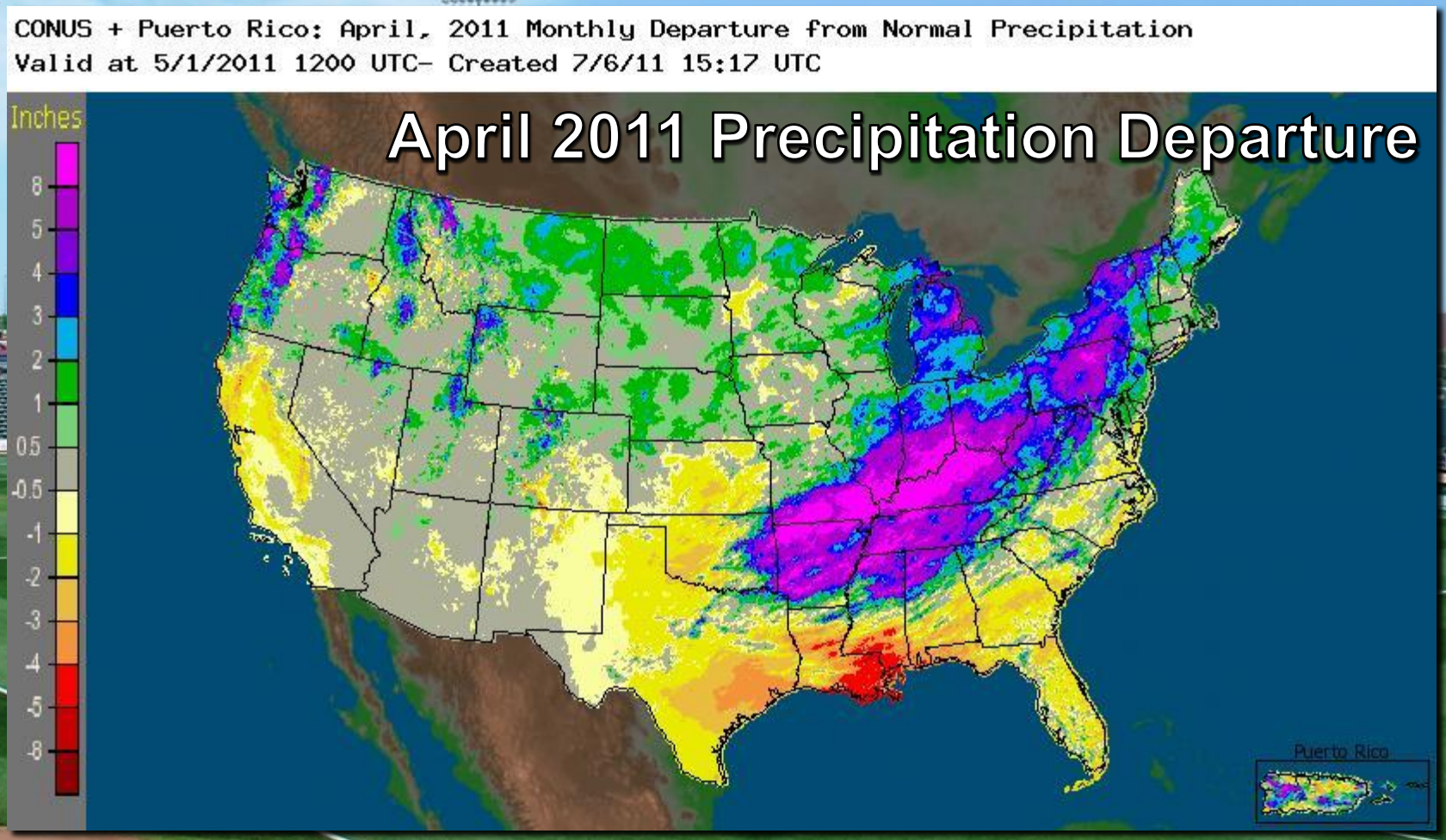
April 2011 vs. April 2012



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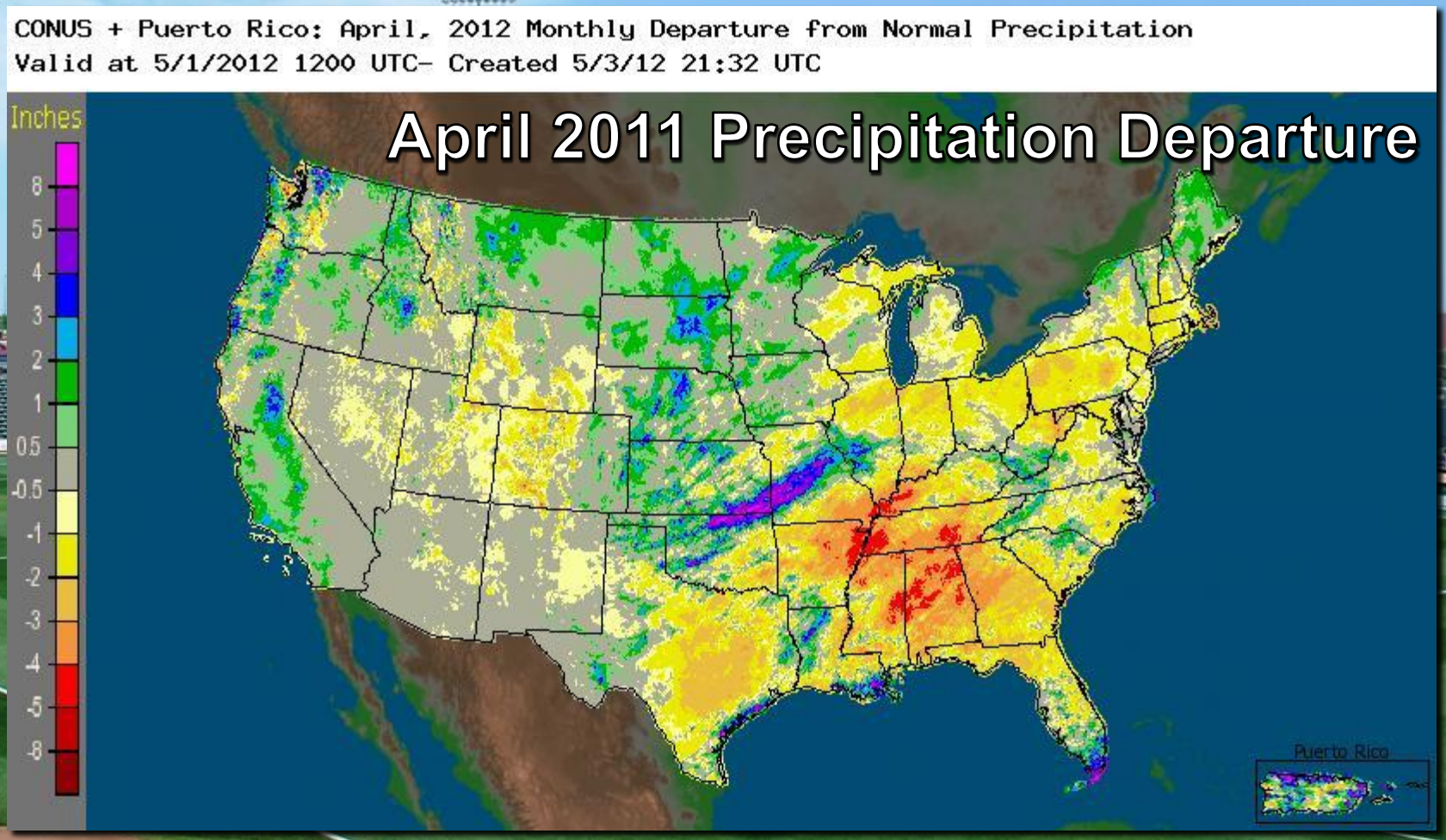
April 2011 vs. April 2012



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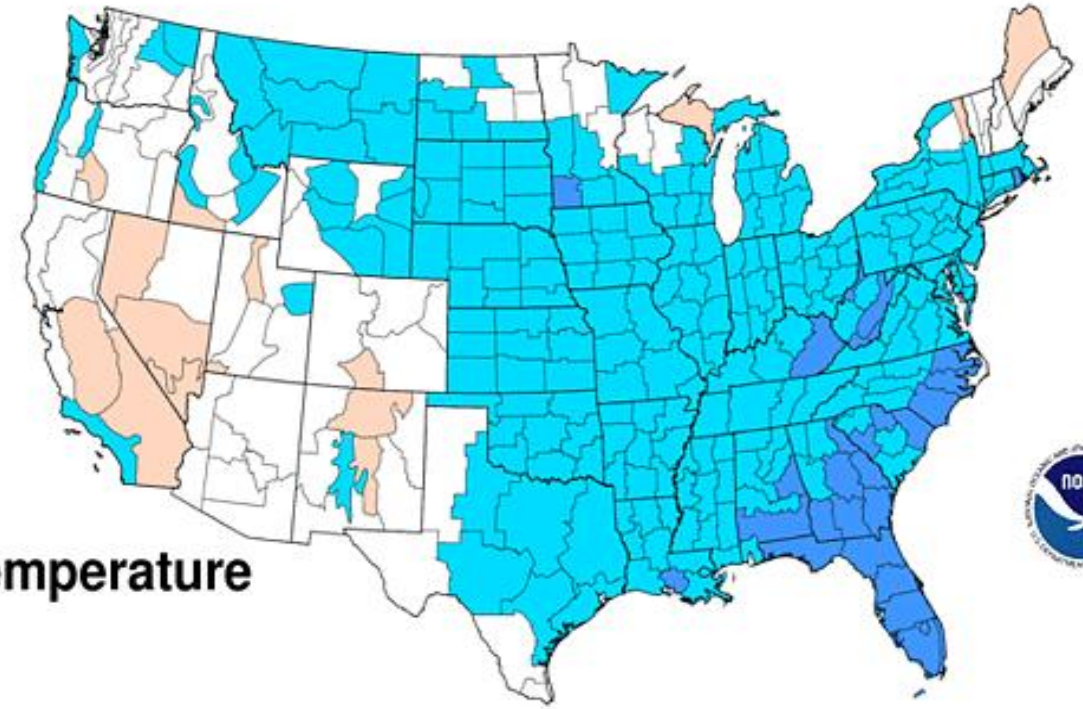
Dec 2010 - Feb 2011 Divisional Ranks

National Climatic Data Center/NESDIS/NOAA



Temperature

Record Coldest | Much Below Normal | Below Normal | Near Normal | Above Normal | Much Above Normal | Record Warme

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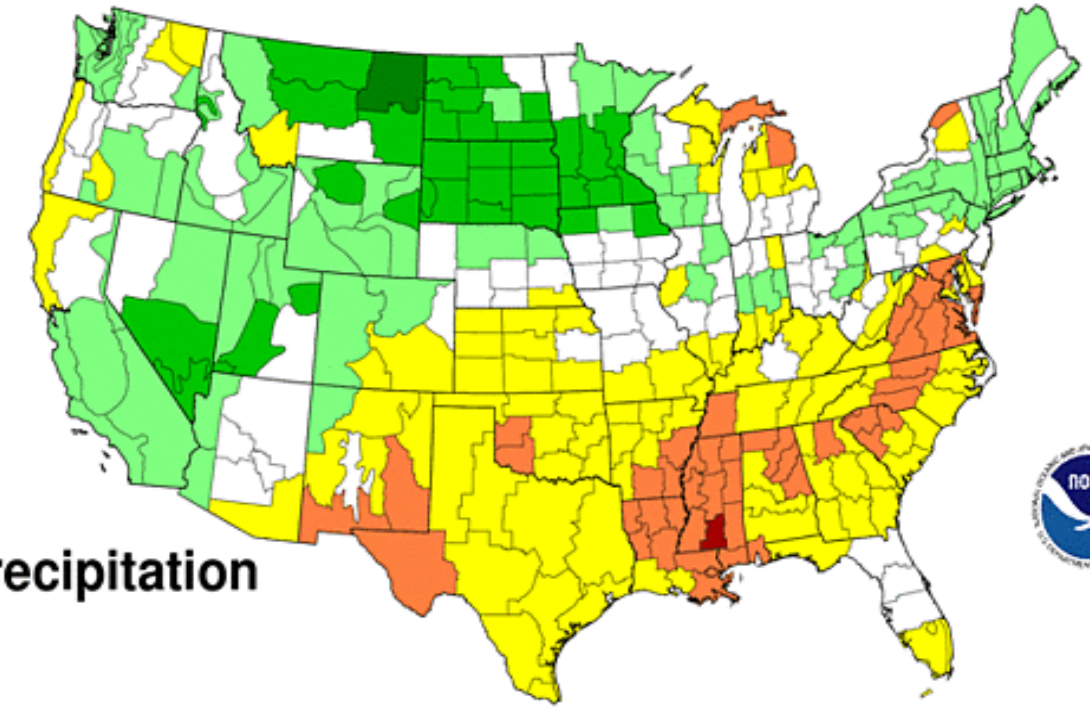
Dec 2010 - Feb 2011 Divisional Ranks

National Climatic Data Center/NESDIS/NOAA



Precipitation

Record Driest | Much Below Normal | Below Normal | Near Normal | Above Normal | Much Above Normal | Record Wettest

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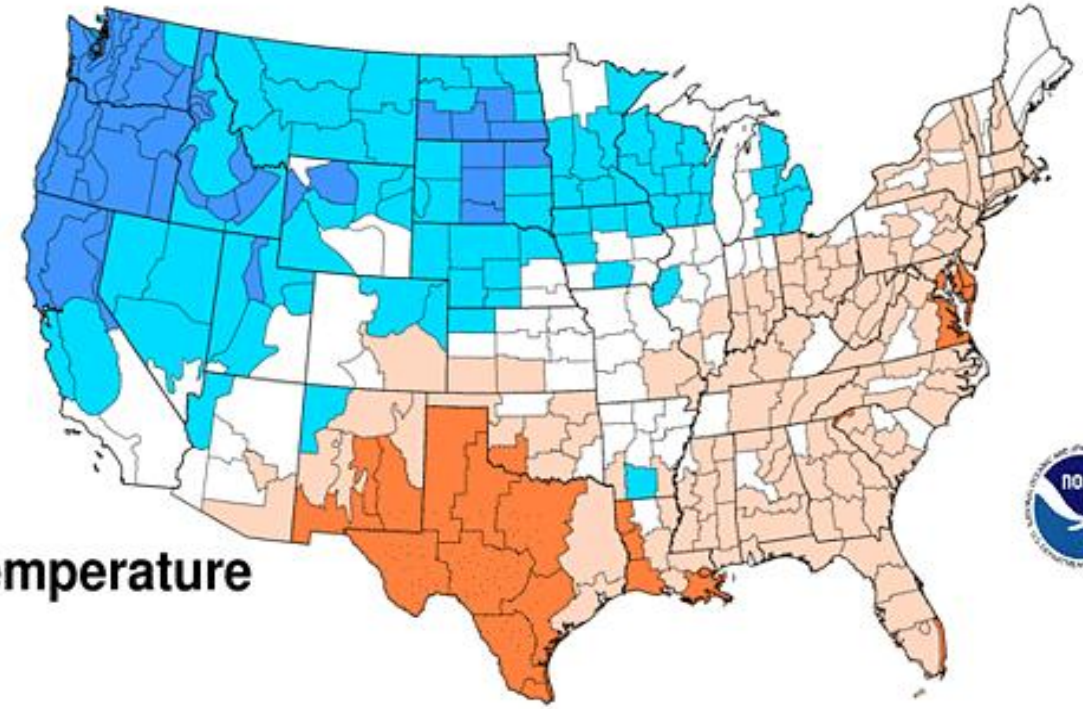
Mar - May 2011

