El Niño-Southern Oscillation (ENSO) Update + What Might We Expect This Winter?

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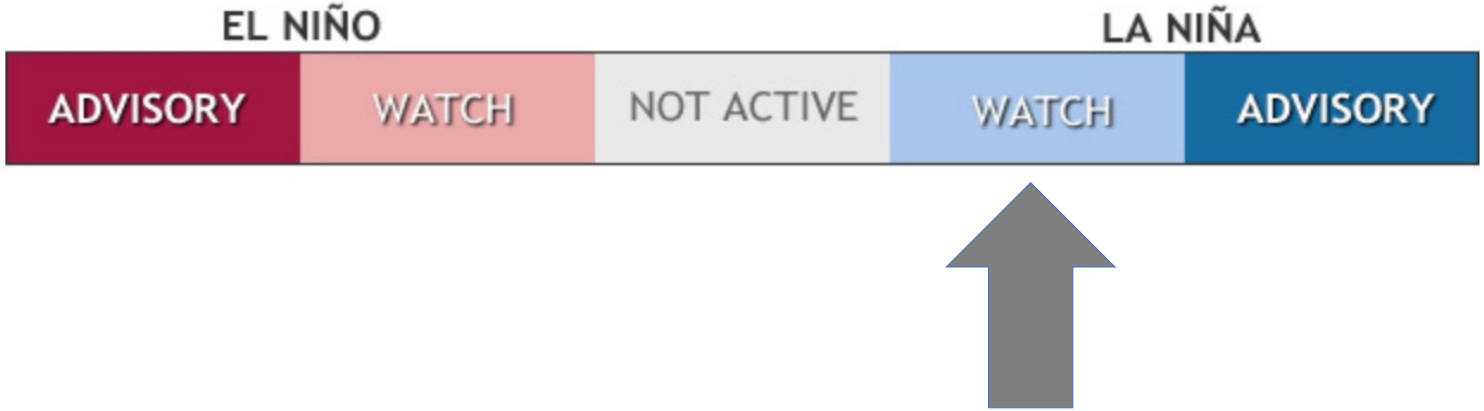
* ENSO blog affiliates

NOAA Eastern Region Climate Services Webinar
19 December 2024



La Niña Watch

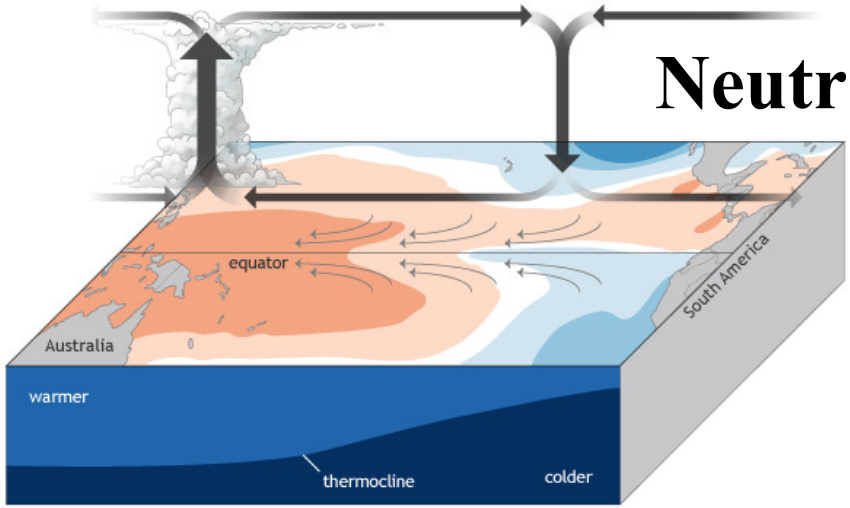
12 December 2024 Update:

La Niña conditions are most likely to emerge in November 2024 - January 2025 (59% chance), with a transition to ENSO-neutral most likely by March-May 2025 (61% chance).

