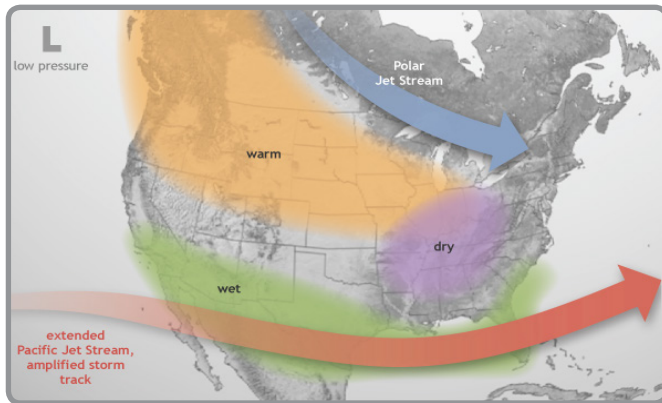
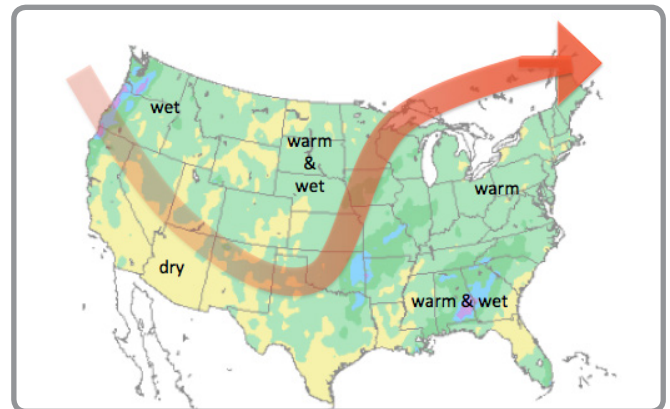


El Niño & December 2015 Weather Patterns



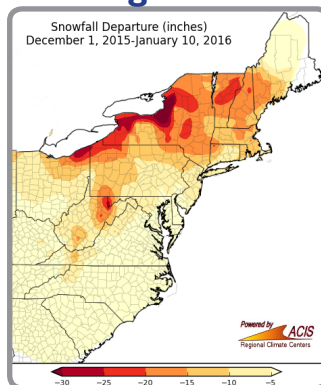
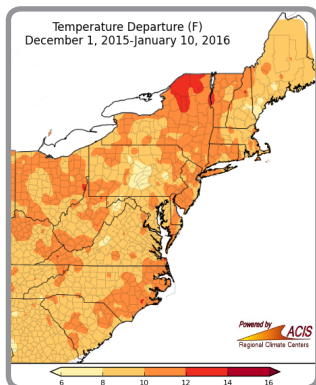
The classic El Niño winter weather pattern features a polar jet stream that is farther north than usual and a Pacific jet stream that runs across the southern United States (see figure above). The active Pacific storm track generally brings above-normal precipitation and below-normal temperatures to southern parts of the Eastern Region. Drier-than-normal conditions are common in Ohio, the Midwest, and western New York and Pennsylvania. As storms often move up the coast during El Niño winters, the Eastern Seaboard generally experiences above-normal precipitation. Typically with strong El Niños, such as the one this year, warmer temperatures extend further into the Northeast than seen in the accompanying diagram.



The weather pattern during December 2015 (see figure above) featured a persistent trough over the West and a ridge over the East. The ridge directed a warm, moist southerly flow of air into the Eastern Region. This contributed to the extremely mild December temperatures. In addition, ample moisture was available as storms moved through, helping to create above-normal precipitation during the month. Although similar, this pattern is somewhat different than what would be expected due to El Niño, indicating [other atmospheric drivers](#) (such as the West Pacific pattern, the Madden-Julian Oscillation, and the Arctic Oscillation) also influenced the month's weather. The season with the greatest El Niño impacts in the U.S. is January through March.