National Climatic Data Center/NESDIS/NOAA



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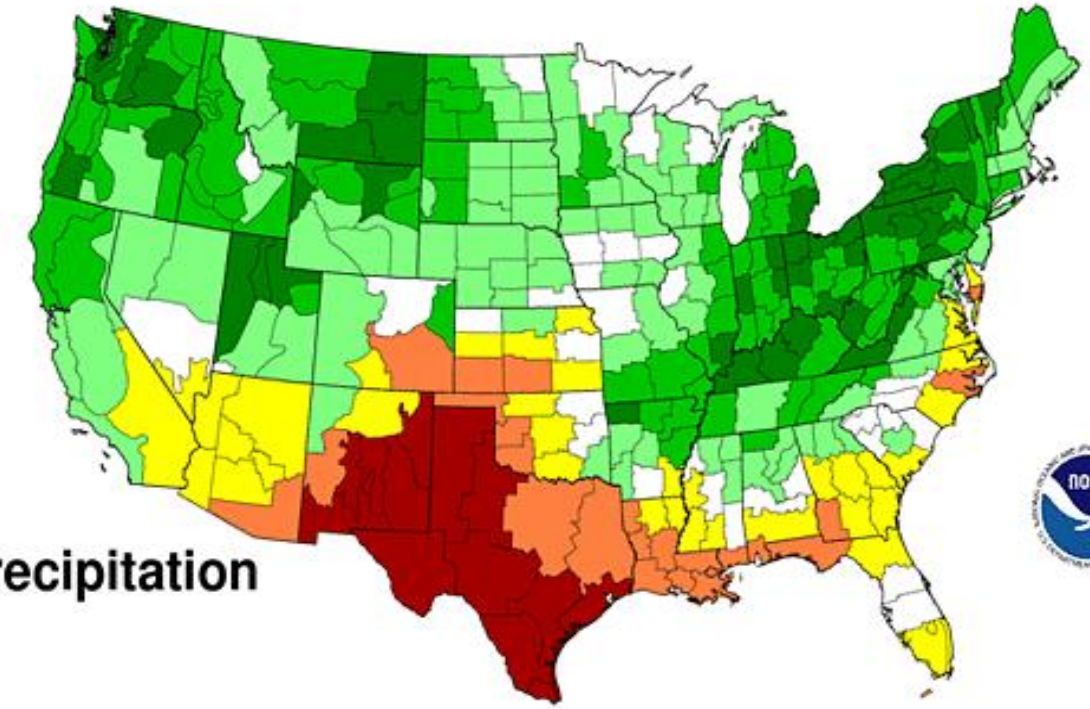
National Climatic Data Center/NESDIS/NOAA



Precipitation

Record Driest | Much Below Normal | Below Normal | Near Normal | Above Normal | Much Above Normal | Record Wettest

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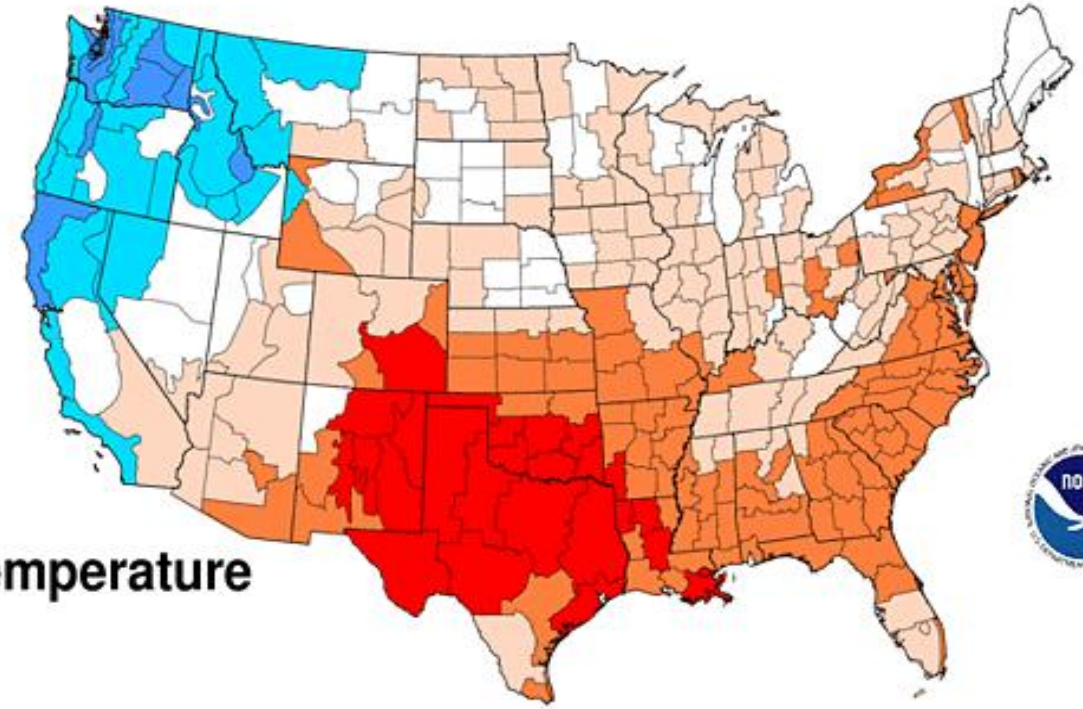
Jun - Aug 2011

National Climatic Data Center/NESDIS/NOAA



Temperature

Record Coldest | Much Below Normal | Below Normal | Near Normal | Above Normal | Much Above Normal | Record Warmest

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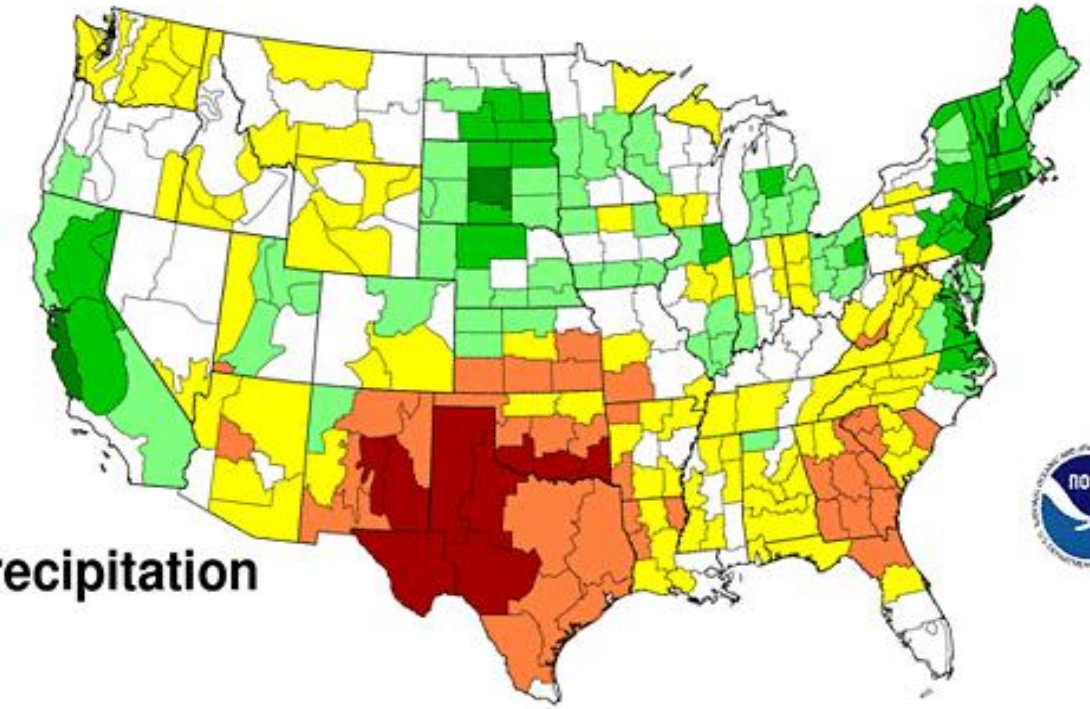
Jun - Aug 2011

National Climatic Data Center/NESDIS/NOAA



Precipitation

Record Driest | Much Below Normal | Below Normal | Near Normal | Above Normal | Much Above Normal | Record Wettest

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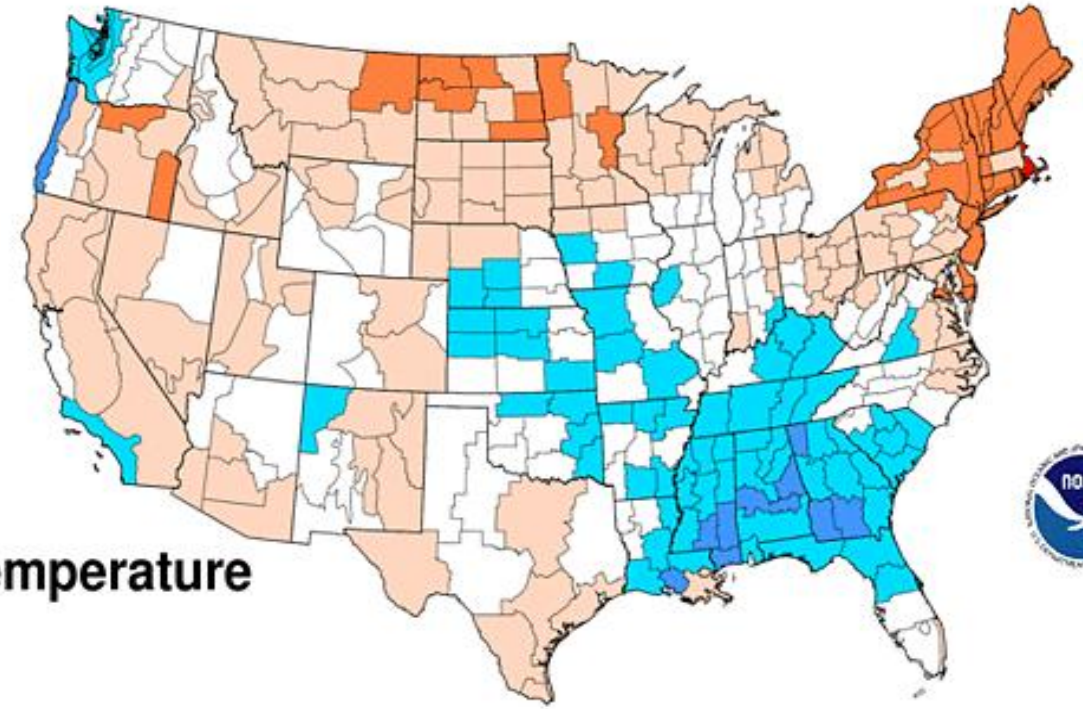
Sep - Nov 2011

National Climatic Data Center/NESDIS/NOAA



Temperature

Record Coldest | Much Below Normal | Below Normal | Near Normal | Above Normal | Much Above Normal | Record Warme

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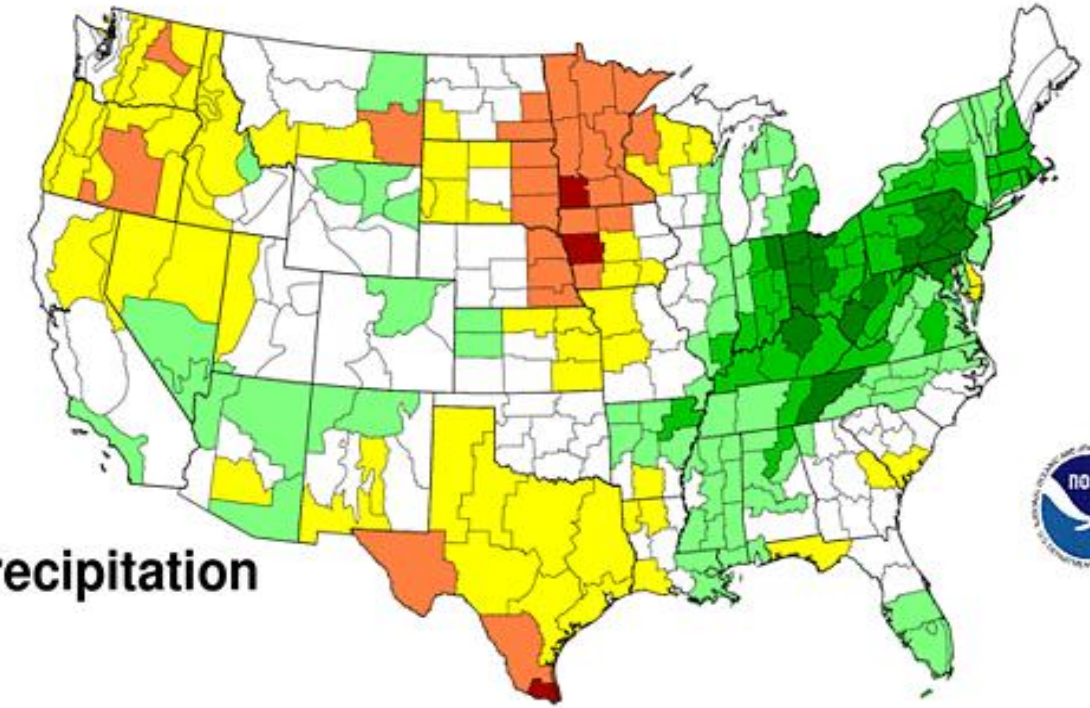
Sep - Nov 2011

National Climatic Data Center/NESDIS/NOAA



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Dec 2011 - Feb 2012 Divisional Ranks

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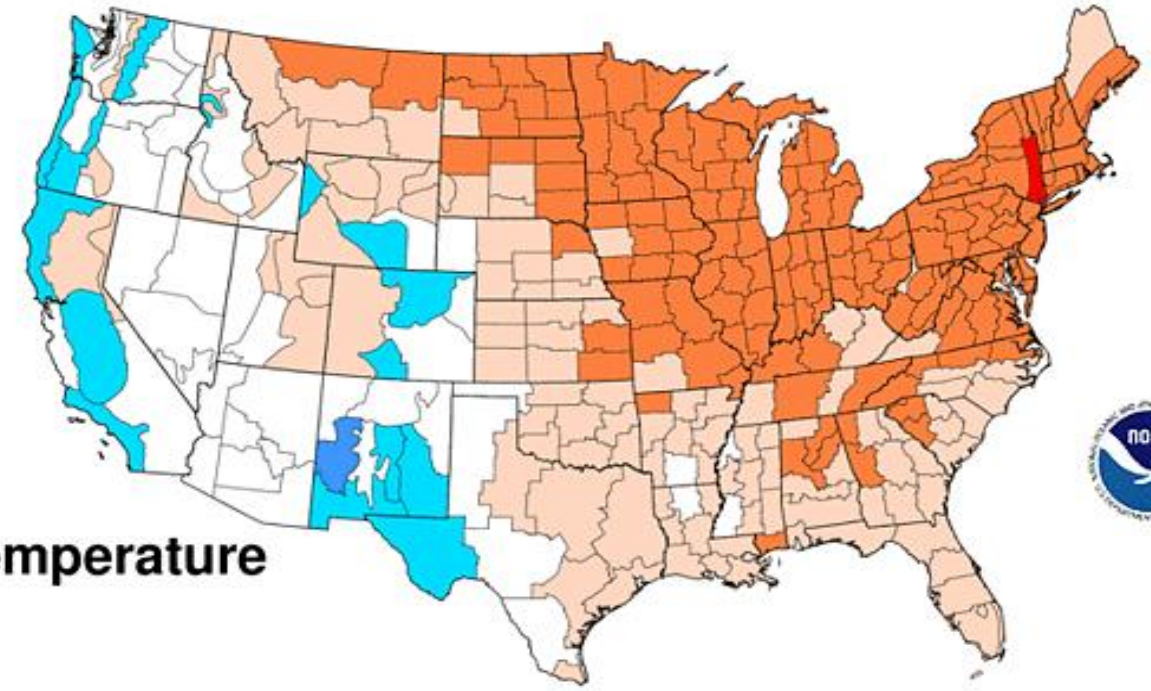