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.shtml

Atmosphere-ocean feedbacks during El Niño-Southern Oscillation
Neutral

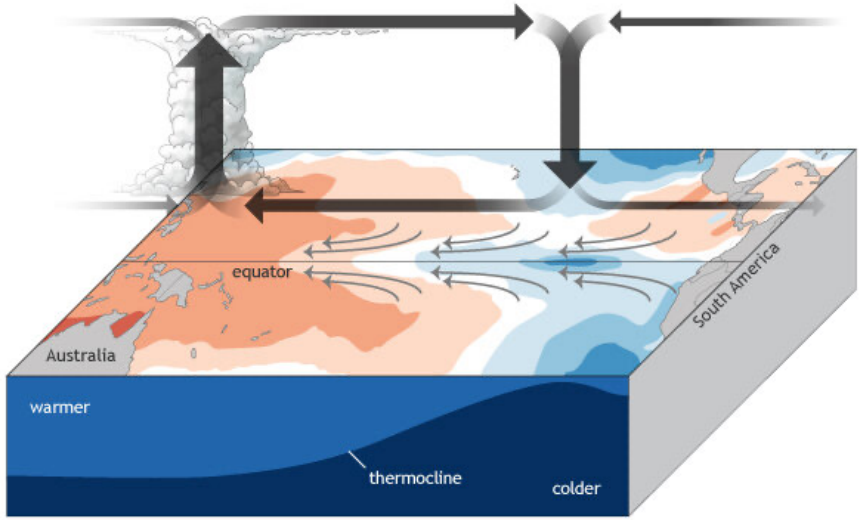
Neutral



NOAA Climate.gov

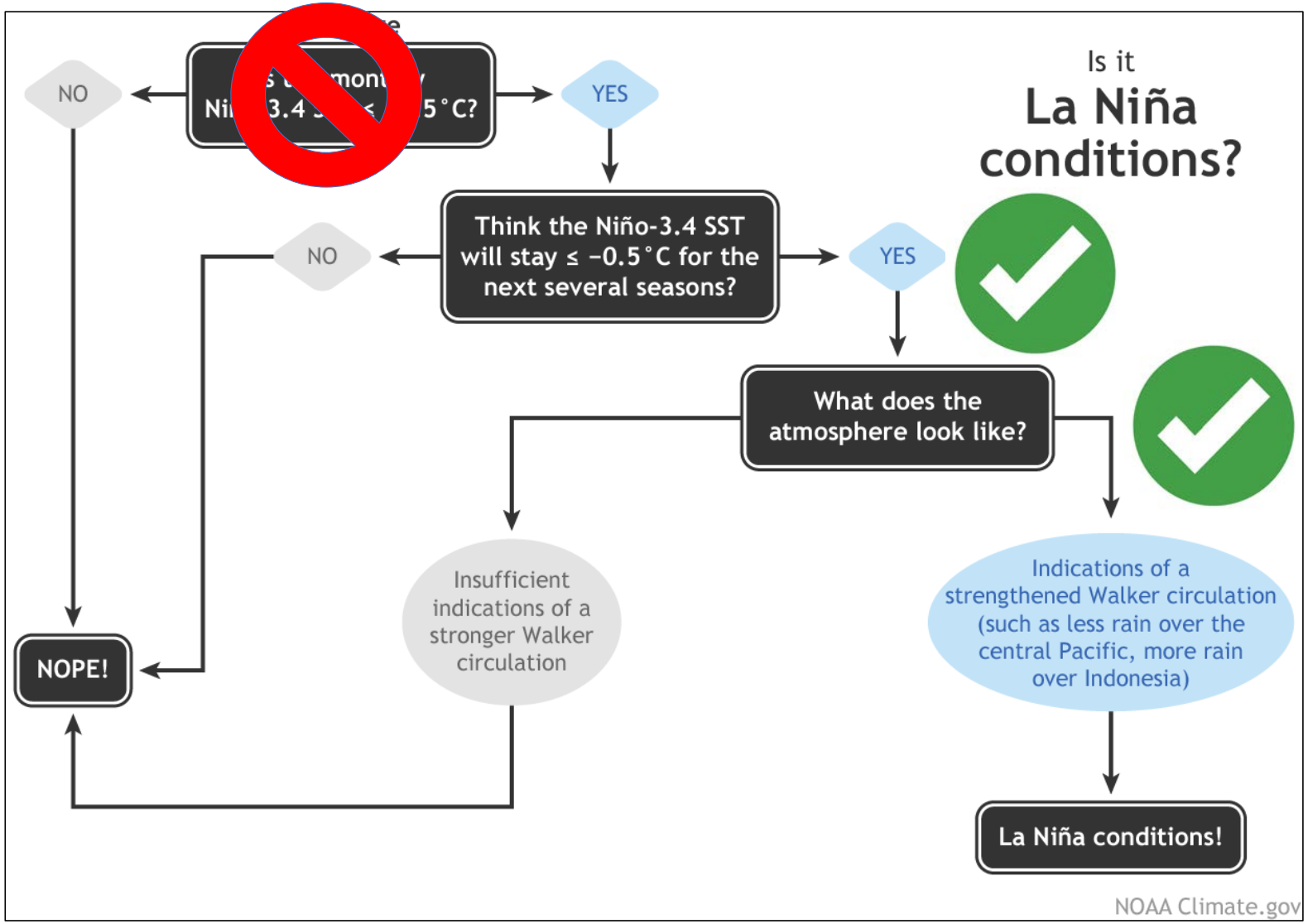
La Niña

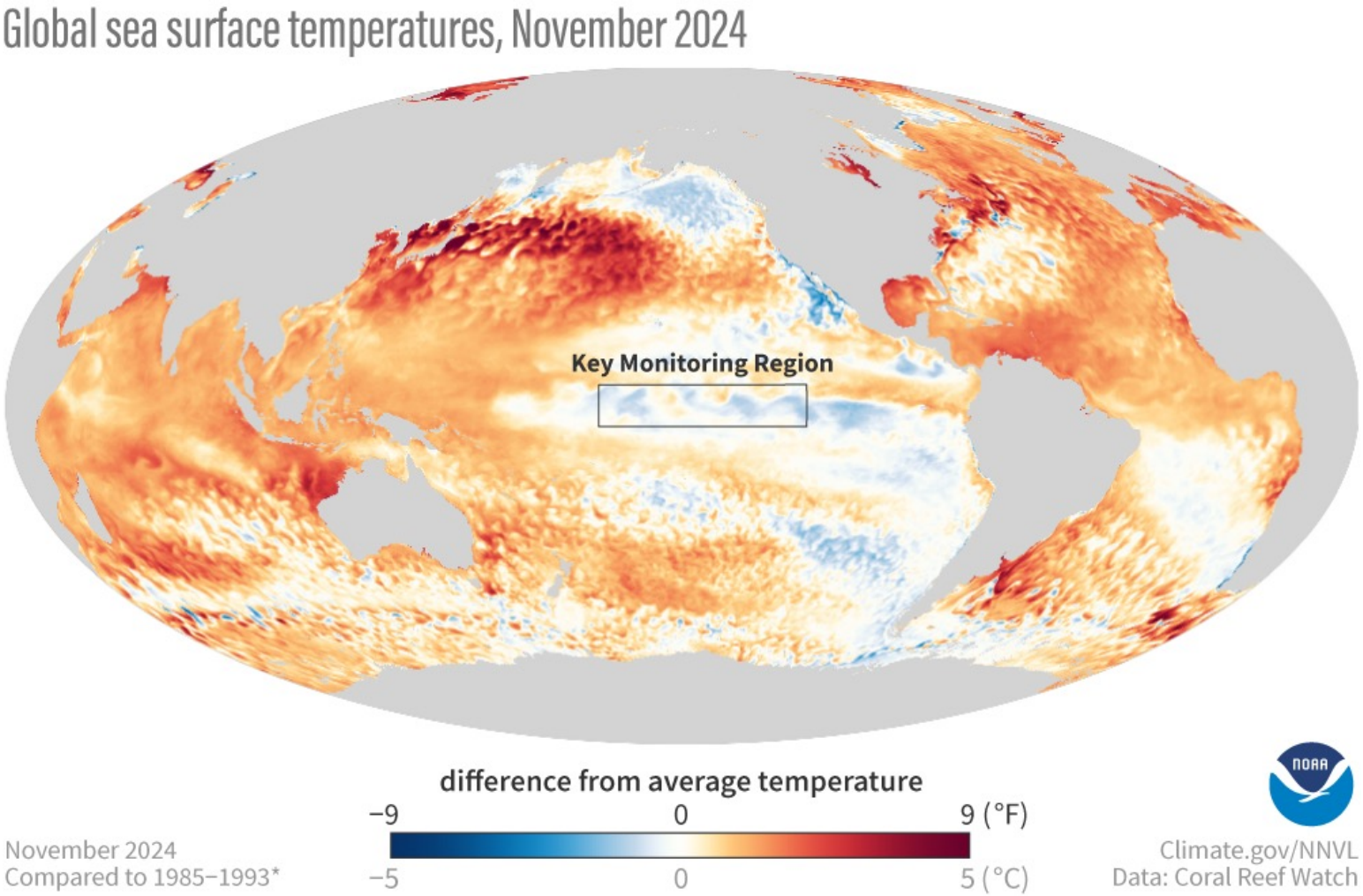
Atmosphere-ocean feedbacks during El Niño-Southern Oscillation
La Niña



NOAA Climate.gov

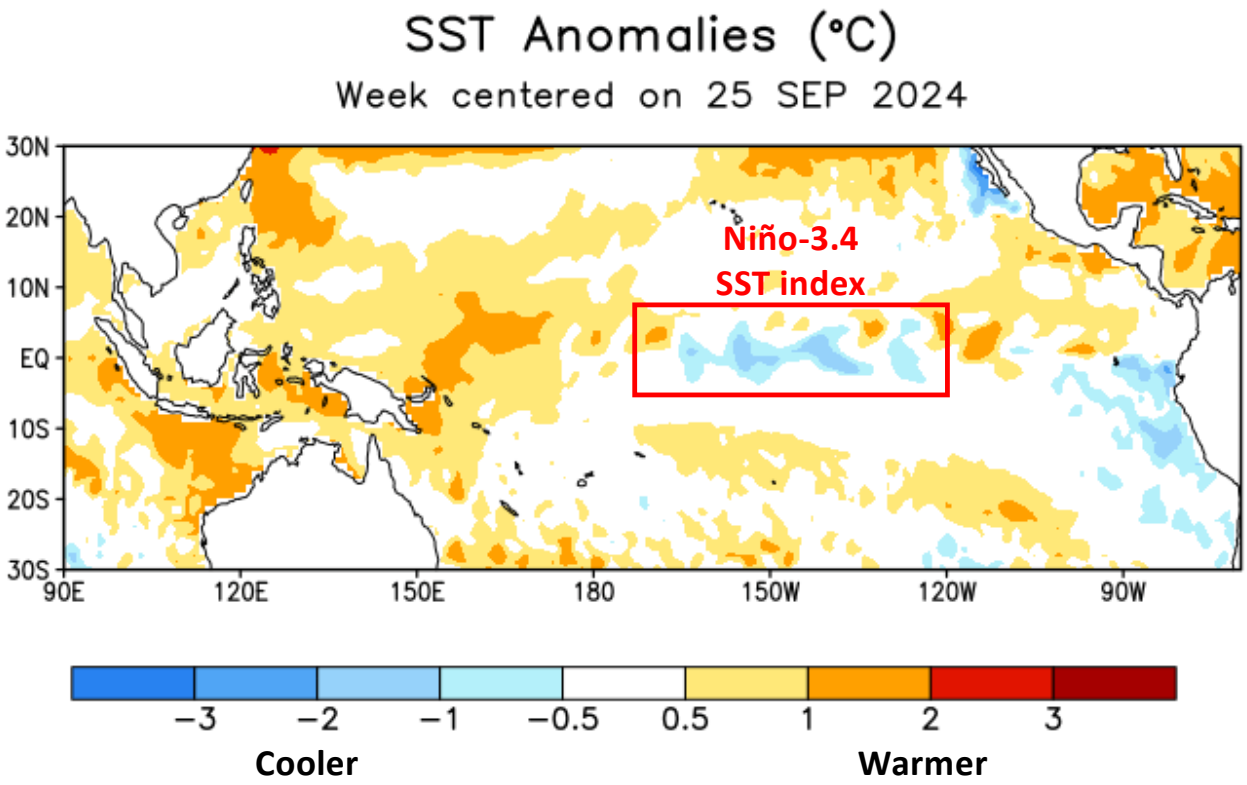
https://www.climate.gov/news-features/blogs/enso/rise-el-niño-and-la-niña