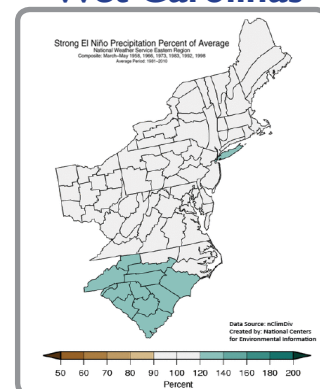
Impacts

December: Warm & Lacking Snow



Temperature anomalies were extremely high during December, setting record temperatures across the globe, including the Eastern Region. The mild temperatures led to below-normal snowfall for the entire region. Several upstate New York sites had their least snowy Decembers on record, latest measurable snow, and/or latest first inch of snow. Across the region, transportation departments performed roadwork longer into the season, as well as saved money on snow removal, fuel, and personnel costs. Home heating costs were also down. The [Residential Energy Demand Temperature Index](#) for December 2015 ranked lowest in the 1895-2015 record for December. While some golf courses saw an increase in business, winter recreation sports and winter gear retailers experienced decreased business. In New England, the Mount Washington Auto Road opened for guided auto tours in late December for the first time in (at least) 35 years and thinner than usual ice was reported on many lakes and waterways. Warm temperatures allowed some crops such as lettuce to be harvested later into December, but caused other plants such as viburnum to bloom early. In addition, insects continued to thrive, some bird species delayed their annual migration, and the allergy season was prolonged in several areas.

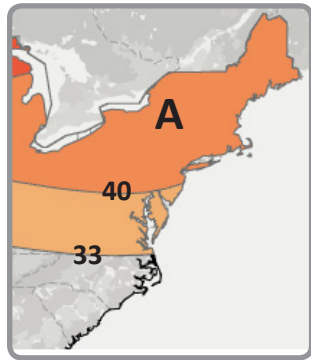
Wet Carolinas



December was a soggy month for the Carolinas, with areas receiving over 200% of normal precipitation. It was North Carolina's wettest December on record. Heavy rains caused river flooding, washed out roads, and delayed holiday travels. This wet trend is likely to continue. Data examined by the National Centers for Environmental Information and the Climate Prediction Center show that the Carolinas have an increased chance of seeing above-normal precipitation during springtime El Niño events. Potential impacts of a wet spring on agriculture include planting delays, increased diseases, and reduced yields. According to the Southeast River Forecast Center, the monthly frequencies of river flooding from December through June are greater than normal in the Southeast during moderate and strong El Niños.

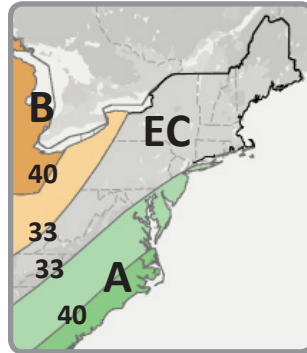
El Niño Outlook

Temperature and Precipitation Outlooks



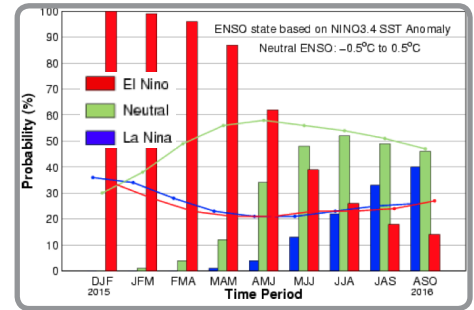
Valid for
February - April 2016

A: Above-normal
B: Below-normal
EC: Equal chances of above-, near, or below-normal
Number: Probability of above- or below-normal



Temperatures are expected to remain above normal through April for all but the Carolinas. This is consistent with a strong El Niño. The region is divided on the precipitation outlook. Coastal areas, including a majority of the Carolinas, have increased probability for above-normal precipitation. Coastal storms such as the snowstorm of January 22nd-23rd are consistent with El Niño impacts that include above-average precipitation for the Mid-Atlantic coastal region. Areas surrounding the Great Lakes and the Ohio Valley have increased probability for below-normal precipitation. As with a typical El Niño pattern, this dry signal is expected to slowly weaken through late spring and early summer. The outlooks above combine many factors including dynamical models, the effects of long-term trends, and soil moisture, in addition to past El Niño patterns. Therefore, they may not match typical El Niño conditions exactly. To learn more about these outlooks or see the latest temperature, precipitation, and drought outlooks, please visit the Climate Prediction Center (CPC) at: <http://www.cpc.ncep.noaa.gov>.