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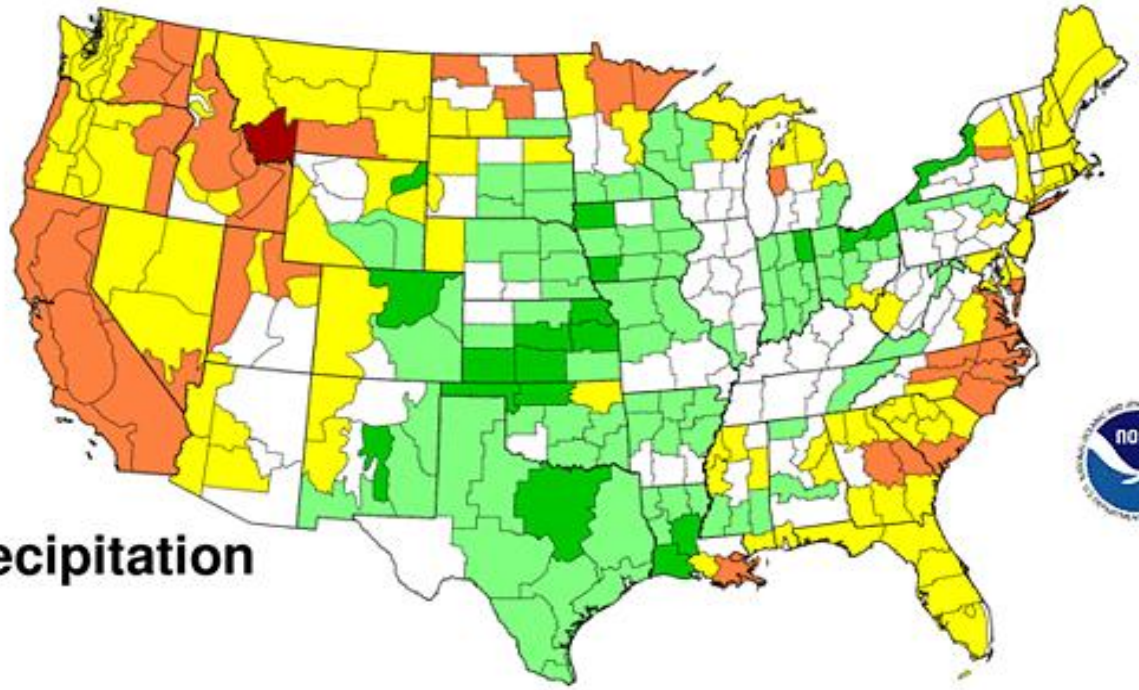

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Mar - May 2012

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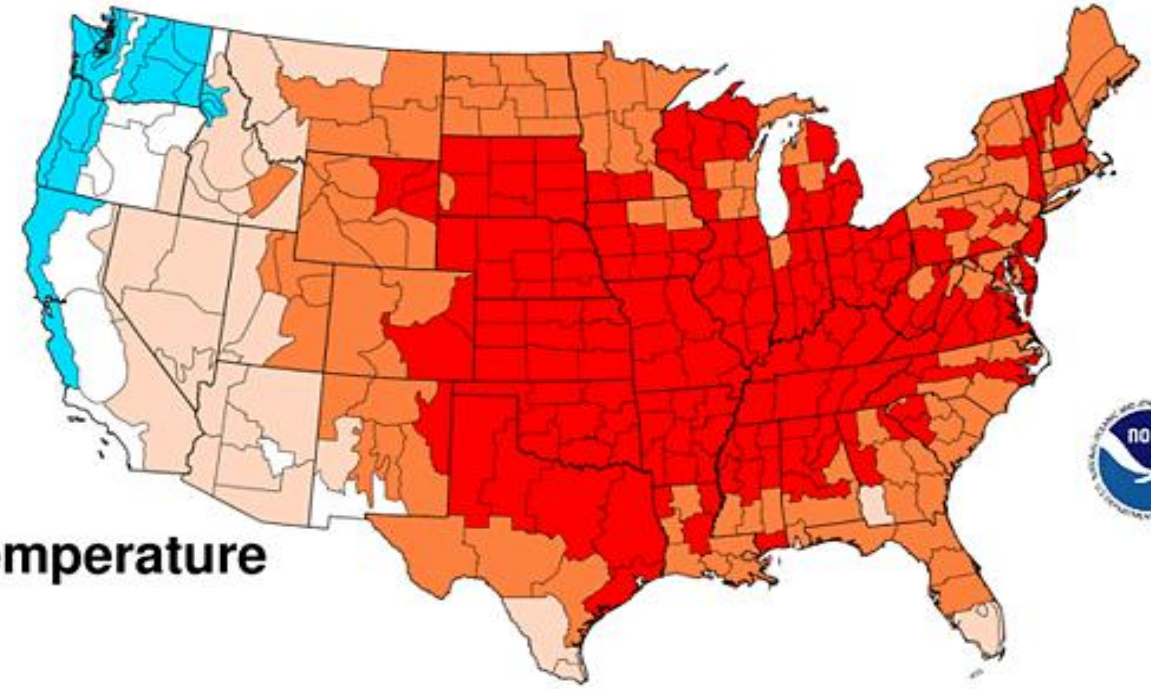

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Mar - May 2012

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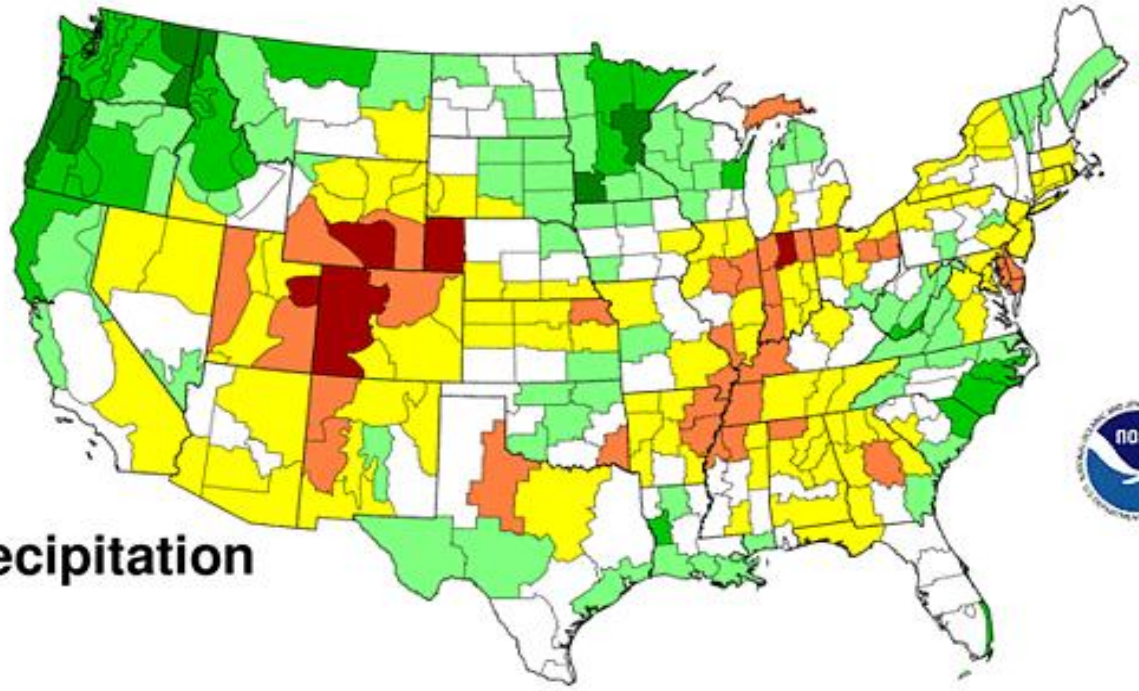

Precipitation

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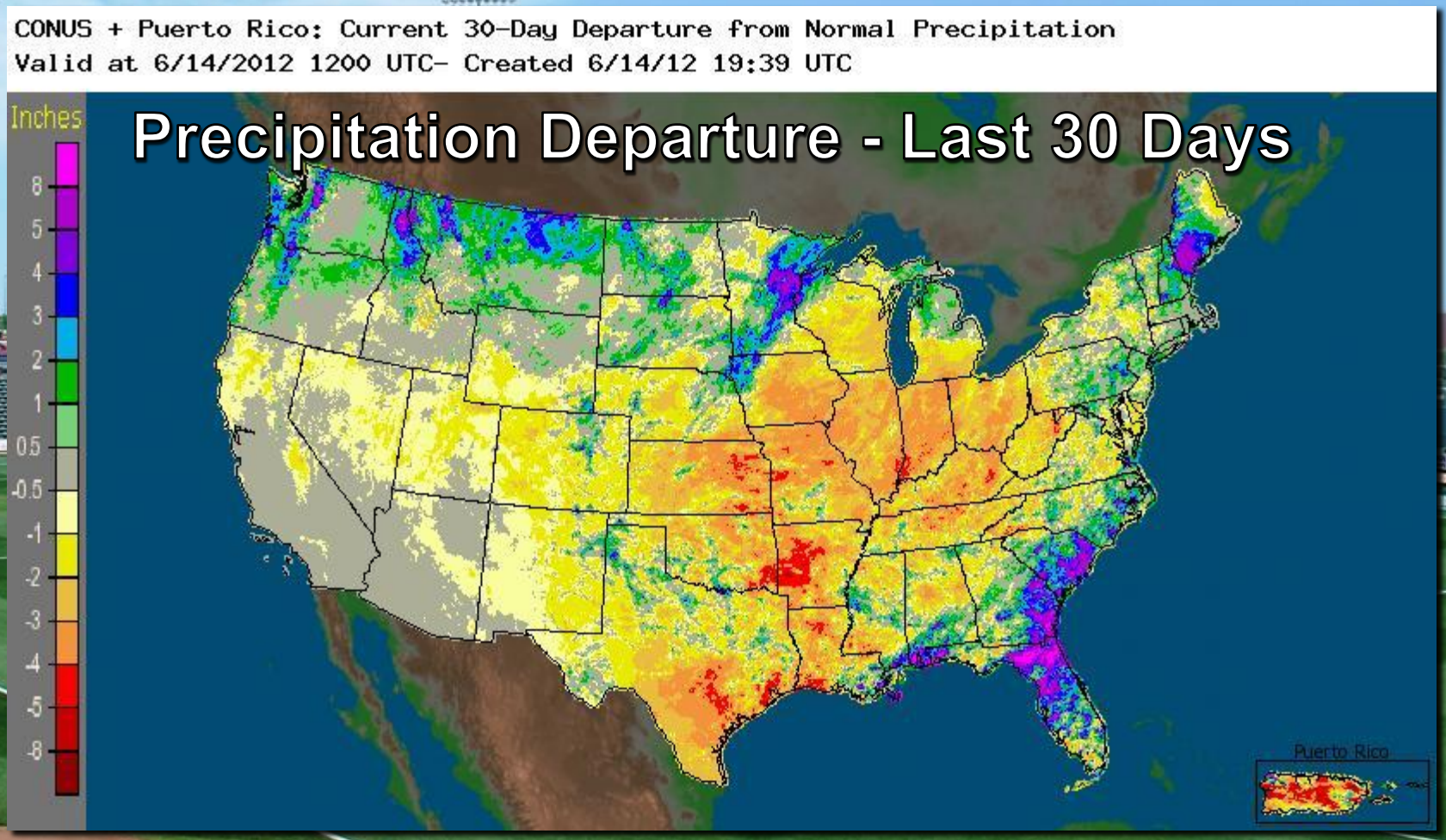
The Extremes Continue



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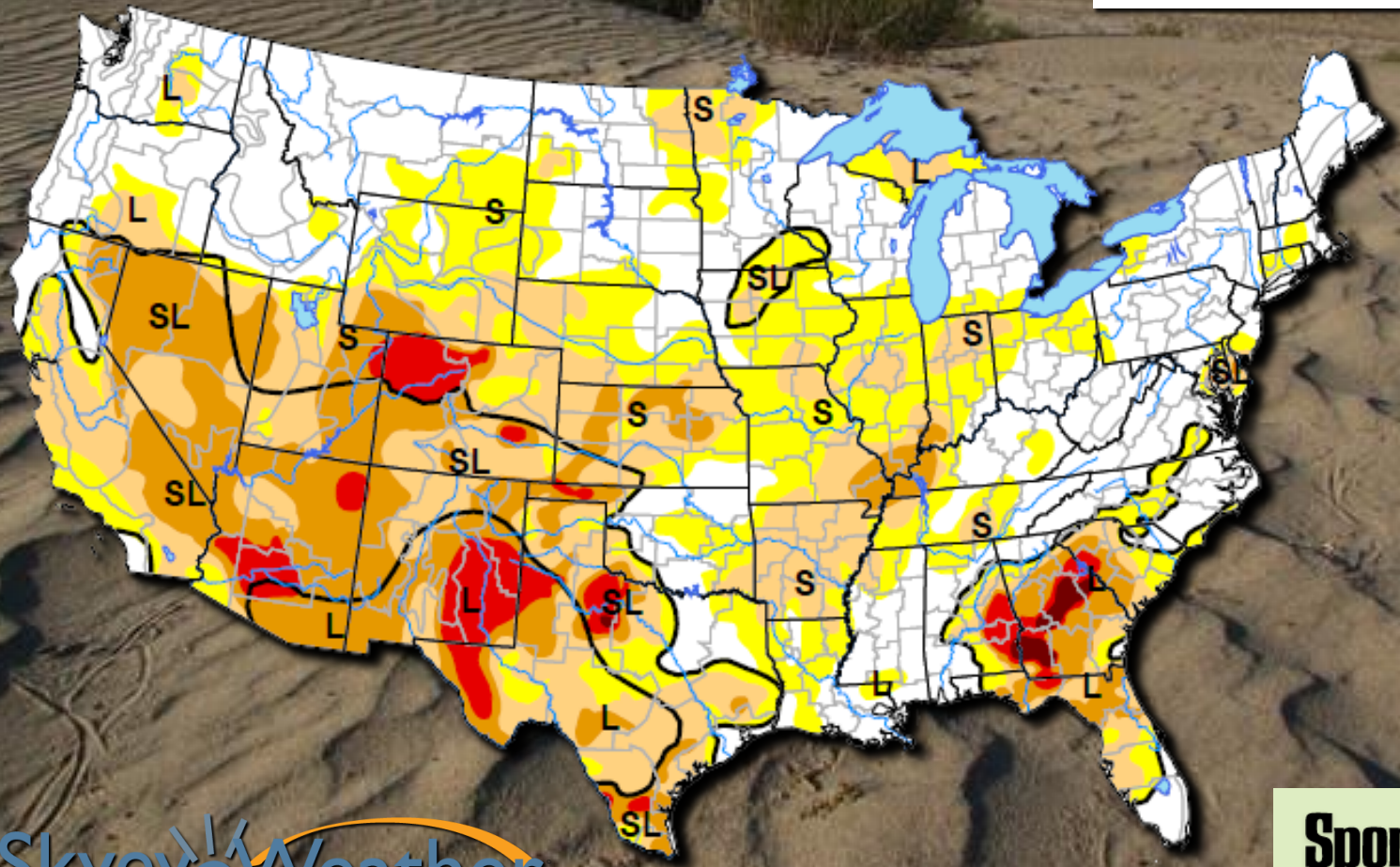
Turf Management in a Changing Climate

Drought Update – June 2012



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Busy Wildfire Season

Colorado, Arizona
New Mexico,
California, etc.