Is it
La Niña conditions?
NO
YES
Think the Niño-3.4 SST will stay ≤ −0.5°C for the next several seasons?
NO
YES
What does the atmosphere look like?
Insufficient indications of a stronger Walker circulation
Indications of a strengthened Walker circulation (such as less rain over the central Pacific, more rain over Indonesia)
NOPE!
La Niña conditions!
NOAA Climate.gov

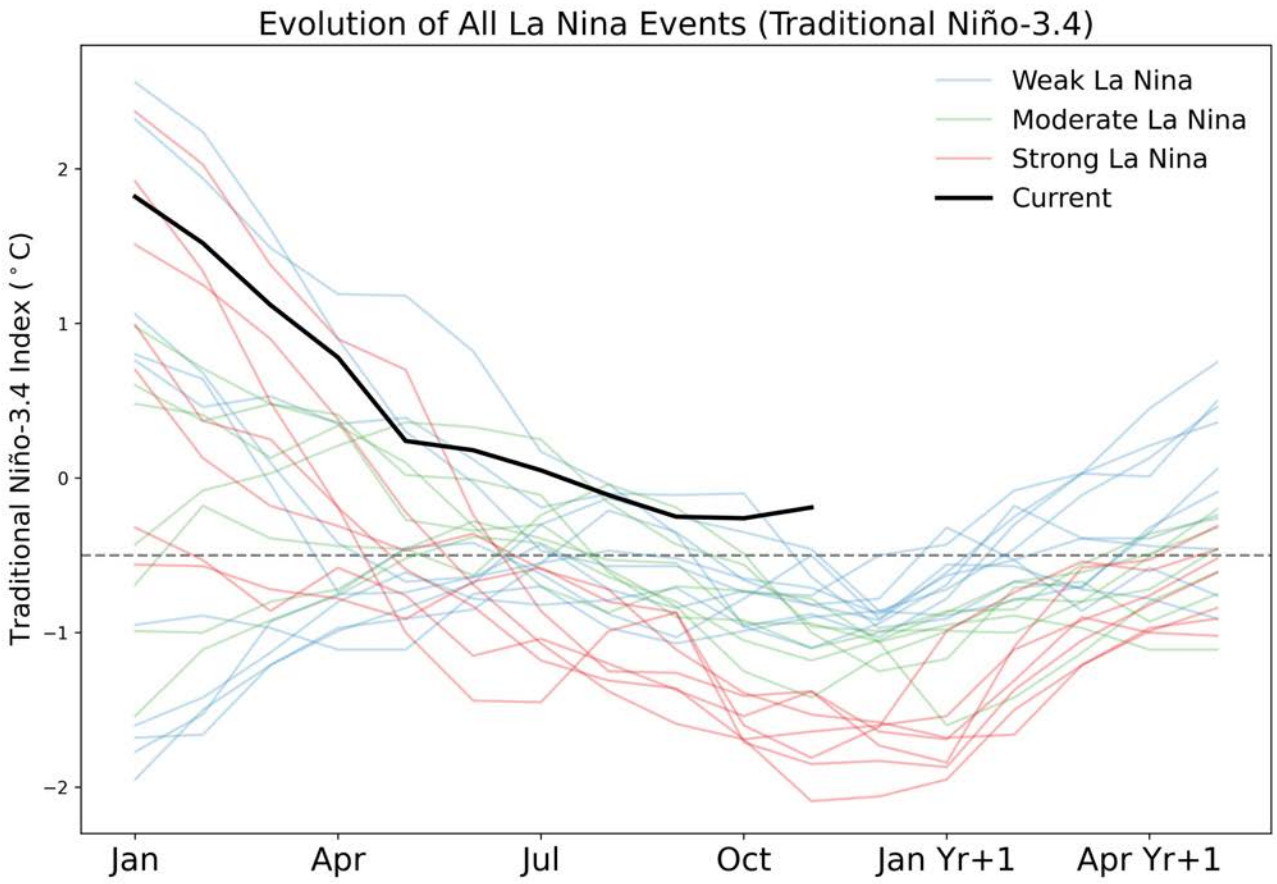


https://www.nnvl.noaa.gov/view/globaldata.html#SSTA

Weekly Average Sea Surface Temperatures during late September through mid December 2024

