

HIGH WIND/SANTA ANA WINDS

Santa Ana winds are generally defined as warm, dry winds that blow from the east or northeast (offshore). These winds occur below the passes and canyons of the coastal ranges of southern California and in the Los Angeles basin.

Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon (the canyon from which it derives its name). Forecasters at the National Weather Service (NWS) in Oxnard and San Diego use the term "Santa Ana Winds" for winds greater than 25 knots.

The complex topography of southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high pressure area forces air downslope from the high plateau. The air warms as it descends toward the California coast at the rate of 5 degrees Fahrenheit per 1000 feet due to compressional heating. Thus, compressional heating provides the primary source of warming. The air is dry since it originated in the desert, and it dries out even more as it is heated.

Santa Ana wind conditions can result in two general disaster conditions. The most common is fire fanned by the high winds. This was the situation with The Santiago Fire, which began at on Sunday, October 21, 2007. On this date, Southern California was in the midst of a "Fire Weather Watch" with strong Santa Ana winds and low relative humidity for the entire area. Critical fire weather conditions were in existence. Santa Ana winds were a major contributing factor to the fire's unpredictable behavior and rapid progression. Hot, dry winds continued to fan the fire throughout the week of October 21-28. Flame heights were reported as high as 100 feet. The Santiago Fire burned 28,400 acres and caused 16 minor injuries to fire personnel. Individual claims for damage or destroyed property included 24 outbuildings, 23 residential structures (8 damaged/15 destroyed), and 12 vehicles which is currently estimated at \$7,358,810.

The second form of disaster would be direct building damage as a result of the high winds. This has occurred in the past few years in many southland communities including Orange County.

Santa Ana winds commonly occur between October and February with December having the highest frequency of events. Summer events are rare. Wind speeds are typically north to east at 35 knots through and below passes and canyons with gusts to 50 knots. Stronger Santa Ana winds can have gusts greater than 60 knots over widespread areas and gusts greater than 100 knots in favored areas. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze, which typically blows onshore daily, can moderate the Santa Ana winds during the late morning and afternoon hours. Santa Ana winds are an important forecast challenge because of the high risk of fire associated with them. Also, unusually high surf

conditions on the northeast side of the Channel Islands normally accompany a Santa Ana event. Other hazards include: wind damage to property, turbulence and low-level wind shear for aircraft, and high wind dangers for boaters.