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Turf Management in a Changing Climate

So What's Going On?

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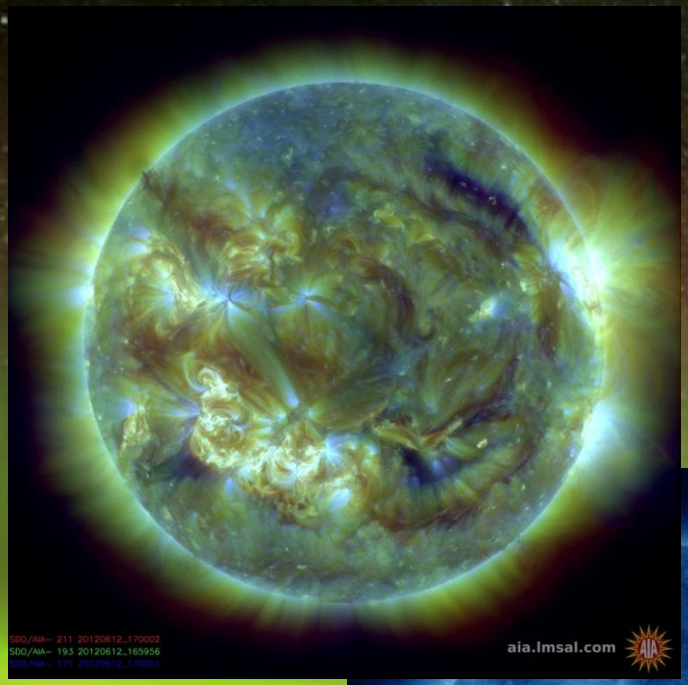
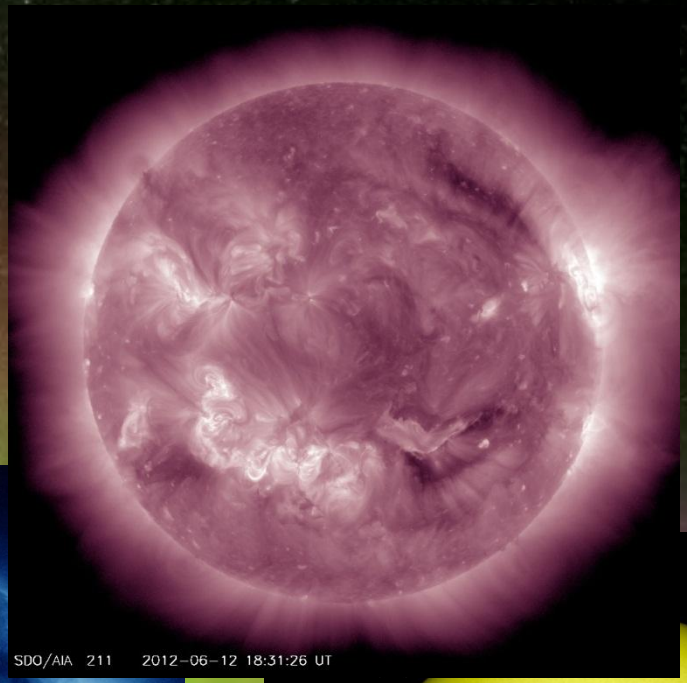
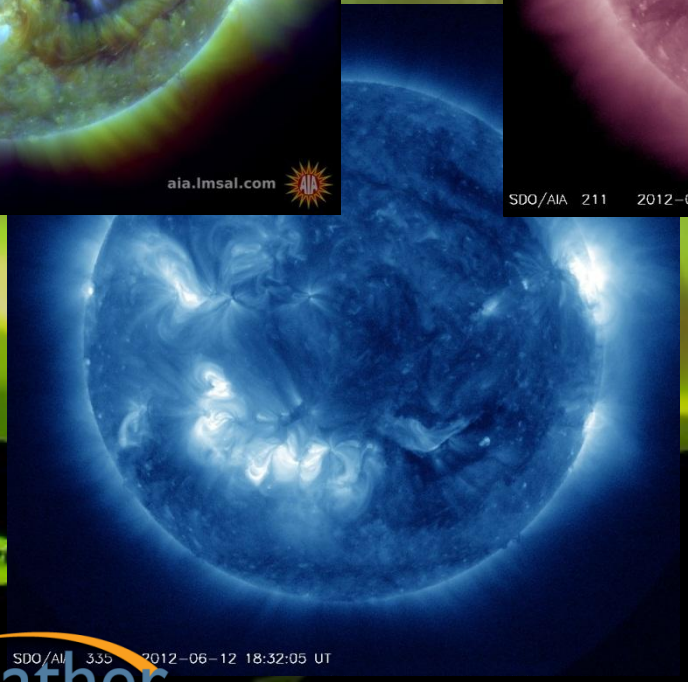
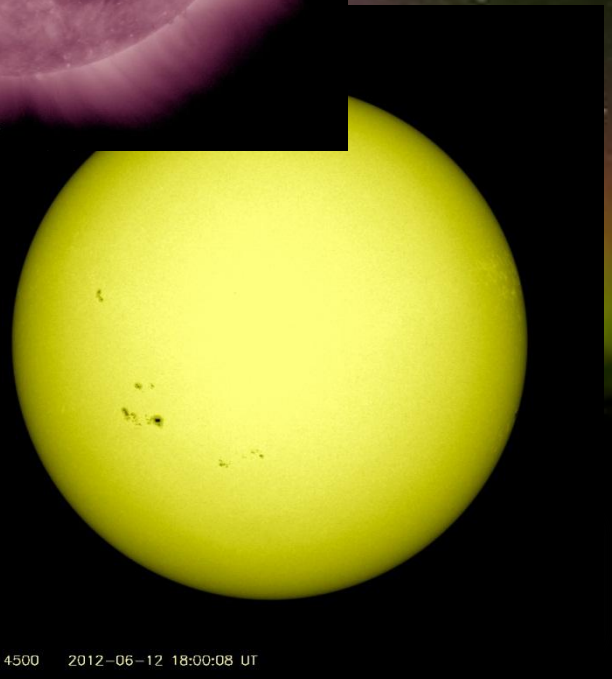
MOTHER EARTH BY WILLIAM ATTARD MCCARTHY WWW.CRESTOCK.COM

The Sun Drives Our Climate!









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Solar Cycle 24
June 2012

- Solar activity (energy output) remains low and sunspot numbers appear to have peaked.

- SC 24 is currently peaking (Svalgaard / Stanford U.)

- NASA June 2012 analysis and forecast; weakest cycle in 100+ years

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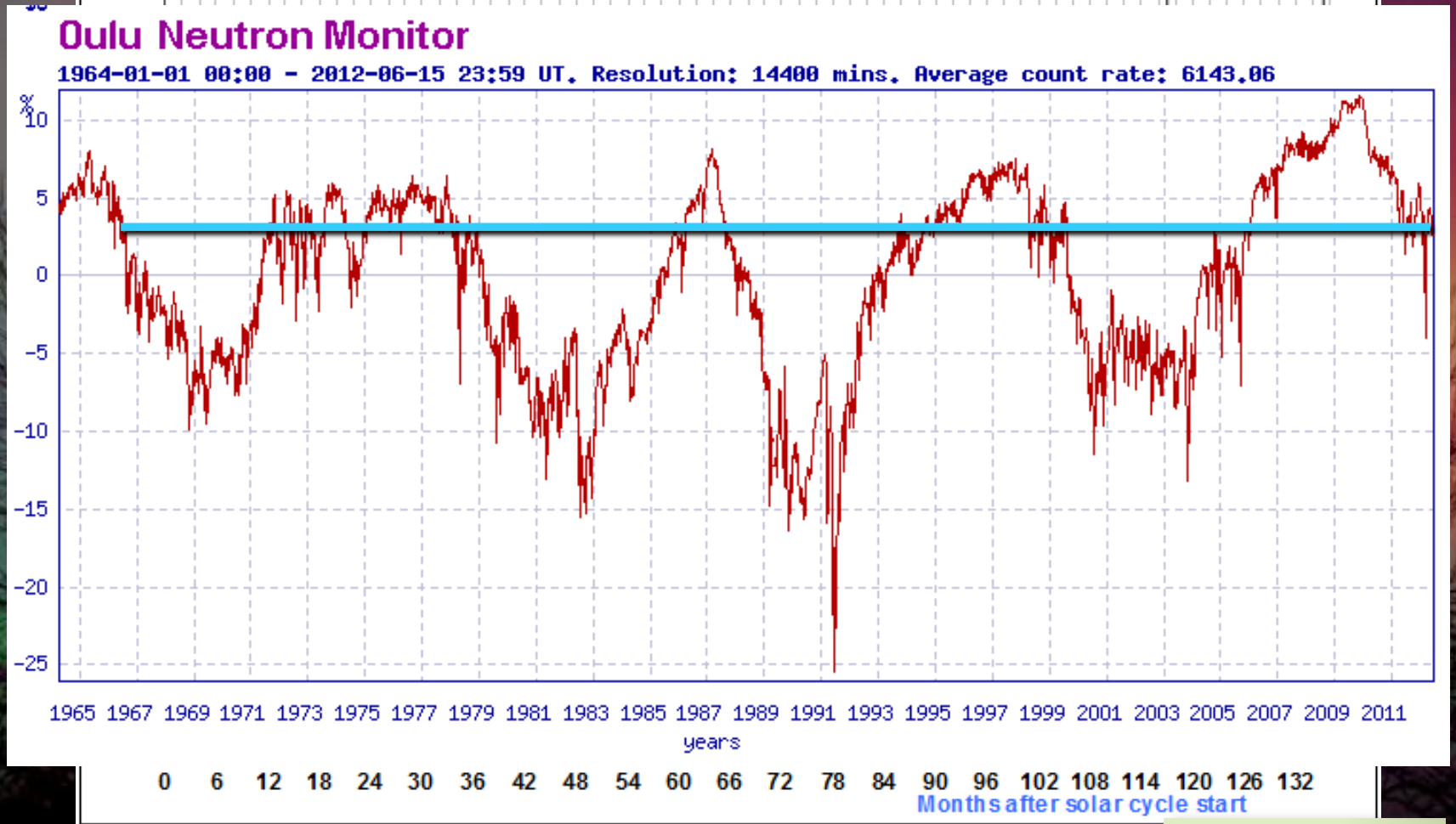
Solar Cycle 24



Hathaway/NASA/MSFC

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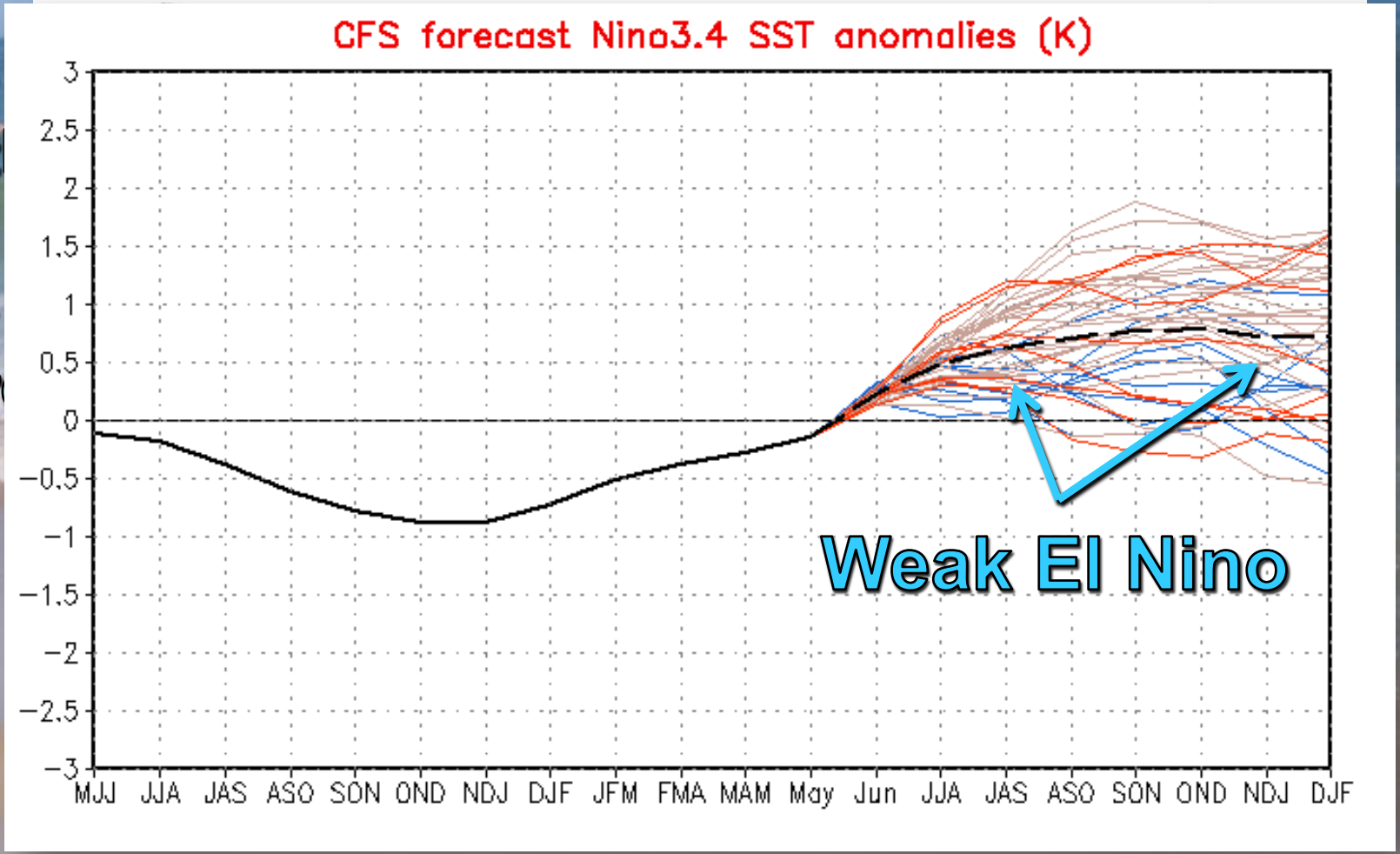
Ocean Temperatures - ENSO