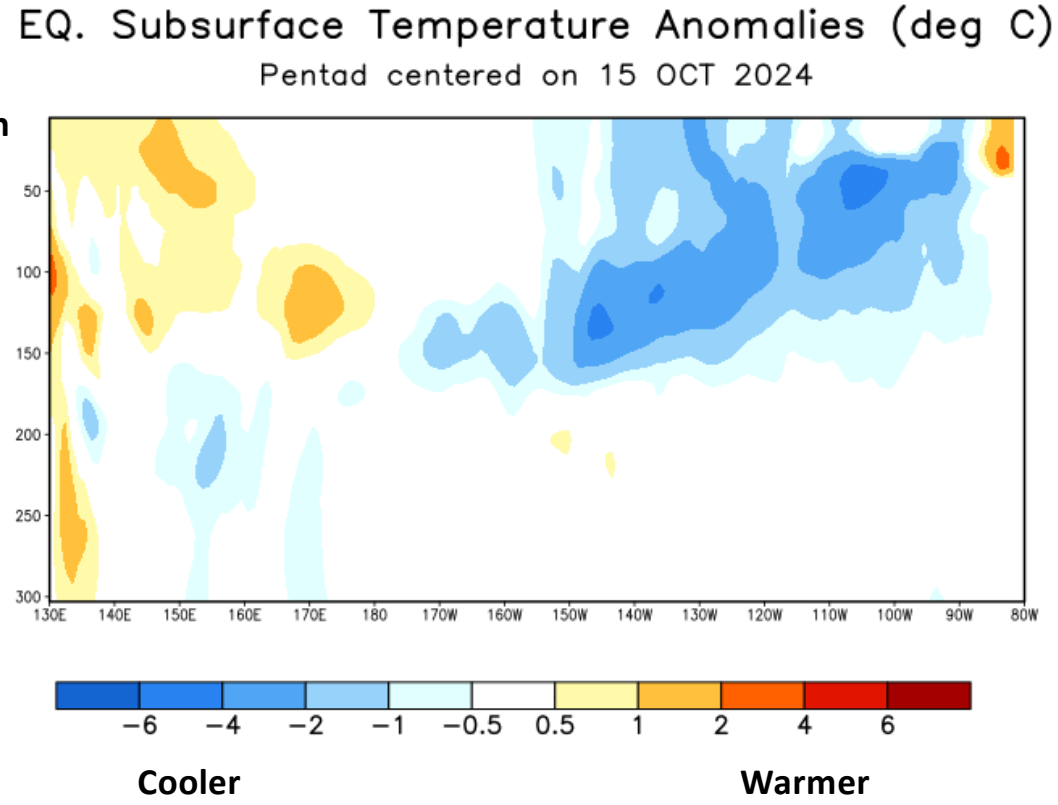


Evolution in the Niño-3.4 SST index for all La Niña episodes since 1950

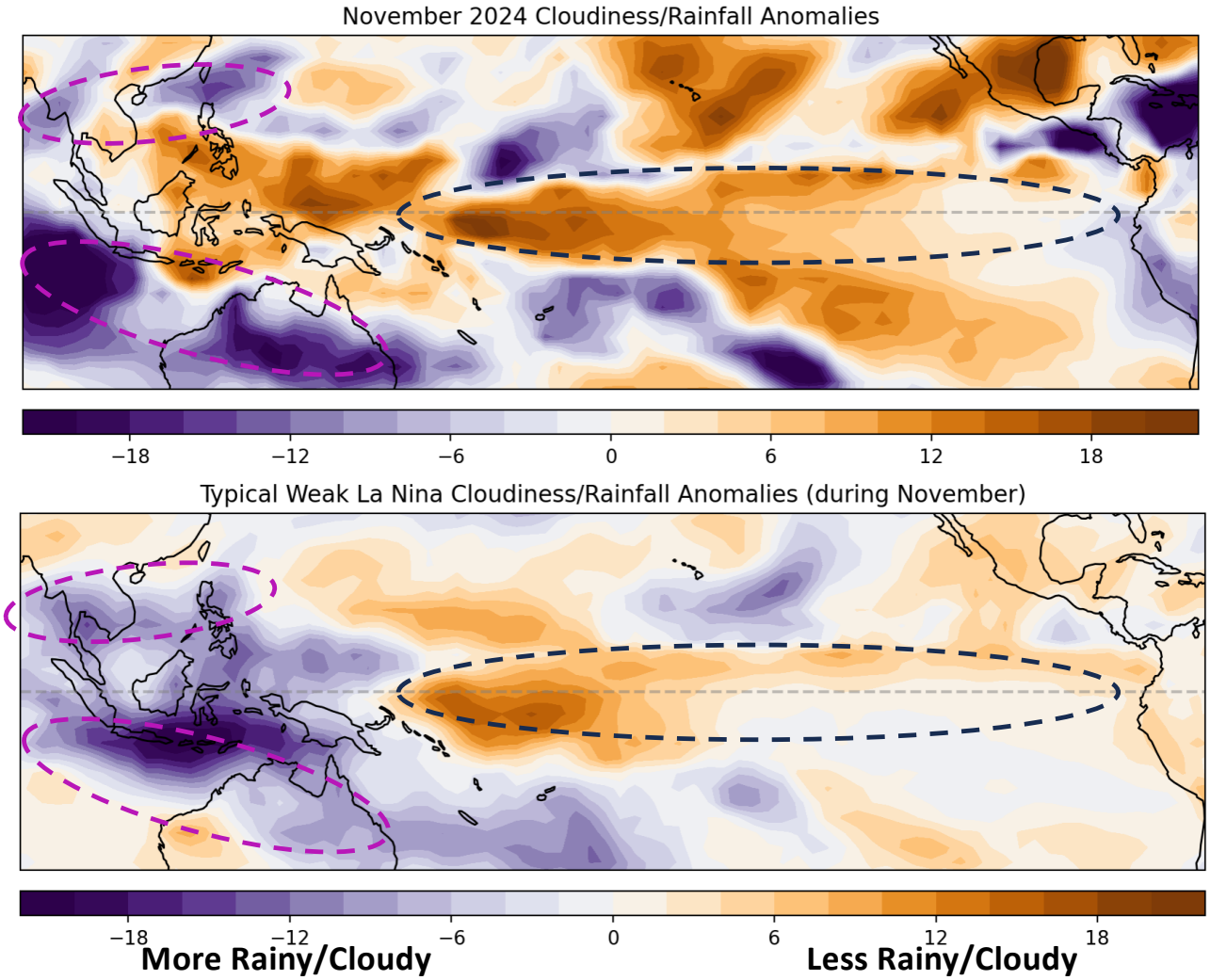


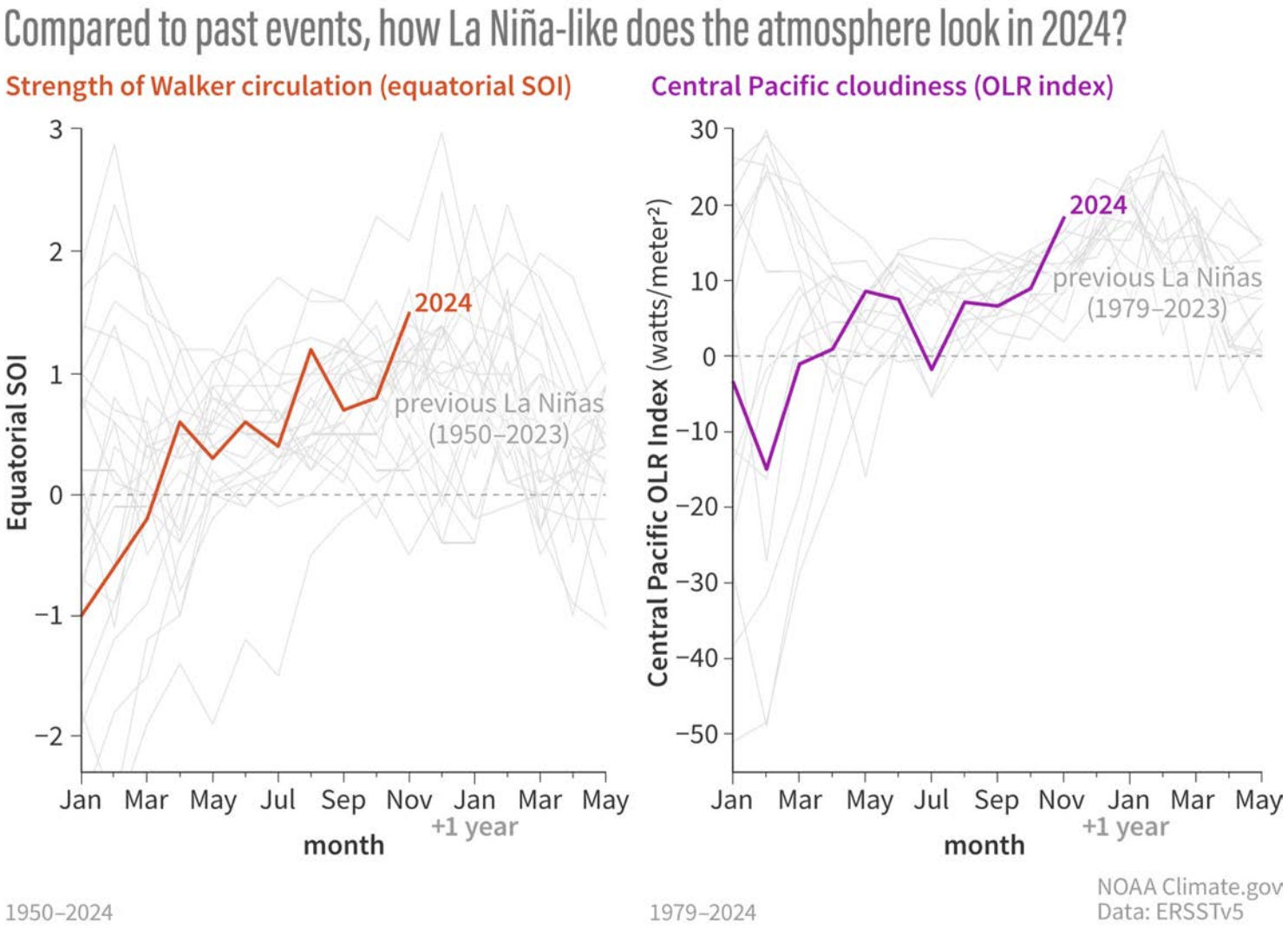
Data: NOAA ERSSTv5 (with 30-year moving climatologies)

