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*
30 November 2023
El Niño Advisory

9 November 2023 Update:
El Niño is anticipated to continue through the Northern Hemisphere spring (with a 62% chance during April-June 2024).

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.shtml
October 2023 Sea Surface Temperature (SST) Anomalies

https://www.nnvl.noaa.gov/view/globaldata.html#SSTA
Weekly Average Sea Surface Temperatures during early September through late November 2023

SST Anomalies (°C)
Week centered on 06 SEP 2023
Evolution in the Niño-3.4 SST index for all El Niño episodes since 1950

Data: NOAA ERSSTv5 (with 30-year moving climatologies)
Subsurface Temperature Departures
during late September through mid November 2023

EQ. Subsurface Temperature Anomalies (deg C)
Pentad centered on 25 SEP 2023
ENSO Outlook (updated 9 November)

Official NOAA CPC ENSO Probabilities (issued Nov. 2023)

based on -0.5°C/+0.5°C thresholds in ERSSTv5 Niño-3.4 index

<table>
<thead>
<tr>
<th>Season</th>
<th>La Nina</th>
<th>Neutral</th>
<th>El Nino</th>
</tr>
</thead>
<tbody>
<tr>
<td>OND</td>
<td>90%</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>NDJ</td>
<td>90%</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>DJF</td>
<td>90%</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>JFM</td>
<td>90%</td>
<td></td>
<td>10%</td>
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<tr>
<td>FMA</td>
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<td></td>
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</tr>
<tr>
<td>JJA</td>
<td>30%</td>
<td>70%</td>
<td>10%</td>
</tr>
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</table>

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoda.shtml
Niño3.4 Index Strength Outlook (updated 9 November)

ENSO Strengths

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.

<table>
<thead>
<tr>
<th>Target</th>
<th>≤ -2.0°C</th>
<th>≤ -1.5°C</th>
<th>≤ -1.0°C</th>
<th>≤ -0.5°C</th>
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<td>15</td>
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<td>6</td>
<td>1</td>
<td>~0</td>
</tr>
</tbody>
</table>

A strong El Niño is favored with greater than a 55% chance through January-March 2024.

A “historically strong” El Niño has a ~1 in 3 chance during November-January.

What Might We Expect Over the Northeast This Winter?
Schematic Version of El Niño Impacts

What Do Precipitation Anomalies look like for previous Strong El Niños?

Poorer Pattern Matches With Typical El Niño Pattern

Better Pattern Matches With Typical El Niño Pattern

Expected or Typical El Niño precipitation pattern during December-February

Below-average precipitation

Above-average precipitation
How Well Do Northeast precipitation anomalies relate to ENSO? (December-February)

Most likely

El Niño strength this winter

El Niño La Niña

Match Score* With Typical El Niño Pattern

Larger values means winter precip pattern looks more like the typical El Niño pattern

#s next to dots refers to the year.
98= 1997-98 winter

* Spatial Pattern Correlation

Niño-3.4/ONI values
December 2023 - February 2024 CPC Outlook
(updated 16 Nov.)

For the northeast region, the overall patterns look fairly similar through February-April.

CPC Seasonal Outlooks for all upcoming seasons:
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/
January-March Average Snowfall Anomalies (ERA5 data) for Moderate & Strong El Niños

What Do Snowfall Anomalies look like for previous Strong El Niños?

Poorer Pattern Matches With Typical El Niño Pattern

Better Pattern Matches With Typical El Niño Pattern

Expected or Typical El Niño precipitation pattern during January-March

Below-average snowfall

Above-average snowfall
Key Takeaways

• A strong El Niño is already in place and is currently strengthening. There is a 1 in 3 chance of a historically strong El Niño that rivals our strongest El Niño events.

• The expected peak (of sea surface temperatures in the Niño-3.4 region) is during the November-January season, but impacts over the United States will lag into the spring seasons.

• For coastal regions, there is a lean toward above-average precipitation (rainfall + snow). For regions adjacent to the Great Lakes, below-average precipitation is favored. Above-average temperatures are favored over the entire region.

• Expected seasonal impacts are always probabilistic (“% chance of”) and never guaranteed. In the northeast, remember the precipitation “bust” in 1991-92!

• During strong El Niño events, only the below-average snowfall near the Great Lakes is statistically significant. Other regions are closer to a coin toss.
ENSO Diagnostics Discussion (updated on the 2\textsuperscript{nd} 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 3\textsuperscript{rd} Thursday of each month)
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/
Extra Slides
Evolution in the Equatorial Southern Oscillation index for all El Niño episodes since 1950

![Chart](image.png)
Evolution in the Central Pacific OLR (cloudiness/convection) index for all El Niño episodes since 1991