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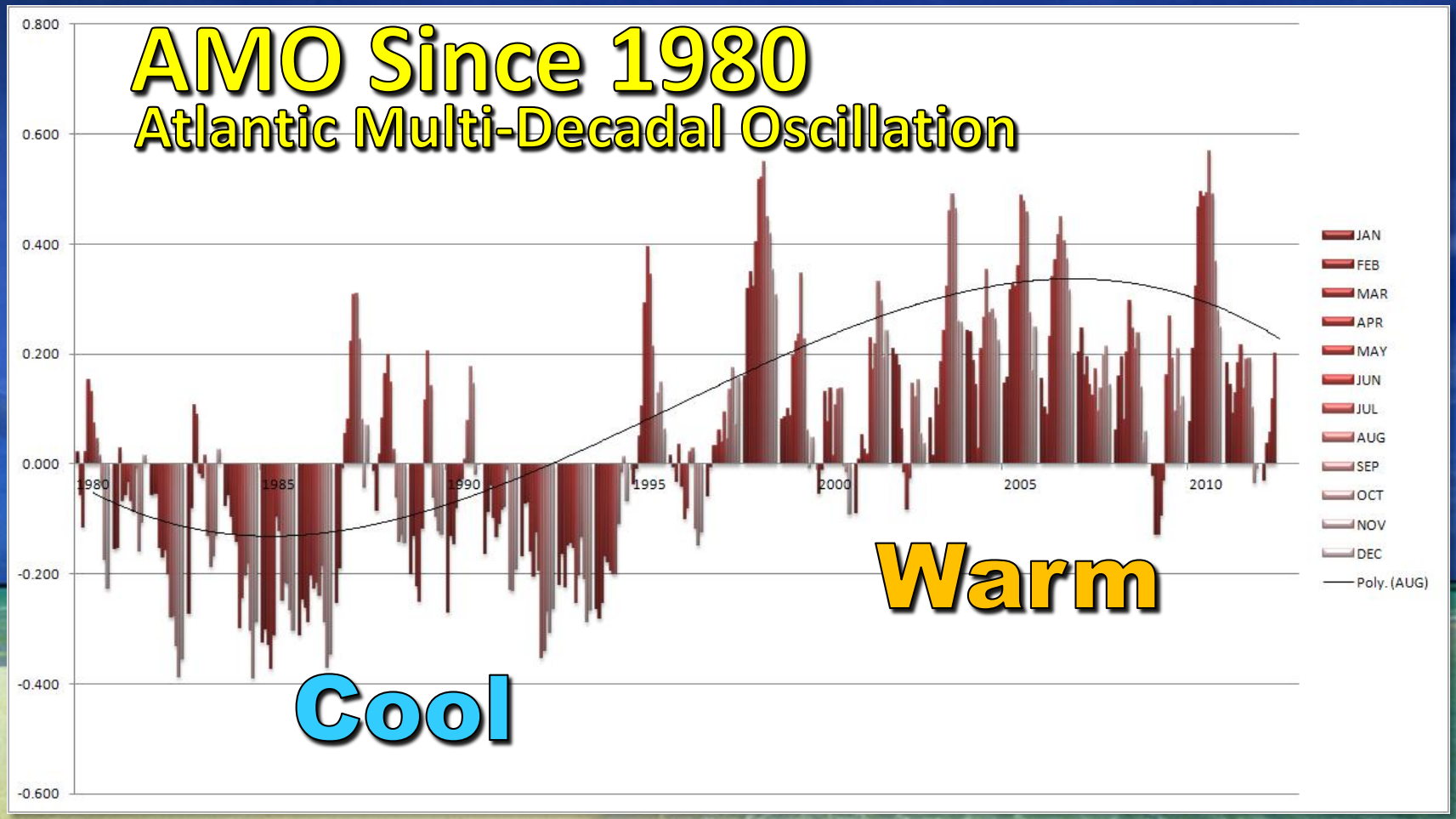
Ocean Cycles



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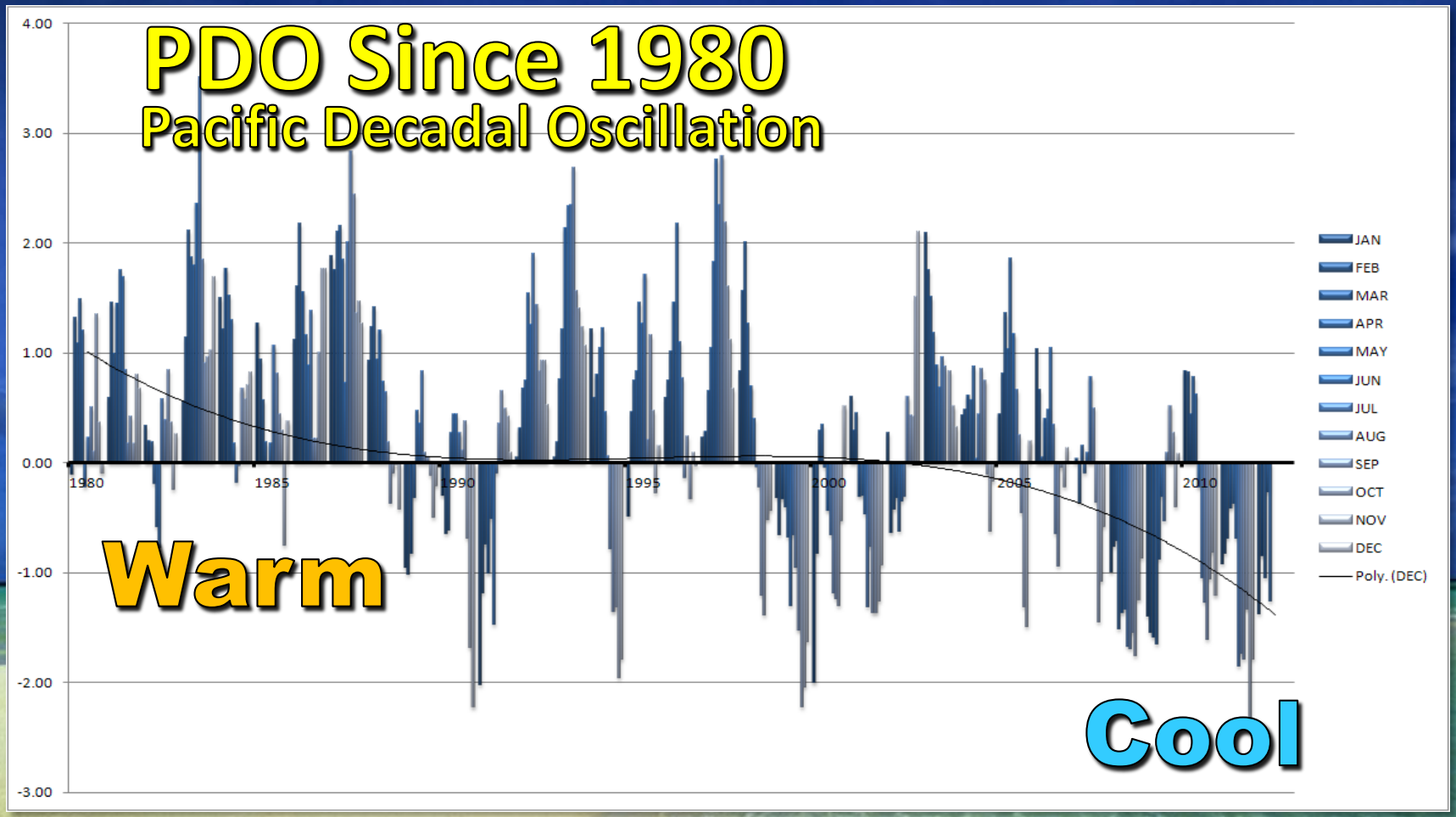
Ocean Cycles



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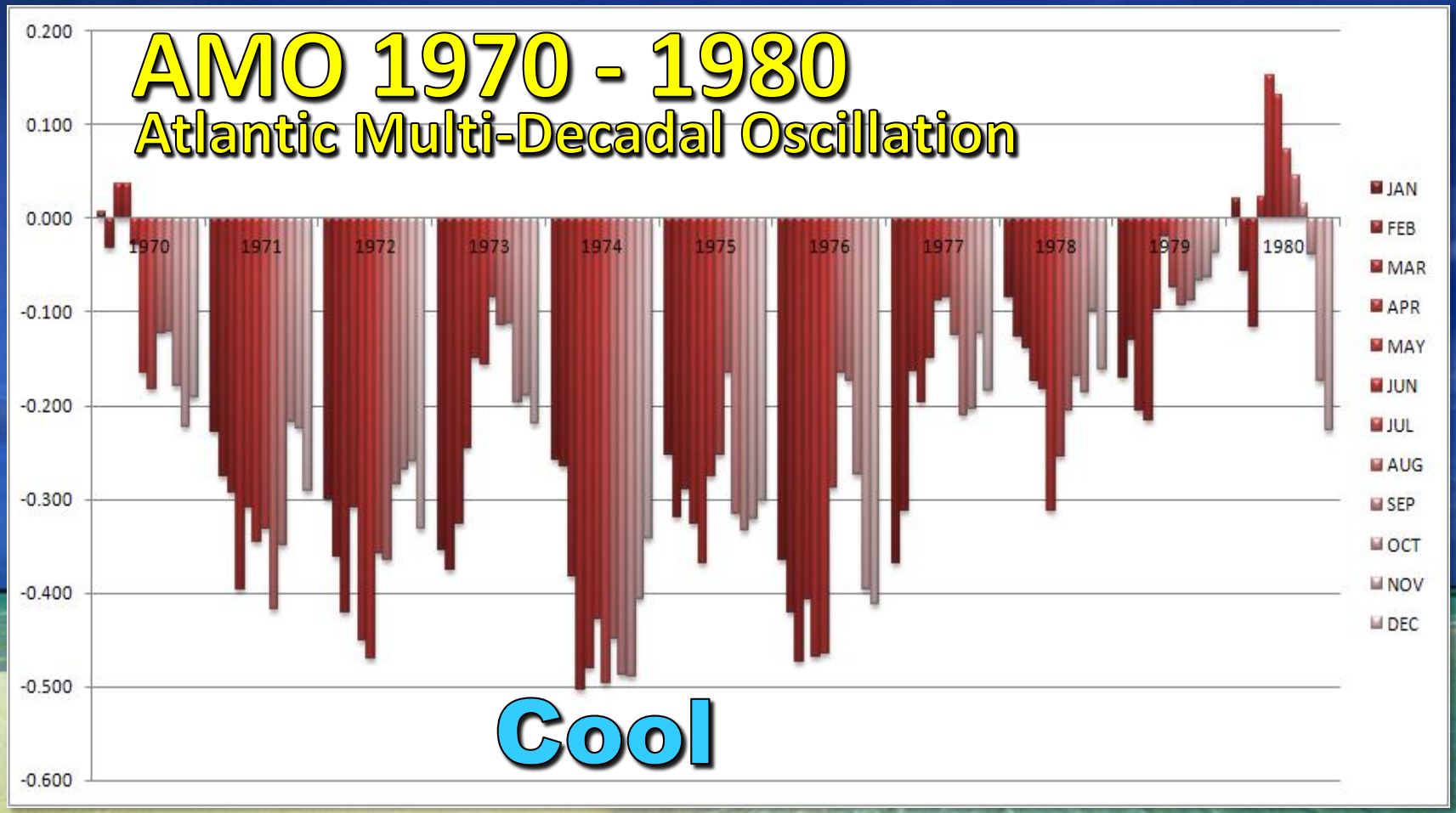
Ocean Cycles



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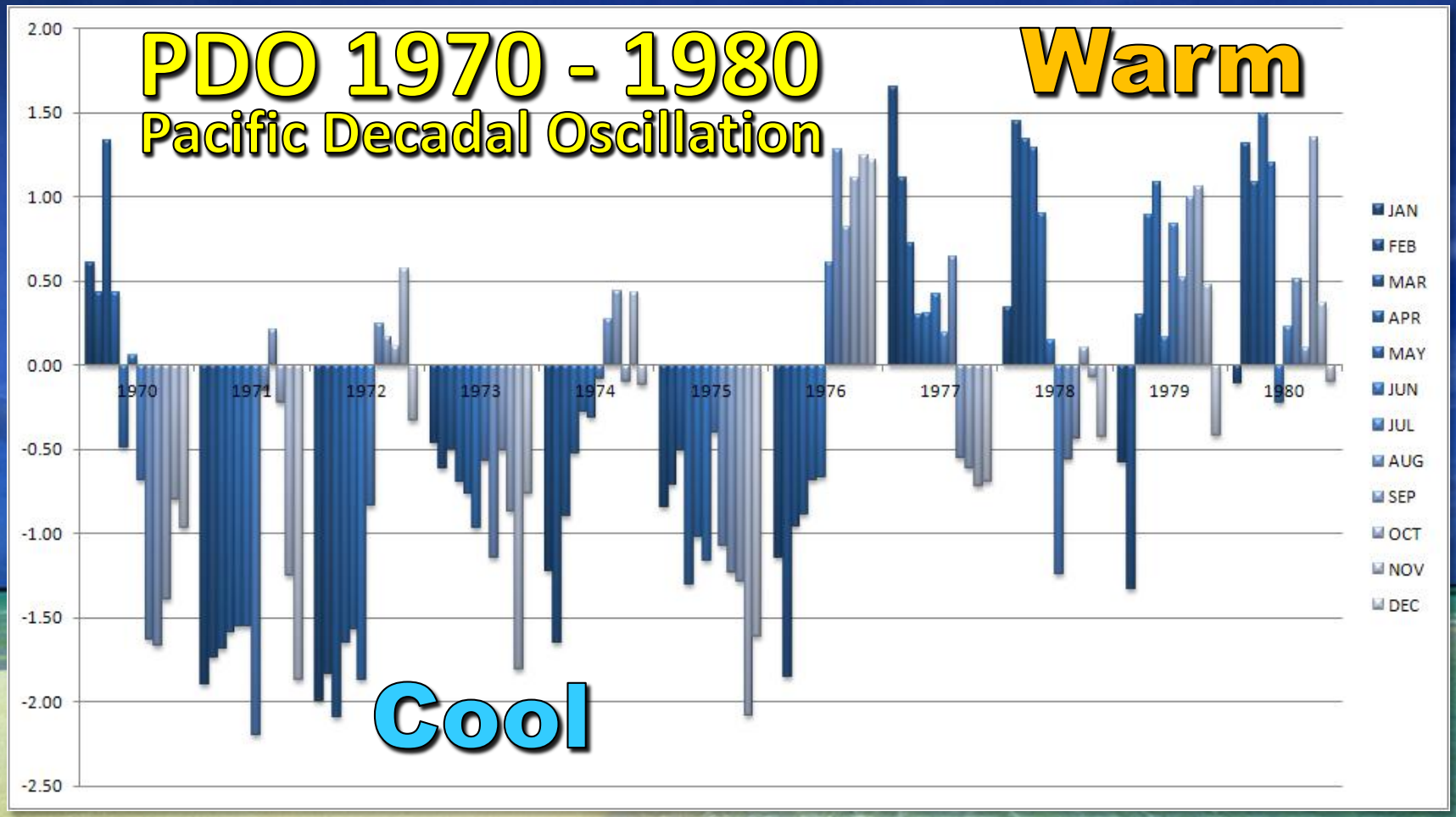
Ocean Cycles