Subsurface Temperature Departures
during mid-October through early December 2024



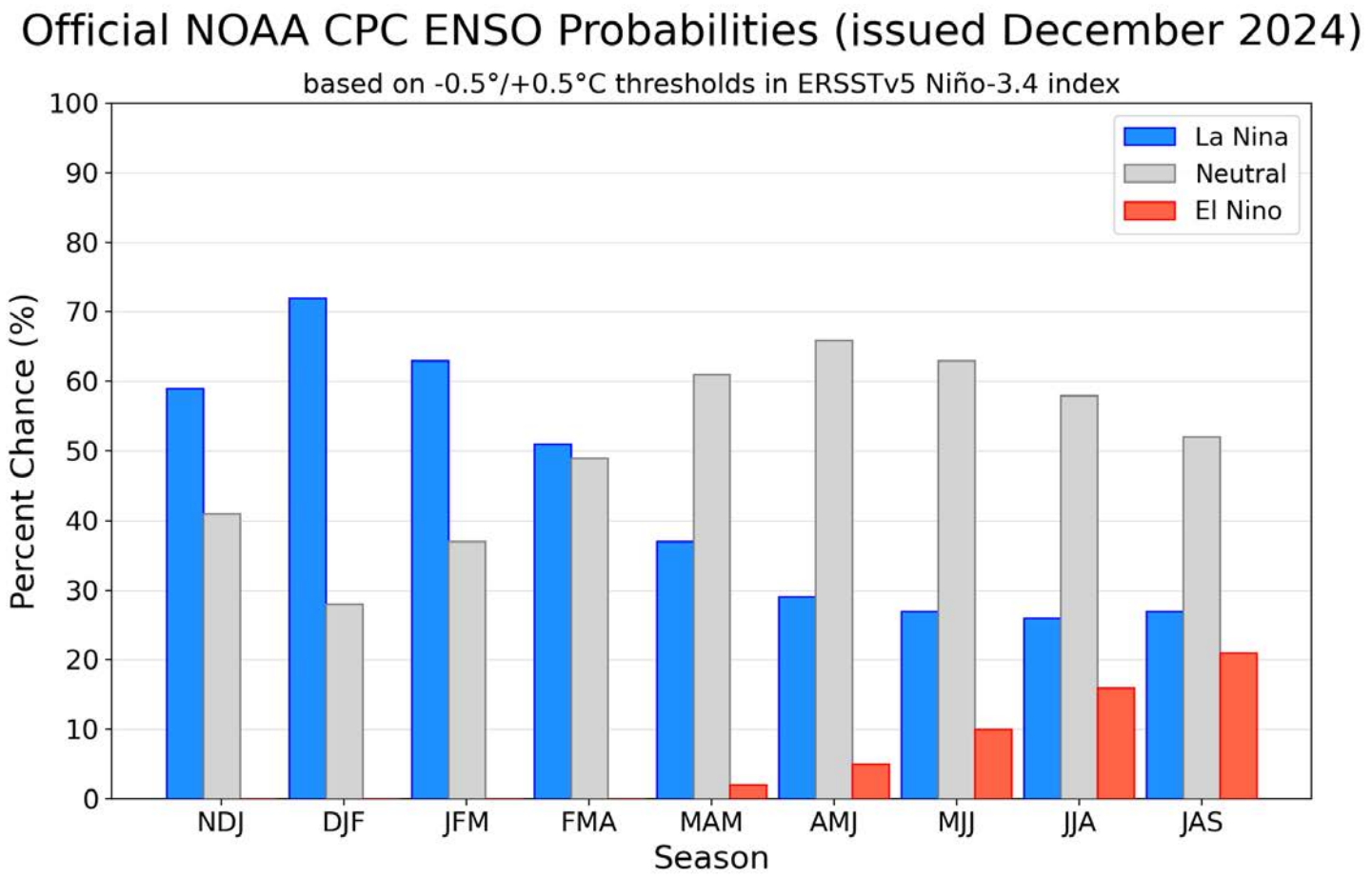
Outgoing Longwave Radiation (OLR) Anomalies (proxy for Rainfall/Cloudiness)





https://www.climate.gov/news-features/blogs/enso/december-2024-enso-update-party-time-excellent

ENSO Outlook (updated 12 December)



https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.shtml

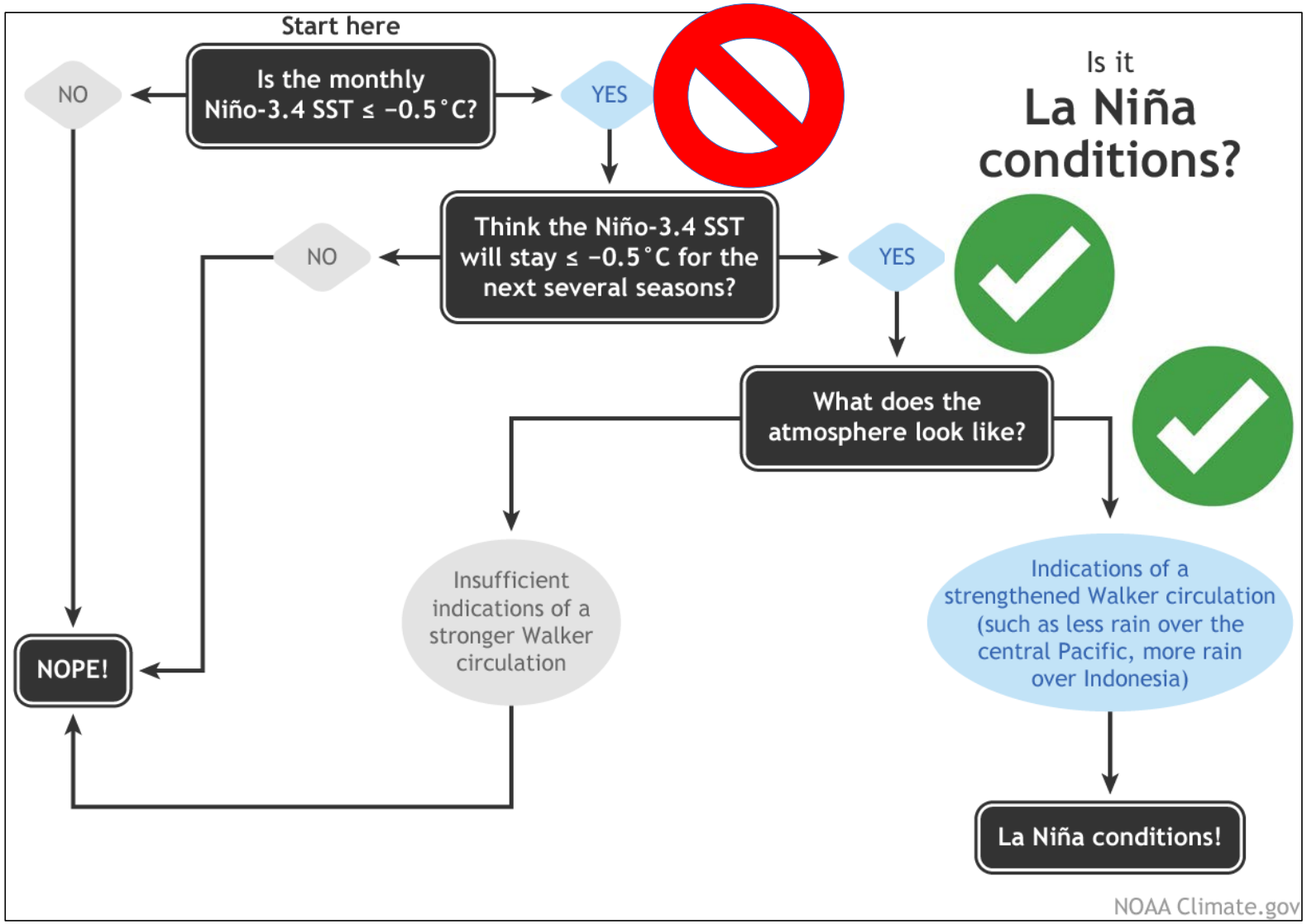
Niño3.4 Index Strength Outlook (updated 12 December)

This table shows the forecast probability (%) of Niño-3.4 index exceeding a certain threshold (in degrees Celsius).
For negative thresholds, the table shows the probability (%) of a Niño-3.4 index value that is less than (more negative) that value.
For positive thresholds, the table shows the probability (%) of a Niño-3.4 index value that is greater than (more positive) that value.
This tool supports the official ENSO Diagnostic discussion updated on the 2nd Thursday of each month.

Target	≤ -2.0°C	≤ -1.5°C	≤ -1.0°C	≤ -0.5°C	≥ 0.5°C	≥ 1.0°C	≥ 1.5°C	≥ 2.0°C
NDJ	~0	~0	~0	59	~0	~0	~0	~0
DJF	~0	~0	12	72	~0	~0	~0	~0
JFM	~0	~0	12	63	~0	~0	~0	~0
FMA	~0	~0	8	51	~0	~0	~0	~0
MAM	~0	~0	5	37	2	~0	~0	~0
AMJ	~0	~0	4	29	5	~0	~0	~0
MJJ	~0	~0	5	27	10	1	~0	~0
JJA	~0	1	6	26	16	3	~0	~0
JAS	~0	2	8	27	21	6	1	~0
	≤ -2.0°C	≤ -1.5°C	≤ -1.0°C	≤ -0.5°C	≥ 0.5°C	≥ 1.0°C	≥ 1.5°C	≥ 2.0°C

A weak La Niña is most likely if it forms. There is a 12% chance it would be at least moderate strength.

