



# Santa Ana Wind Season Outlook

Issued: Tuesday, February 7, 2017

The following is a new experimental product from Predictive Services which uses a number of statistical methods to make long range predictions of the Santa Ana wind season in Southern California. This outlook uses 30 years of historical meteorological data in conjunction with a blend of three statistical models which forecast above/below normal numbers of Santa Ana wind days for a 1 month and a 3 month time period. While it is difficult to assign specific winds speeds, a Santa Ana wind day is determined to be distinctly different from the light offshore winds which normally occur during the overnight and early morning hours of the day. Santa Ana wind days were defined by correlating wind velocities with synoptic scale weather patterns that result in gusty, dry offshore winds across Southern California. The models used in this outlook are: Random Forest, ARIMA Time Series, and Analog. The Random Forest and Analog methods use various predictors such as the Pacific Decadal Oscillation (PDO), the Southern Oscillation Index (SOI), and the Niño3.4 index. The time series model relies solely on frequencies and trends within the 30-year historical dataset.

## Discussion:

While January has one of the highest Santa Ana wind day counts of the year, February marks the start of a period where numbers of offshore windy days begin declining. Last month there were only 4 Santa Ana wind days which was well below normal. This is not surprising given the kind of weather pattern that persisted over the region. For most of the month, a strong westerly jet drove abundant amounts of moisture into the Western United States with California seeing the bulk of this moisture. This zonal type of flow is not conducive for the development of Santa Ana winds across Southern California and thus fewer than normal offshore days were the result.

The Pacific Decadal Oscillation (PDO) and the Niño3.4 Index are now in almost a neutral state. This makes the forecast for the next few months somewhat challenging as there no longer remains a clear teleconnection signal to associate with. Most of our models suggest near to above normal number of Santa Ana wind days for both the February and the February through April time periods. However, our analog model identifies years having a similar sea surface temperature profile across the Pacific Basin which resulted in a below normal number of days (Figures 1 and 2). Although a strong Santa Ana wind event may be in the offering for the 12<sup>th</sup> and 13<sup>th</sup> of this month, the longer range models suggest that any Santa Ana wind events during February may be few and far between. The normal number of day counts for February is around 7 while the three month period averages around 17. However, the average number of Santa Ana wind days will be decreasing as the spring draws near, with the mean number of days dropping to around 3 or 4 by April.

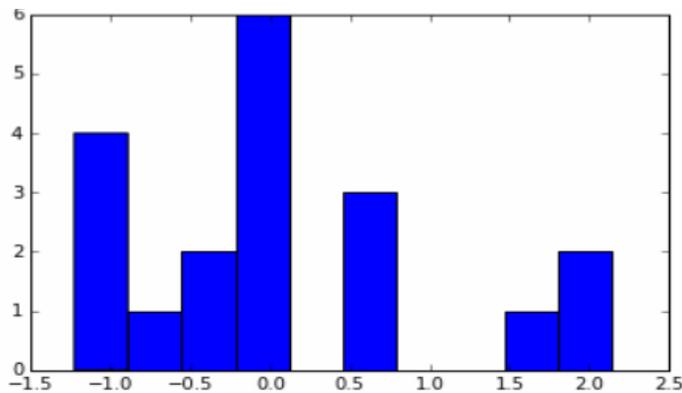


Figure 1 – Histogram for February 2017 showing most of the results from the analog model skewed toward below normal.

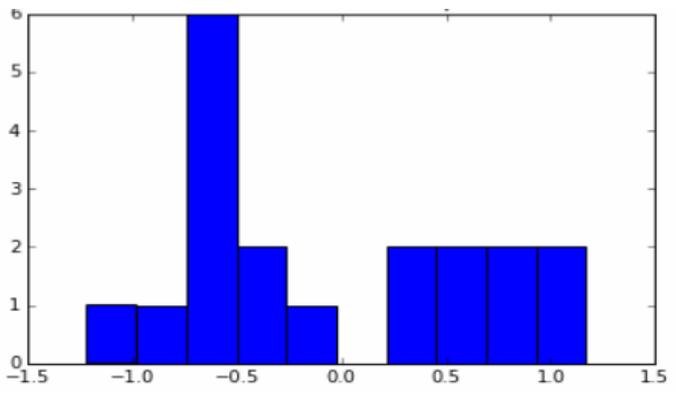


Figure 2 – Histogram for February-April 2017 showing most of the results from the analog model skewed toward below normal.

## Summary:

**Confidence in this forecast is low to moderate.** The PDO and the Niño3.4 index lack a strong signal which is causing these predictors to be less influential in the forecast process as compared to previous months. Some ridging will be possible across California from time to time, but the overall pattern does not look favorable for frequent Santa Ana wind events during the next month and even beyond. Unless an extended period of significant warming and drying occurs, no major fire activity is anticipated through at least April.