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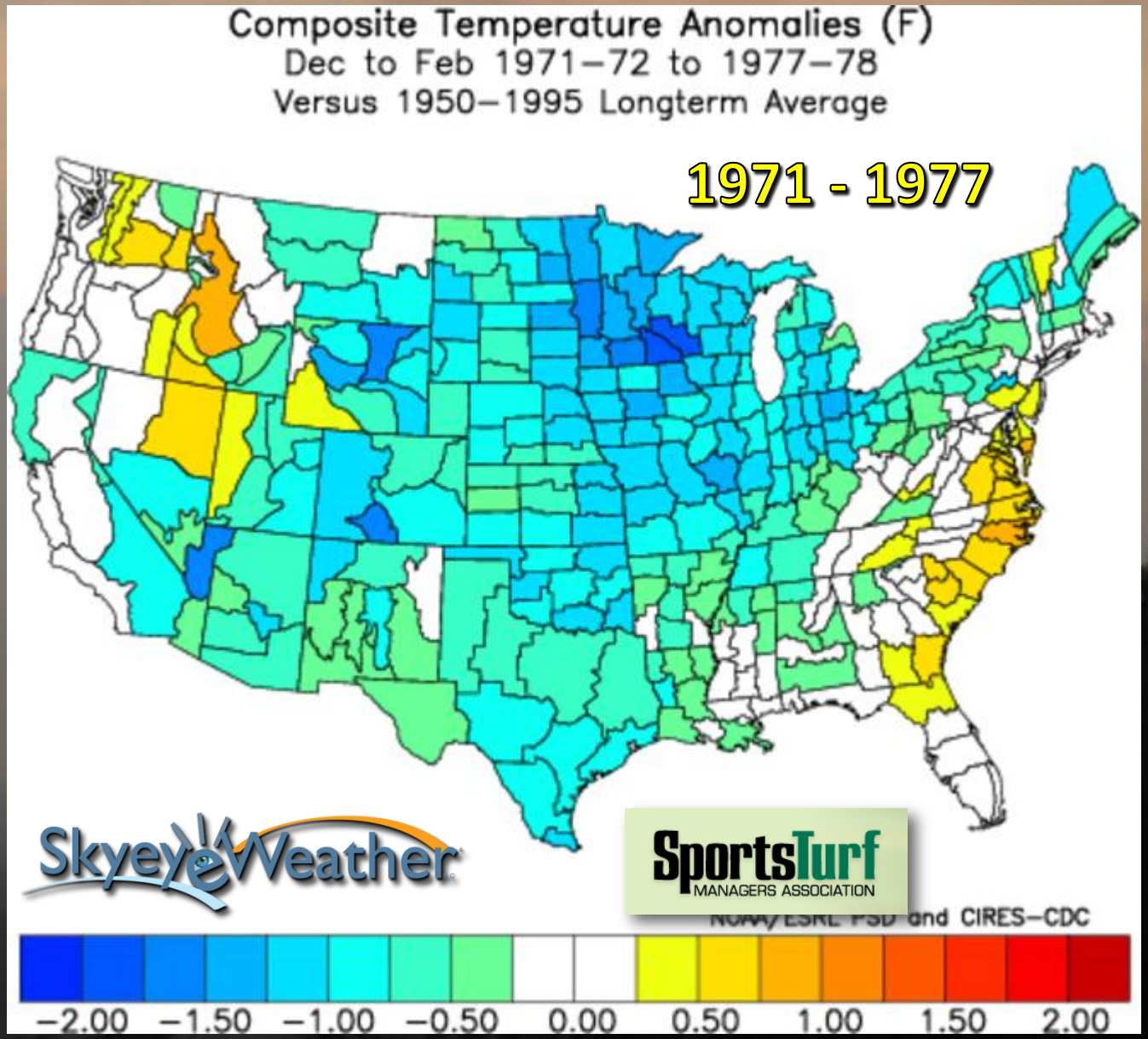
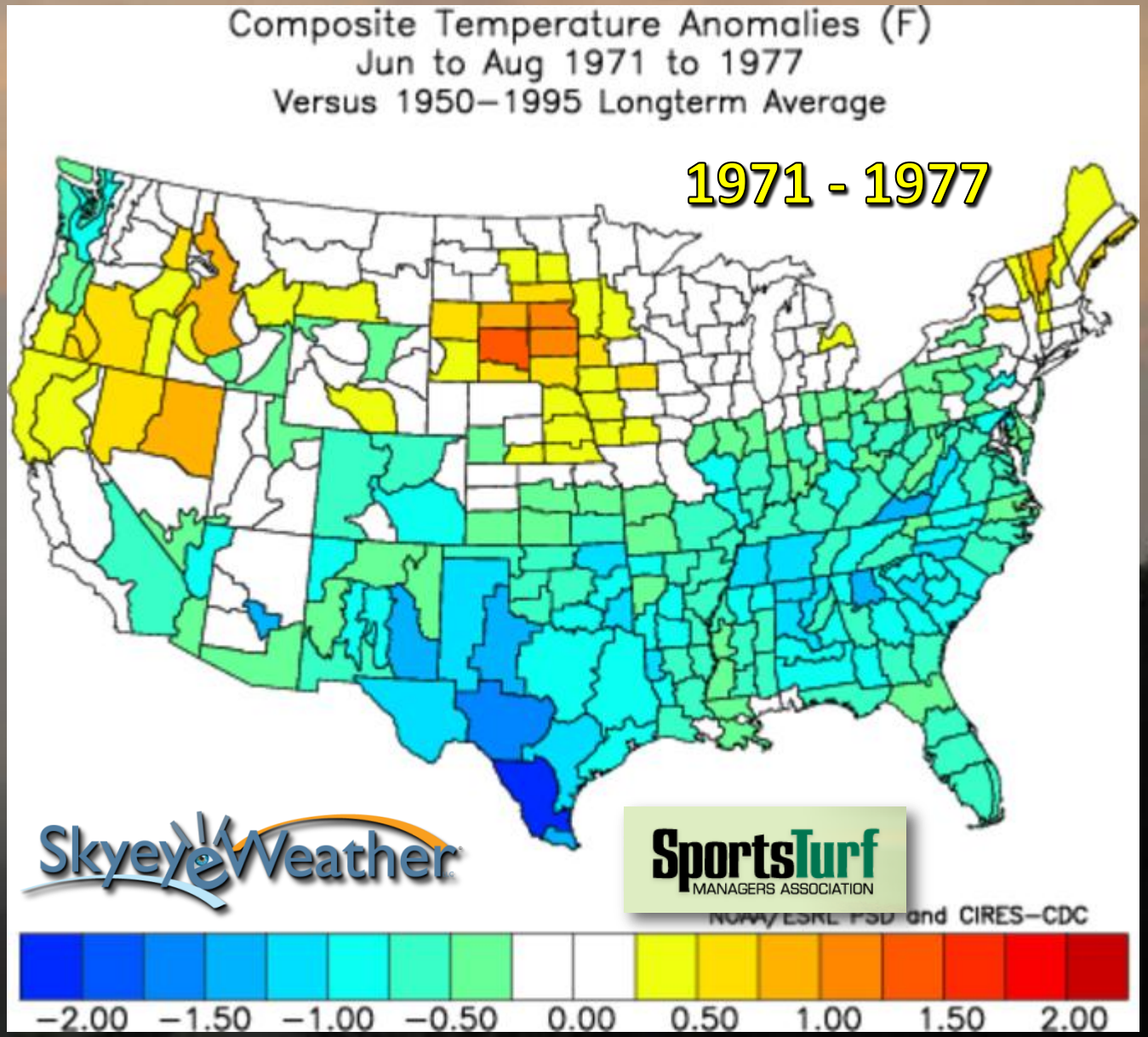
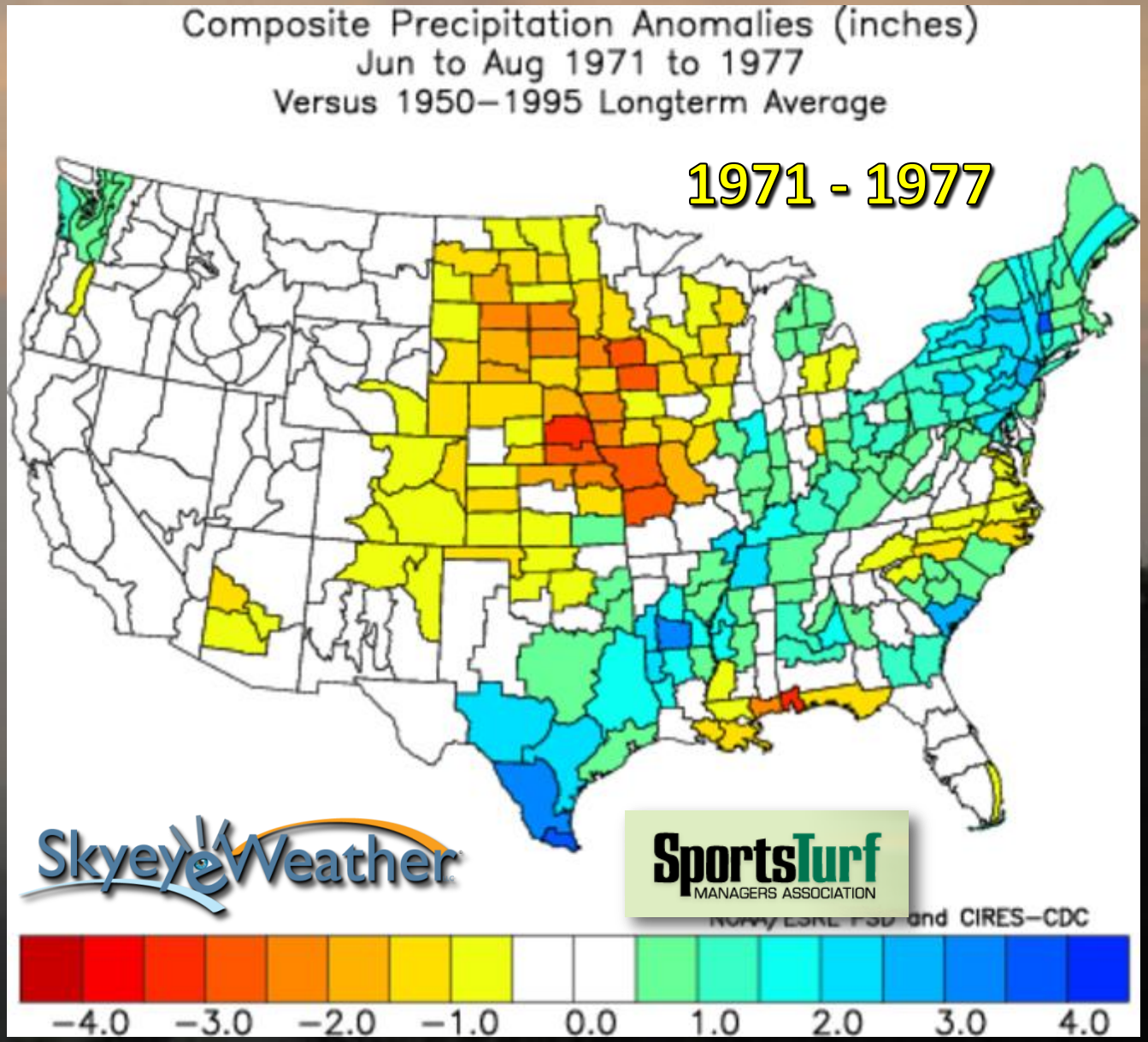
Winter Temperatures