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/strengths/index.php


Start here
Is the monthly Niño-3.4 SST ≤ −0.5°C?
NO
YES
Think the Niño-3.4 SST will stay ≤ −0.5°C for the next several seasons?
NO
YES
What does the atmosphere look like?
Insufficient indications of a stronger Walker circulation
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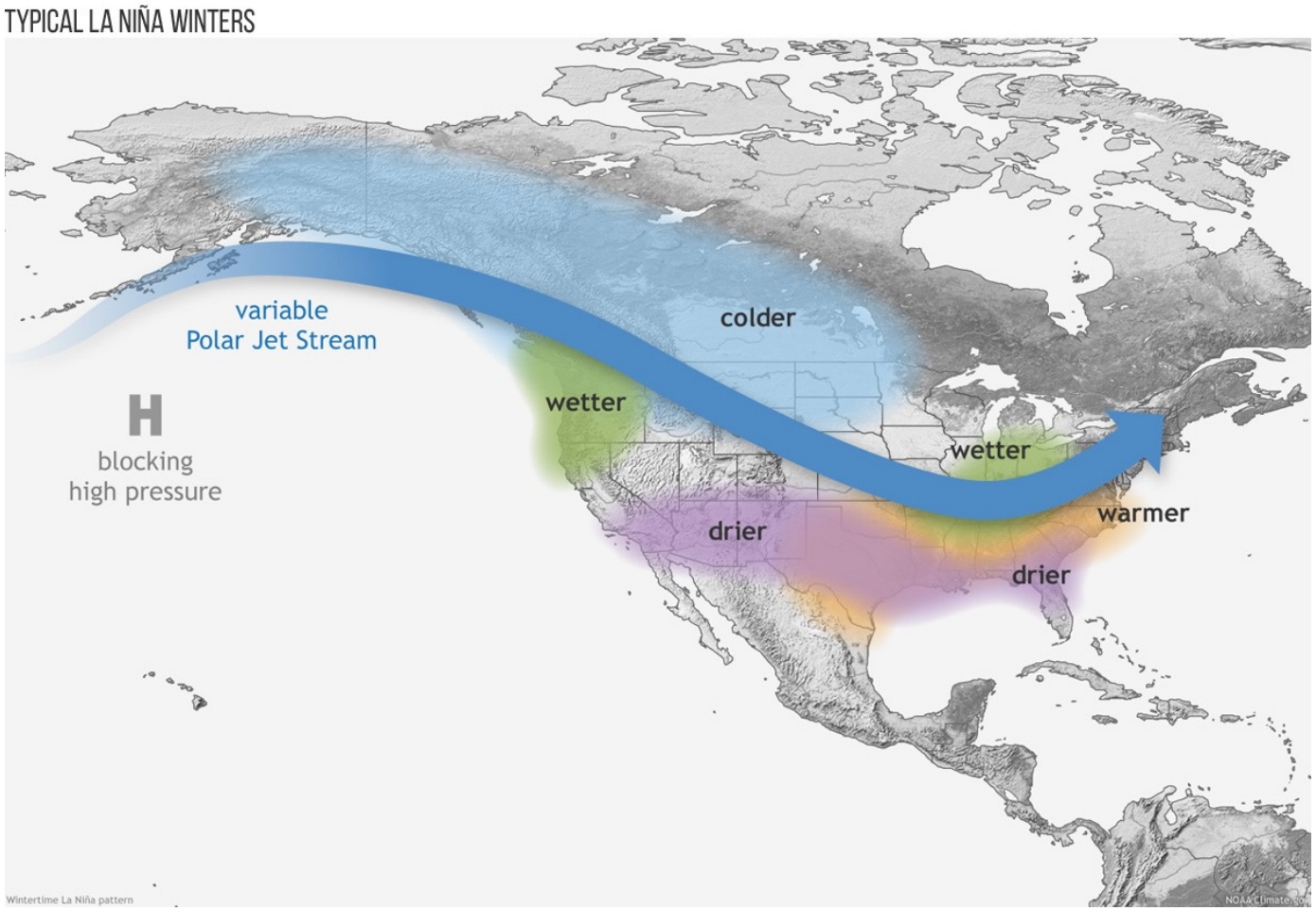
NOPE!
La Niña conditions!
Is it
La Niña conditions?
NOAA Climate.gov

What Might We Expect Over the Eastern Region This Winter?

Schematic Version of La Niña Impacts

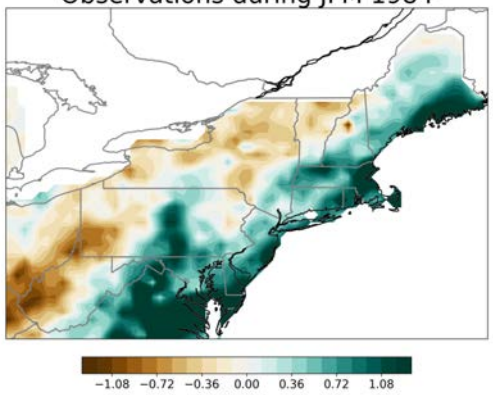


https://www.climate.gov/news-features/featured-images/how-el-niño-and-la-niña-affect-winter-jet-stream-and-us-climate

What Do Precipitation Anomalies look like for previous Weak La Niñas?

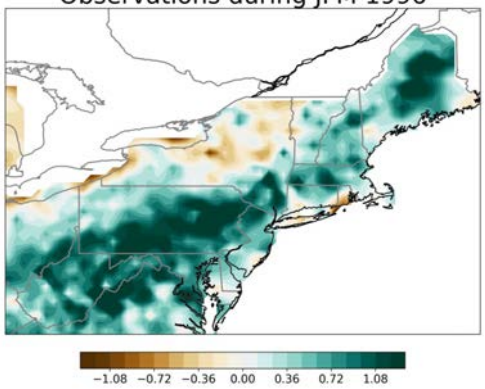
Opposite Pattern Match With Typical Weak La Niña