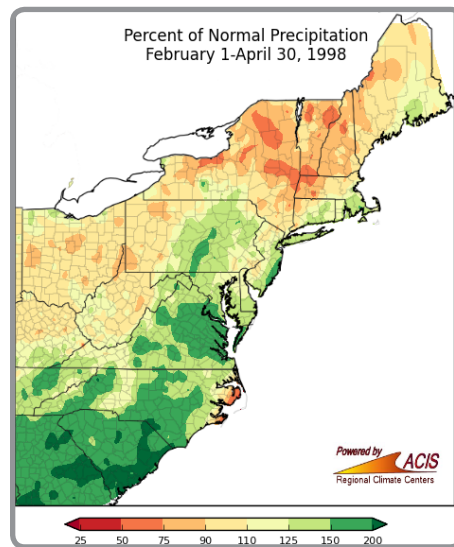
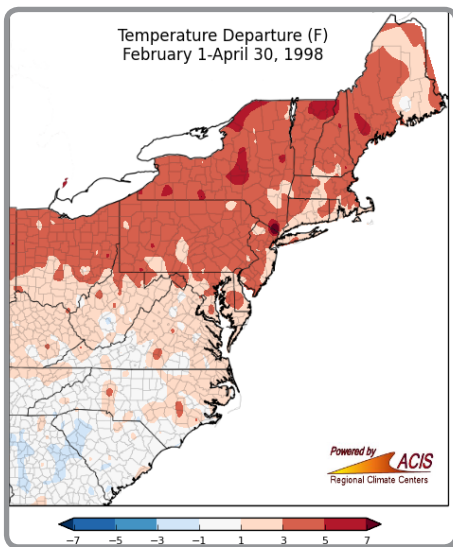
El Niño Strength



Early-Jan CPC/IRI
Consensus Probabilistic ENSO Forecast

The current El Niño is one of the strongest recorded since 1950, rivaling that of 1997-98. The Oct-Dec ONI (Oceanic Niño Index) value was 2.3, the only other time the index reached that high was during the 1997-98 event. This El Niño is expected to remain strong throughout winter, changing to neutral conditions late spring or early summer. El Niños are often followed in the next winter by La Niñas, the cooling of equatorial Pacific sea surface temperatures. The CPC is currently forecasting a 40% chance of La Niña by Aug-Oct, with chances expected to increase for the subsequent winter.

Comparisons and Limitations



Late Winter/Early Spring Conditions During Past El Niños

The maps above illustrate the late winter to early spring conditions of the record-breaking El Niño of 1997-98. Temperatures were within 3 degrees of normal for a majority of the southern portion of the region, with larger above-normal departures in the northern states. Precipitation was varied in the region with below-normal amounts in Ohio, West Virginia, western Pennsylvania, New York, and New England and above-normal amounts from Pennsylvania down to the Carolinas.

As we move toward spring, the trend for El Niño in the Eastern Region is not as clear as the winter trend. While 1998 saw mostly above-normal temperatures, other strong El Niño years have seen cooler conditions such as March and April of 1992. But similar to winter, there are other factors that affect spring conditions such as long-term trends and soil conditions.

Eastern Region Partners

- National Oceanic and Atmospheric Administration
www.noaa.gov
- National Centers for Environmental Information
www.ncei.noaa.gov
- National Weather Service, Eastern Region
www.weather.gov
- NOAA Fisheries Science Centers and Regional Offices, Atlantic
www.nmfs.noaa.gov
- Office for Coastal Management
www.oceanservice.noaa.gov
- NOAA Research, Climate Program Office and Geophysical Fluid Dynamics Lab
www.research.noaa.gov
- NOAA National Sea Grant Office
www.seagrant.noaa.gov
- NOAA's North Atlantic, South Atlantic, and Great Lakes Regional Collaboration Teams
www.regions.noaa.gov
- Climate Prediction Center
www.cpc.noaa.gov
- National Operational Hydrologic Remote Sensing Center
www.nohrsc.noaa.gov
- Northeast Regional Climate Center
www.nrcc.cornell.edu
- Southeast Regional Climate Center
www.sercc.com
- National Integrated Drought Information System
www.drought.gov
- Carolinas Integrated Sciences and Assessments
www.cisa.sc.edu
- Consortium on Climate Risk in the Urban Northeast
www.ccrun.org
- Cooperative Institute for North Atlantic Research
www.cinar.org
- Eastern Region State Climatologists
www.stateclimate.org