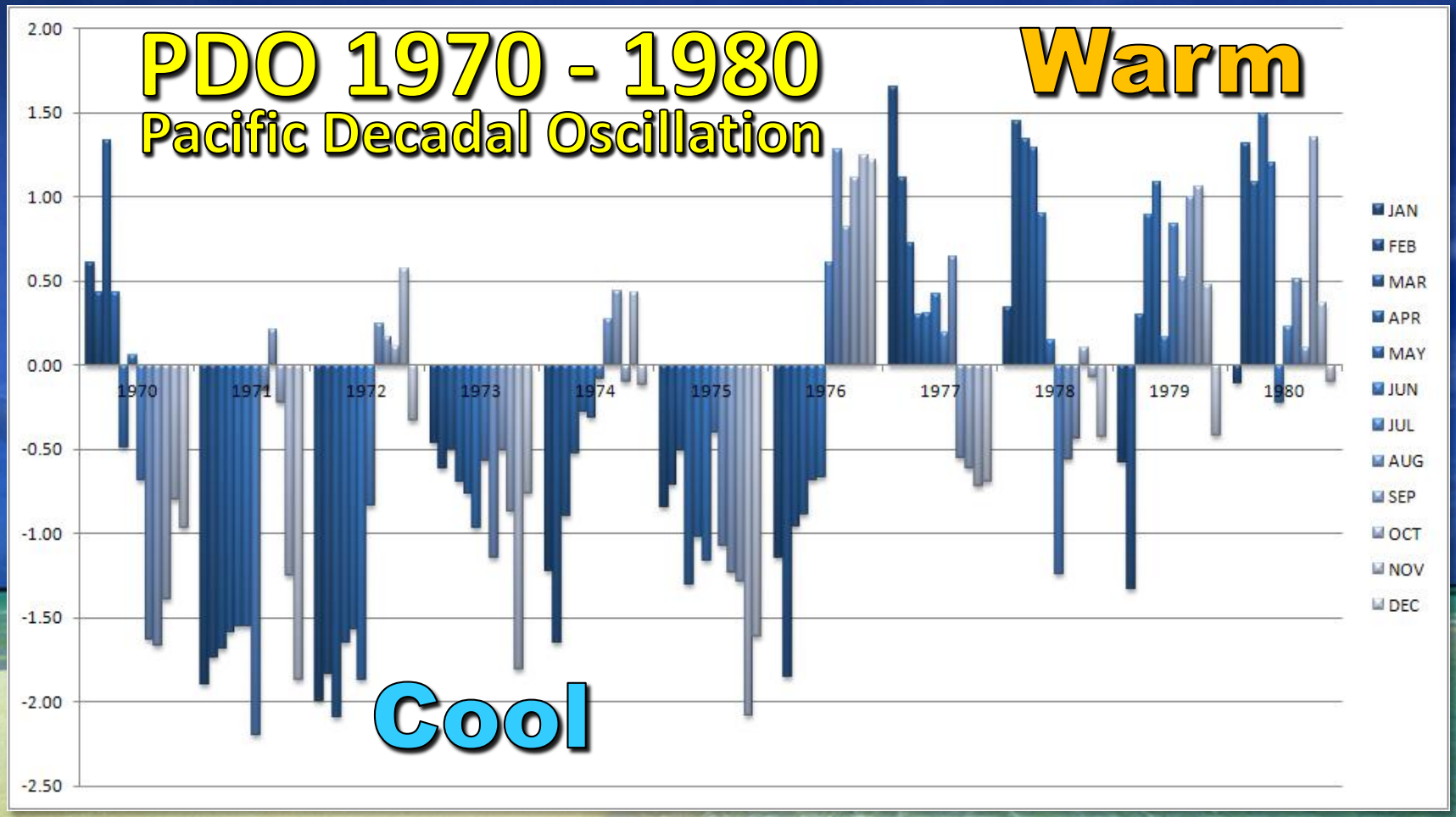
Summer Temperatures



Summer Rainfall



Ocean Cycles



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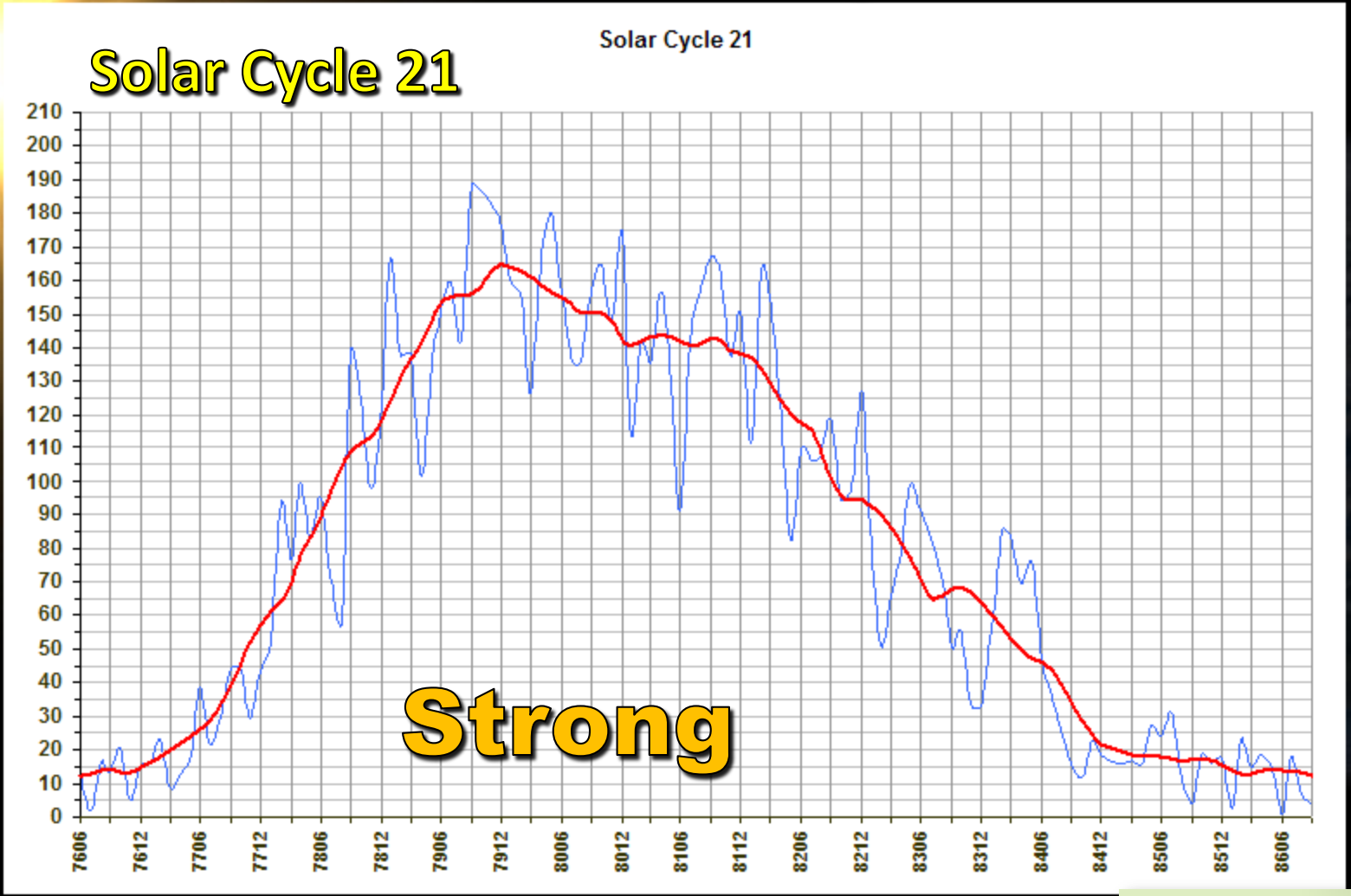
What Changed?



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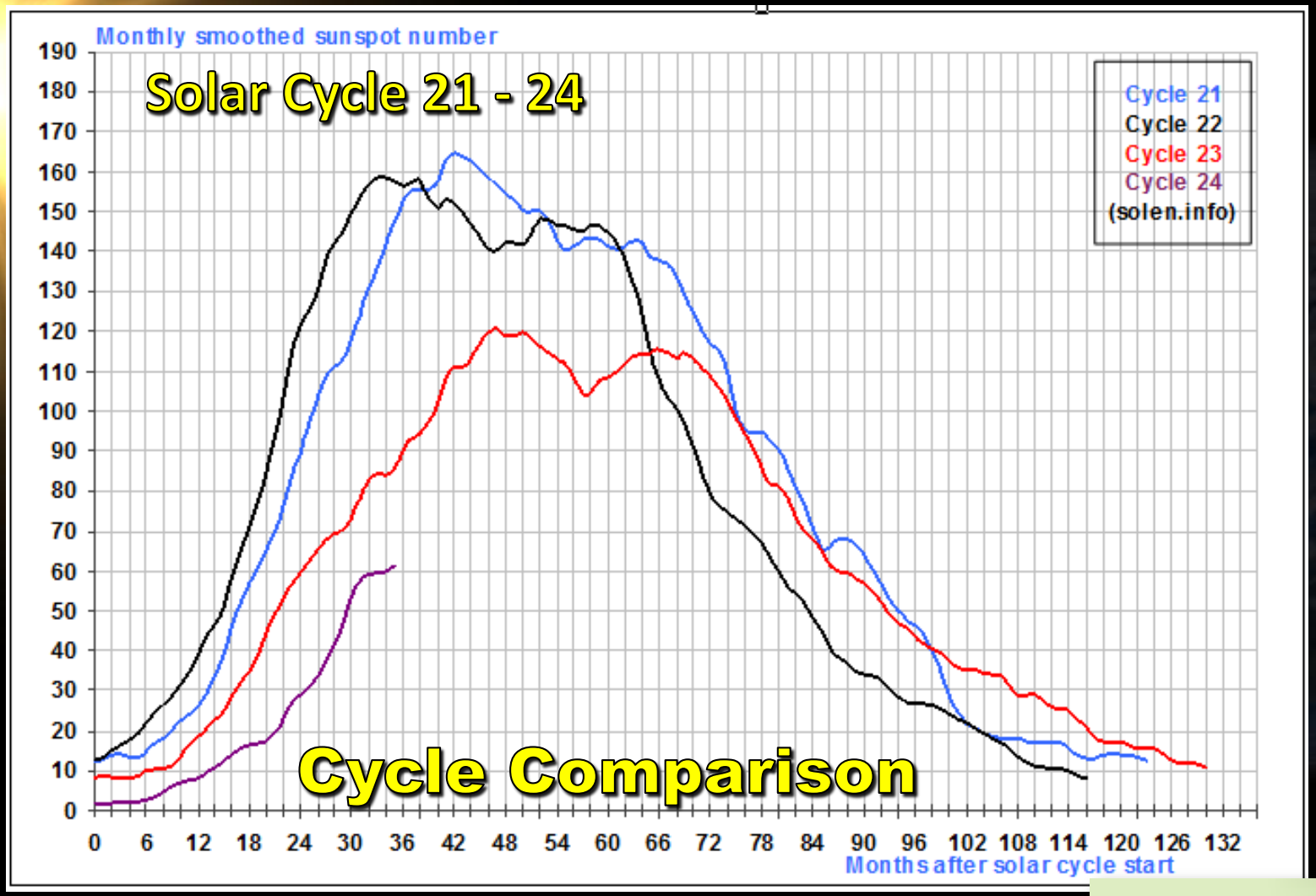
Weakest in 200+ Years!



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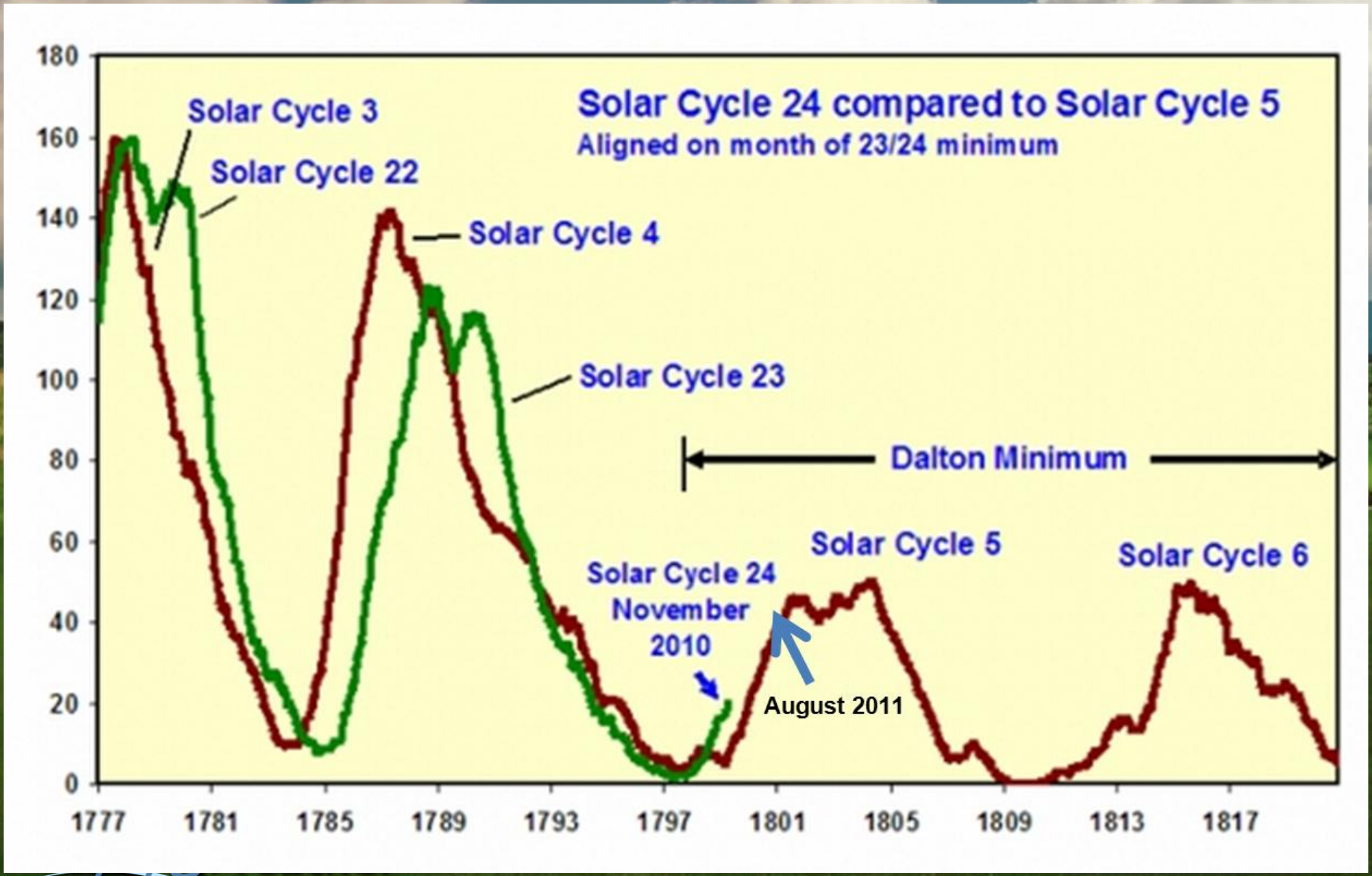
Considerations for 2013



Wildcards?