Observations during JFM 1984

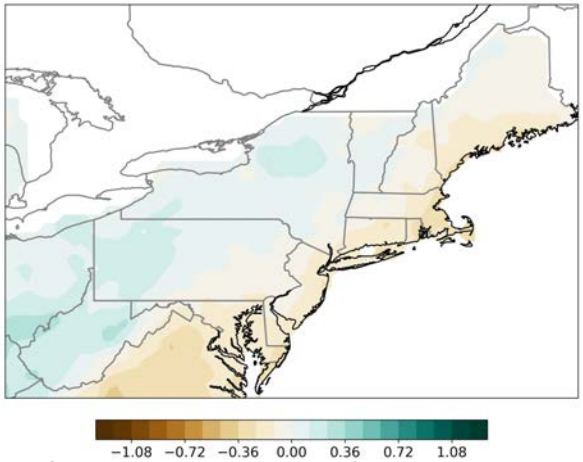


Little Match With Typical Weak La Niña

Observations during JFM 1996



Expected or Typical La Niña precipitation pattern during January-March

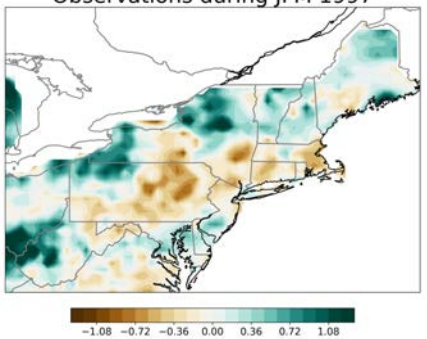


Below-average precipitation

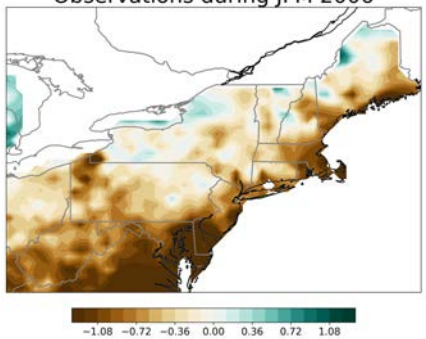
Above-average precipitation

Better Pattern Matches With Typical Weak La Niña

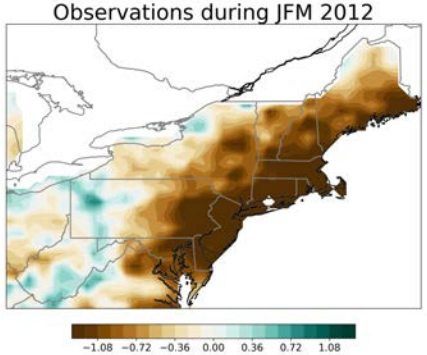
Observations during JFM 1997



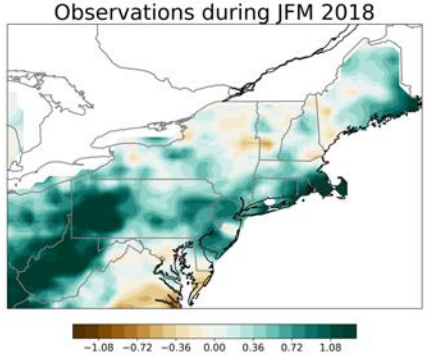
Observations during JFM 2006



Observations during JFM 2012



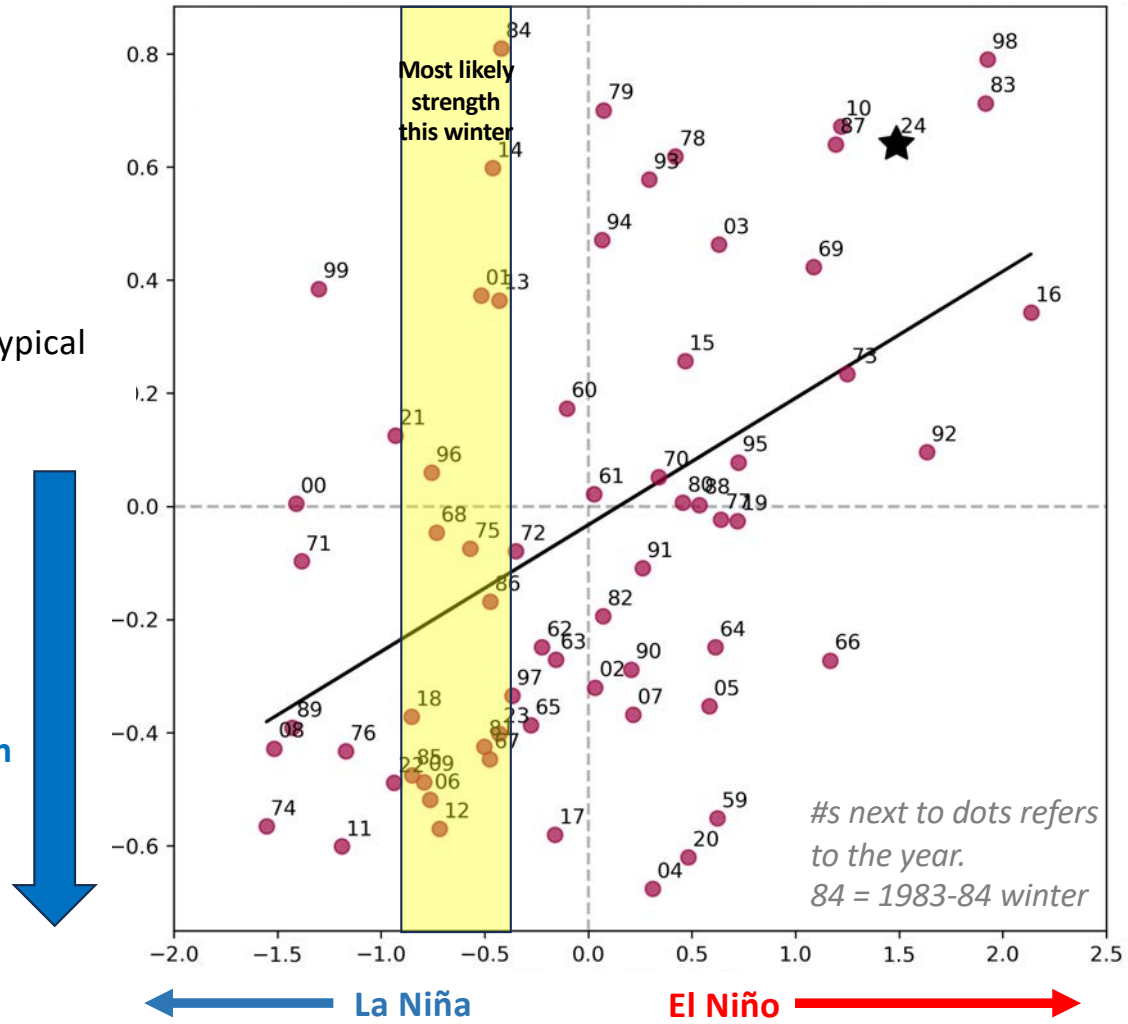
Observations during JFM 2018



How well do Eastern Region precipitation anomalies relate to ENSO? (January-March)

