



Freeze Forecast

In his book *A History of Florida Citrus Freezes*, Dr. John Attaway discusses the major freezes that impacted Florida. These freezes occurred in 1835, 1886, 1894–1995, 1899, 1917, 1934, 1940, 1962, 1977, 1981, 1982, 1983, 1985, and 1989. While freezes sometimes seemed to occur in clusters and did not occur regularly every 20 years, there have been one or more serious freezes during every 20-year period between 1880 and 2000. Our last major and very memorable freeze was in 1989. The winter of 2006–2007 will mark 17 years since we have had a serious freeze. Given the historical average of at least one freeze during a 20-year period, one could argue that we should have a major freeze again soon.

With our recent fruit and tree losses due to hurricanes, canker, and development, a major freeze could damage the citrus industry just when it is trying to recover. The good news is that the climate prediction for this winter suggests that the probability of a major freeze is low. This is because we are currently under the influence of El Niño.

Cooling Condition

El Niño conditions result from above-average sea-surface temperatures (SST) in the eastern equatorial Pacific Ocean. Though it seems amazing that ocean temperatures thousands of miles away can influence Florida's climate, that is the case. Tending to reach their maximum strength from December through February, previous El Niños occurred in 2002–2003, and there was a strong one in 1997–1998. This present El Niño developed in

mid-September and will very likely continue through May 2007.

El Niño is credited with reducing the number of hurricanes in 2006. Earlier in 2006, it was predicted that there would be nine hurricanes and five intense hurricanes, and that the 2006 season would be the



fourth hyperactive season in a row. According to <http://agclimete.org> in the Southeast Climate Consortium (SECC), El Niños tend to create high shear over areas in the Atlantic, Caribbean, and Gulf of Mexico where hurricanes can develop. This shear often reduces hurricane development.

With El Niños, a subtropical jet stream is more prominent, and it has a zonal flow (west to east) pattern to it. There is instability associated with this subtropical jet, and this brings more frequent storms and rainfall to Florida and the Southeast. NOAA's Climate

Prediction Center indicates that southern California, Texas, Florida, and the Gulf Coast should have above normal rainfall from December 2006 through April 2007. This increased rain and cloudiness promotes cooler than normal temperatures during the winter. During the strong El Niño winter of 1997–1998, heavy rainfall brought flooding to parts of Florida.

The zonal flow of the subtropical jet tends to deflect or block arctic fronts that can bring freezing temperatures into Florida. Hence, the probability of a major freeze in an El Niño year is low. In the 11 major Florida freezes since 1894, 10 occurred in neutral years, and only one occurred in a weak El Niño period in January 1977. That weak El Niño ended early in March 1977, and this current El Niño is stronger and expected to last longer.

Optimistic Outlook

A question that is often asked is "Will global warming cause fewer freezes in Florida?" Global warming certainly did not reduce freeze intensity or frequency in the 1980s. David Zierden of the SECC indicated that our science is not able to answer that question at this time.

Will we have a serious freeze this winter? El Niño is no guarantee that freezes will not occur, but only that the odds are lower. The zonal flow of the jet stream blocking arctic air masses tends to make this prediction likely. Without a hard freeze since 1989, the numbers game suggests that there will be a major freeze at some point in the next few years. We'll just have to wait and see.