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Wildcards?
Tropical Activity
SkyeyeWeather
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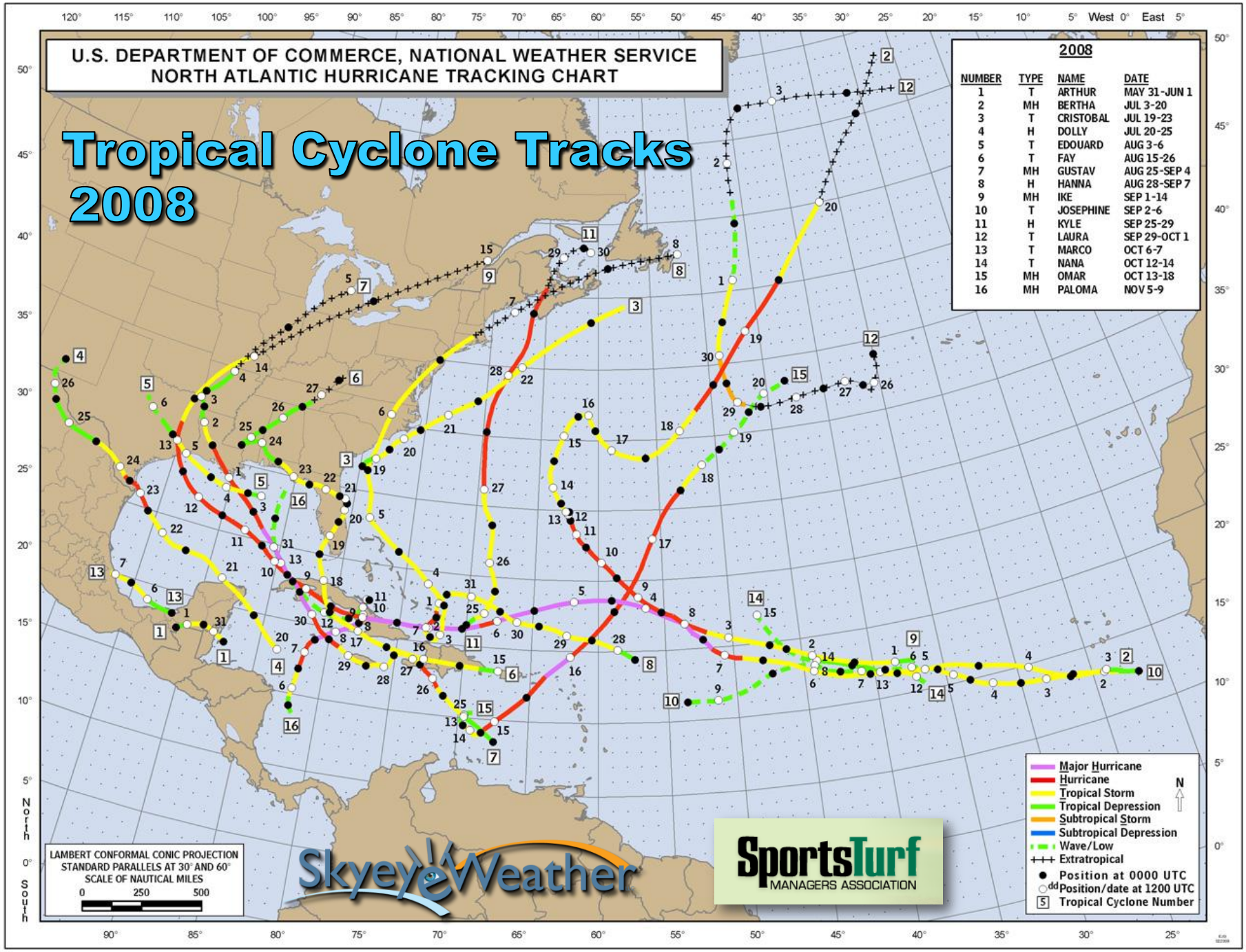
U.S. DEPARTMENT OF COMMERCE, NATIONAL WEATHER SERVICE
NORTH ATLANTIC HURRICANE TRACKING CHART
Tropical Cyclone Tracks
2008
2008
NUMBER TYPE NAME DATE
1 T ARTHUR MAY 31-JUN 1
2 MH BERTHA JUL 3-20
3 T CRISTOBAL JUL 19-23
4 H DOLLY JUL 20-25
5 T EDOUARD AUG 3-6
6 T FAY AUG 15-26
7 MH GUSTAV AUG 25-SEP 4
8 H HANNA AUG 28-SEP 7
9 MH IKE SEP 1-14
10 T JOSEPHINE SEP 2-6
11 H KYLE SEP 25-29
12 T LAURA SEP 29-OCT 1
13 T MARCO OCT 6-7
14 T NANA OCT 12-14
15 MH OMAR OCT 13-18
16 MH PALOMA NOV 5-9
Major Hurricane
Hurricane
Tropical Storm
Tropical Depression
Subtropical Storm
Subtropical Depression
Wave/Low
Extratropical
Position at 0000 UTC
Position/date at 1200 UTC
Tropical Cyclone Number
N
LAMBERT CONFORMAL CONIC PROJECTION
STANDARD PARALLELS AT 30° AND 60°
SCALE OF NAUTICAL MILES
0 250 500
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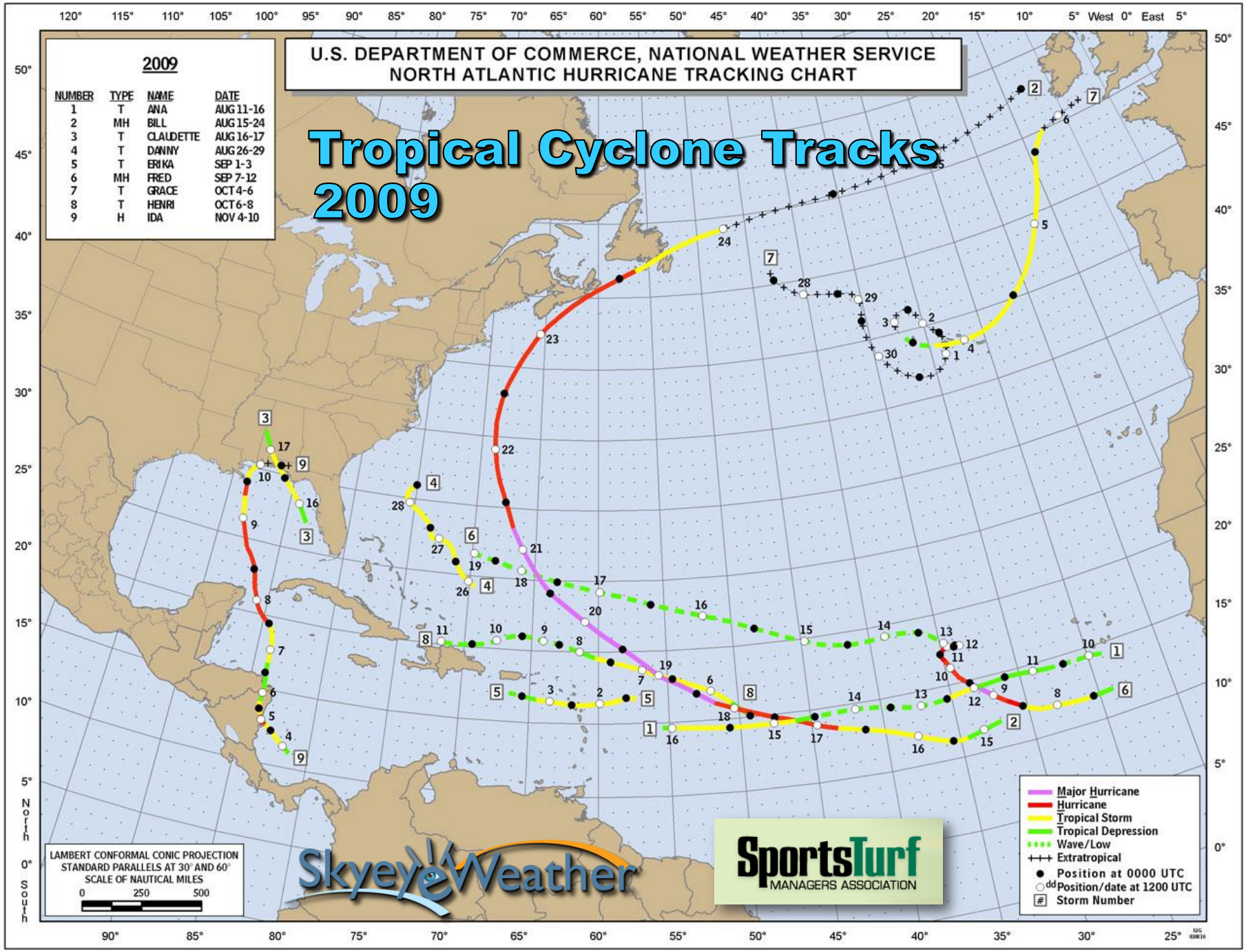
U.S. DEPARTMENT OF COMMERCE, NATIONAL WEATHER SERVICE
NORTH ATLANTIC HURRICANE TRACKING CHART
Tropical Cyclone Tracks
2009
2009
NUMBER TYPE NAME DATE
1 T ANA AUG 11-16
2 MH BILL AUG 15-24
3 T CLAUDETTE AUG 16-17
4 T DANNY AUG 26-29
5 T ERIKA SEP 1-3
6 MH FRED SEP 7-12
7 T GRACE OCT 4-6
8 T HENRI OCT 6-8
9 H IDA NOV 4-10
LAMBERT CONFORMAL CONIC PROJECTION
STANDARD PARALLELS AT 30° AND 60°
SCALE OF NAUTICAL MILES
0 250 500
Major Hurricane
Hurricane
Tropical Storm
Tropical Depression
Wave/Low
Extratropical
Position at 0000 UTC
dd Position/date at 1200 UTC
Storm Number
SkyeyeWeather
SportsTurf
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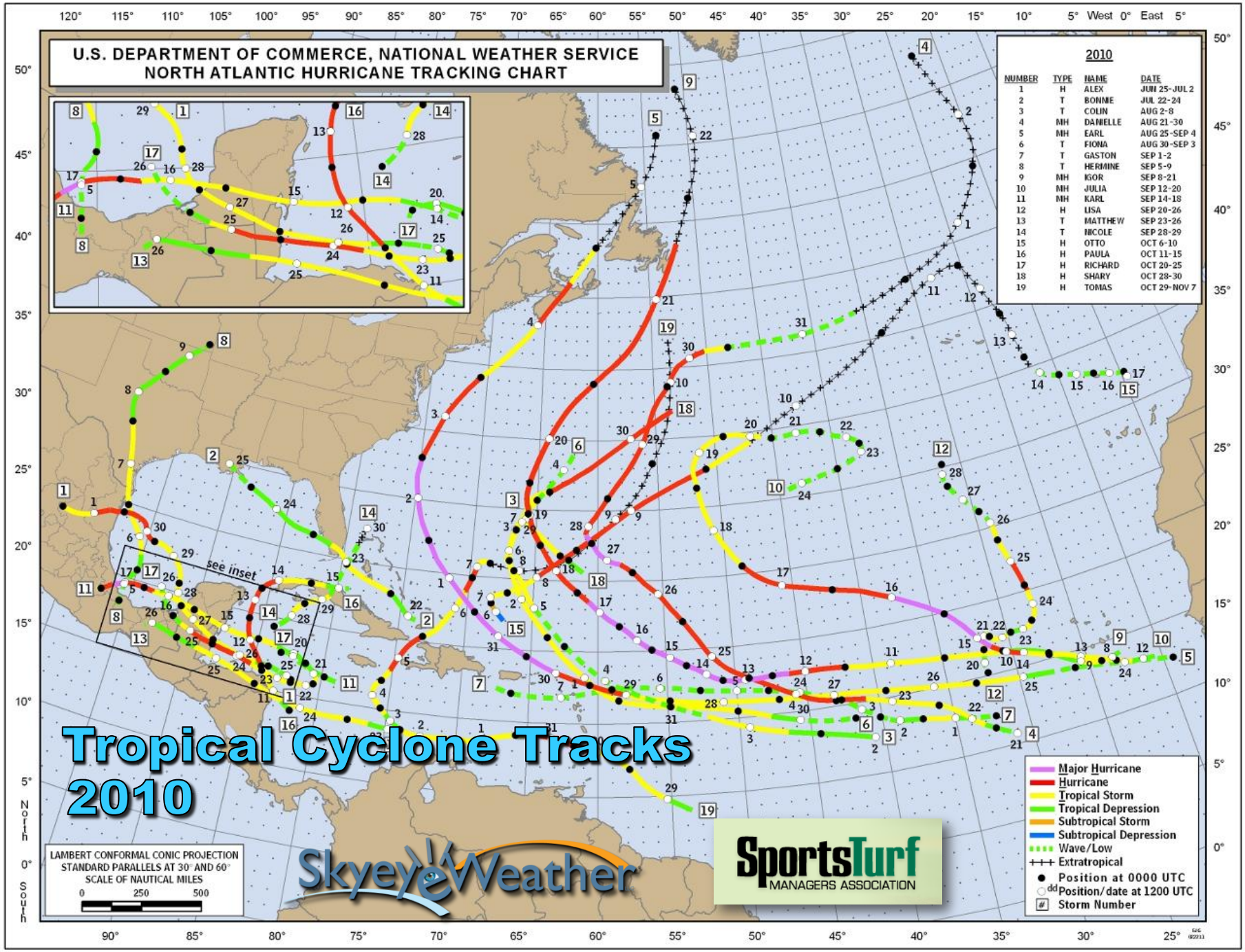
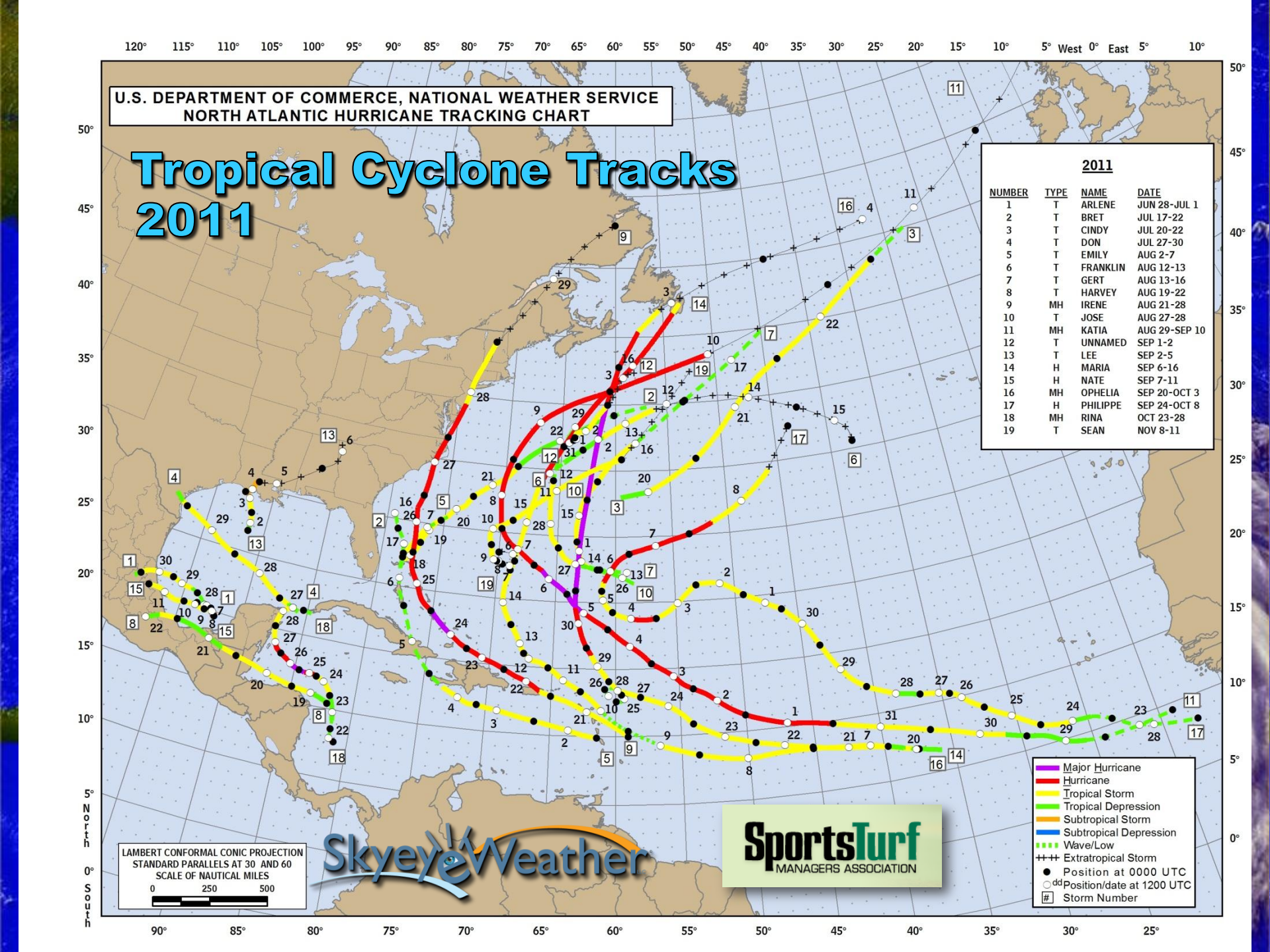

U.S. DEPARTMENT OF COMMERCE, NATIONAL WEATHER SERVICE
NORTH ATLANTIC HURRICANE TRACKING CHART
2010
NUMBER TYPE NAME DATE
1 H ALEX JUN 25-JUL 2
2 T BONNIE JUL 22-24
3 T COLIN AUG 2-8
4 MH DANIELLE AUG 21-30
5 MH EARL AUG 25-SEP 4
6 T FIONA AUG 30-SEP 3
7 T GASTON SEP 1-2
8 T HERMINE SEP 5-9
9 MH IGOR SEP 8-21
10 MH JULIA SEP 12-20
11 MH KARL SEP 14-18
12 H LISA SEP 20-26
13 T MATTHEW SEP 23-26
14 T NICOLE SEP 28-29
15 H OTTO OCT 6-10
16 H PAULA OCT 11-15
17 H RICHARD OCT 20-25
18 H SHARY OCT 28-30
19 H TOMAS OCT 29-NOV 7
see inset
Major Hurricane
Hurricane
Tropical Storm
Tropical Depression
Subtropical Storm
Subtropical Depression
Wave/Low
Extratropical
Position at 0000 UTC
dd Position/date at 1200 UTC
Storm Number
LAMBERT CONFORMAL CONIC PROJECTION
STANDARD PARALLELS AT 30° AND 60°
SCALE OF NAUTICAL MILES
0 250 500
Tropical Cyclone Tracks
2010
SkyeyeWeather
SportsTurf
MANAGERS ASSOCIATION


U.S. DEPARTMENT OF COMMERCE, NATIONAL WEATHER SERVICE
NORTH ATLANTIC HURRICANE TRACKING CHART
Tropical Cyclone Tracks
2011
2011
NUMBER TYPE NAME DATE
1 T ARLENE JUN 28-JUL 1
2 T BRET JUL 17-22
3 T CINDY JUL 20-22
4 T DON JUL 27-30
5 T EMILY AUG 2-7
6 T FRANKLIN AUG 12-13
7 T GERT AUG 13-16
8 T HARVEY AUG 19-22
9 MH IRENE AUG 21-28
10 T JOSE AUG 27-28
11 MH KATIA AUG 29-SEP 10
12 T UNNAMED SEP 1-2
13 T LEE SEP 2-5
14 H MARIA SEP 6-16
15 H NATE SEP 7-11
16 MH OPHELIA SEP 20-OCT 3
17 H PHILIPPE SEP 24-OCT 8
18 MH RINA OCT 23-28
19 T SEAN NOV 8-11
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Considerations for 2013

And beyond...

Shorter Growing Seasons

Efficient Irrigation

Drought-Resistant Turf

SkyeyeWeather

SportsTurf MANAGERS ASSOCIATION

Turf Management in a Changing Climate

Recent extremes and what's coming next…

Thoughts / Questions?

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Meteorologist
Skyeye Weather LLC
www.skyeyeweather.com

SkyeyeWeather LLC

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