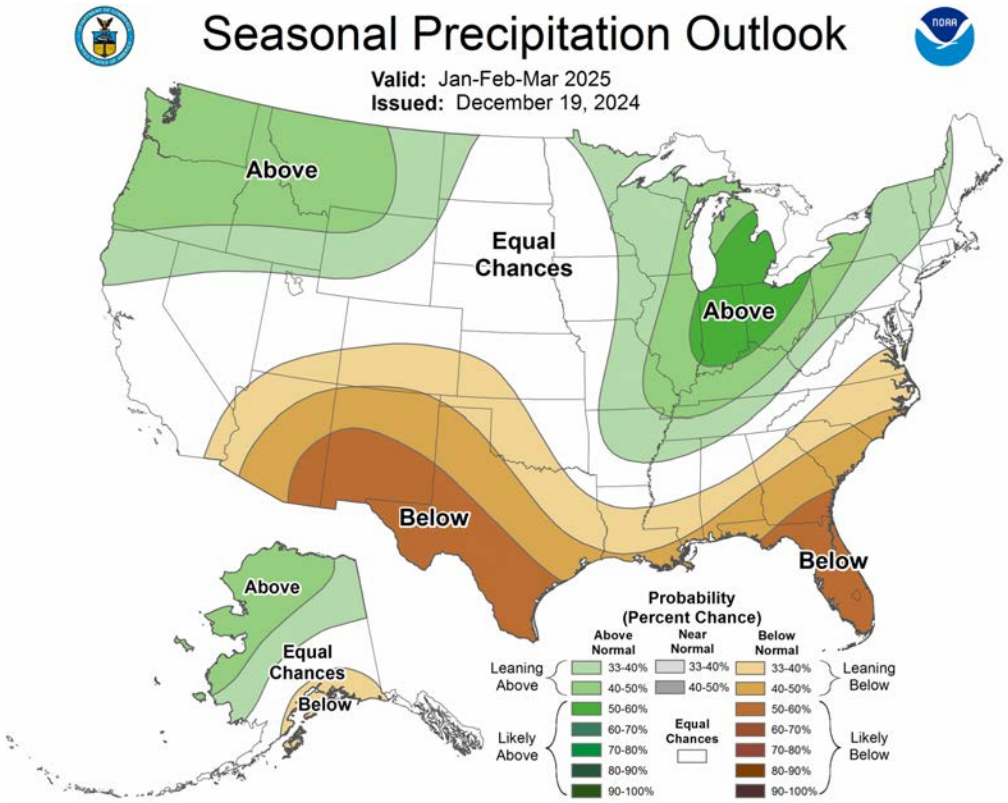
Match Score* With Typical ENSO Pattern

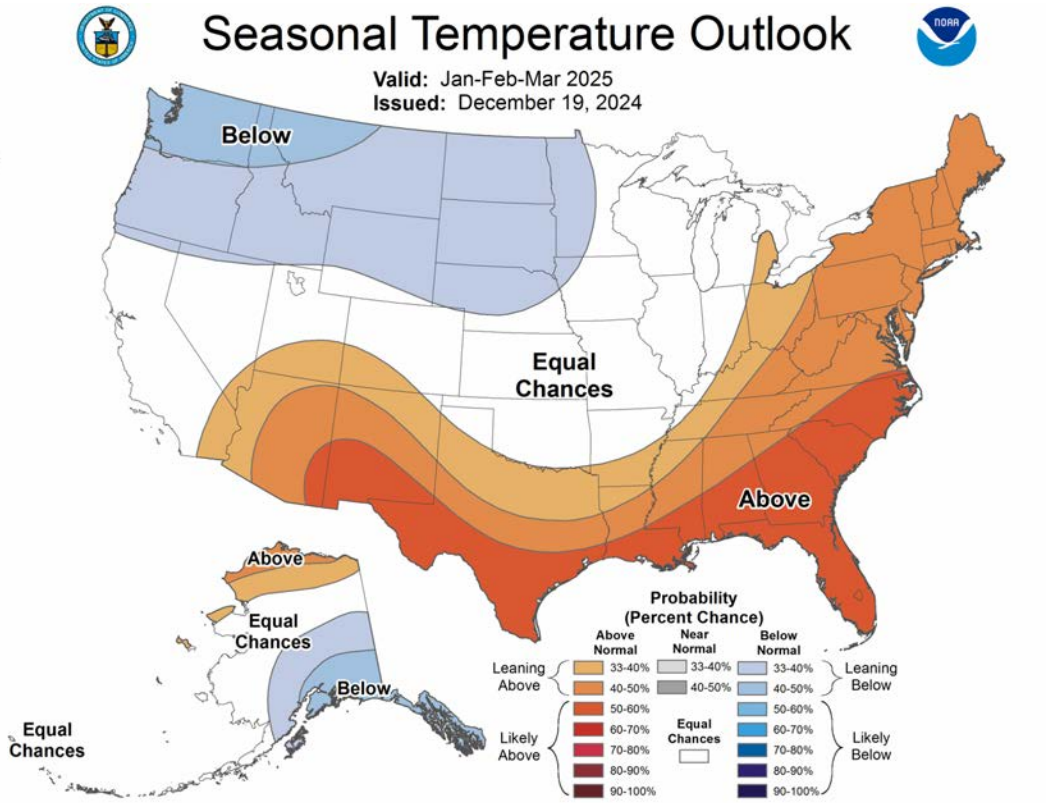
Larger values means winter precip pattern looks more like the typical La Niña pattern



** Spatial Pattern Correlation*

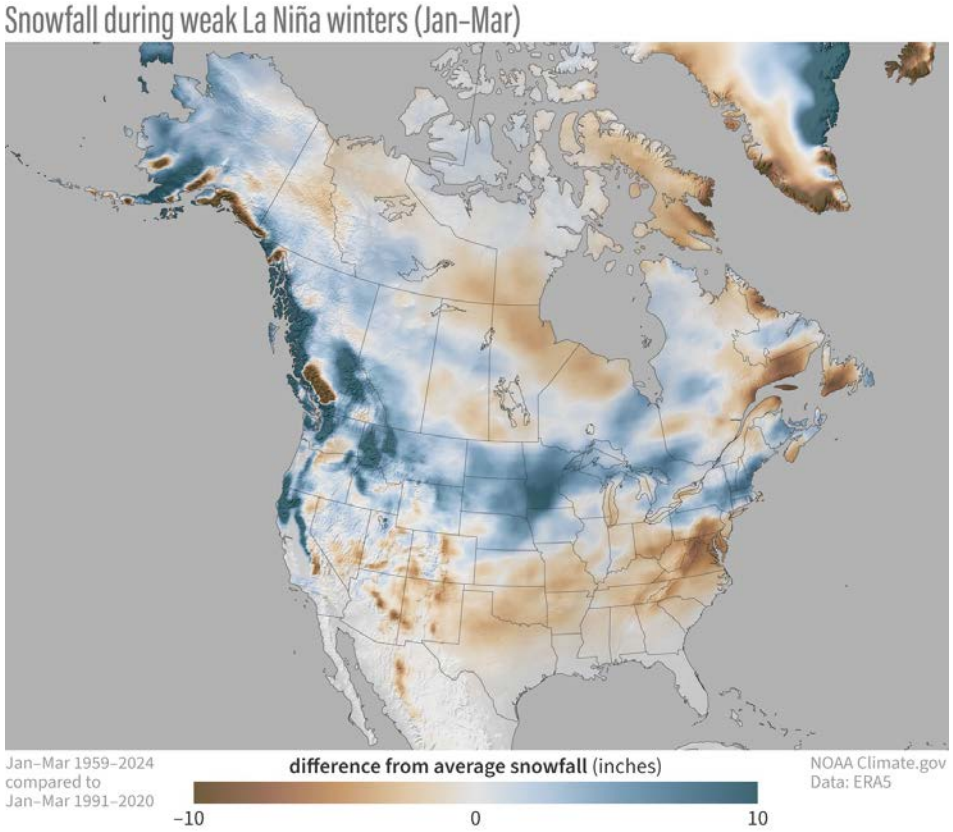
January - March 2025 CPC Outlook
(updated 19 Dec.)

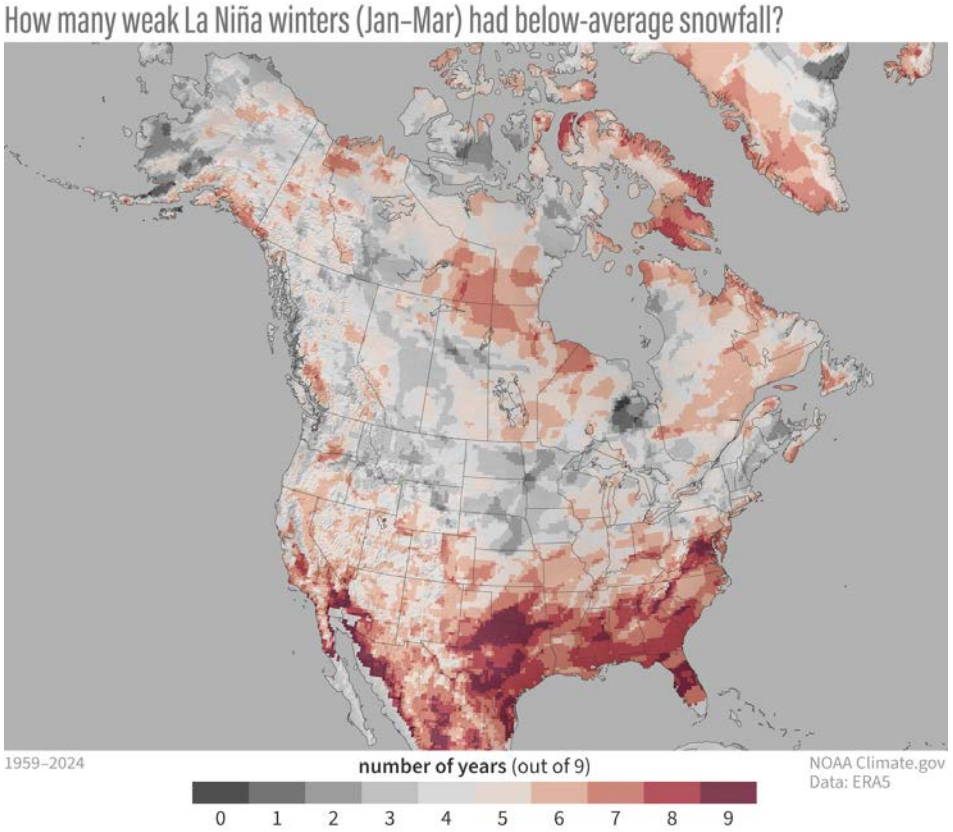




View CPC Seasonal Outlooks for all upcoming seasons:
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/

How about Snow?





https://www.climate.gov/news-features/blogs/enso/revisiting-la-nina-and-winter-snowfall

Key Takeaways

- If La Niña forms, it would likely be on the weaker side of events. A weaker event means weaker “pushing” onto the atmosphere which can lead to somewhat higher chances of ‘busts’ or unexpected outcomes.

- It is expected to be strongest during the winter (in Niño-3.4 region sea surface temperatures), but some impacts over the United States may lag into the spring seasons (February-April to April-June).

- Over the Eastern region, odds lean toward above-average temperature. For interior, western parts of the region, above-average precipitation (rain + snow) is also favored ("equal chances” along coastal areas).

- Expected seasonal impacts are always probabilistic (“% chance of”) and never guaranteed. This is an important message to convey to users of these products.

ENSO Diagnostics Discussion (updated on the 2nd Thursday of each month)

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html

ENSO Blog (updated twice a month)

https://www.climate.gov/news-features/blogs/enso [or just google “ENSO Blog”]

CPC Seasonal Outlook (updated on the 3rd Thursday of each month)

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/