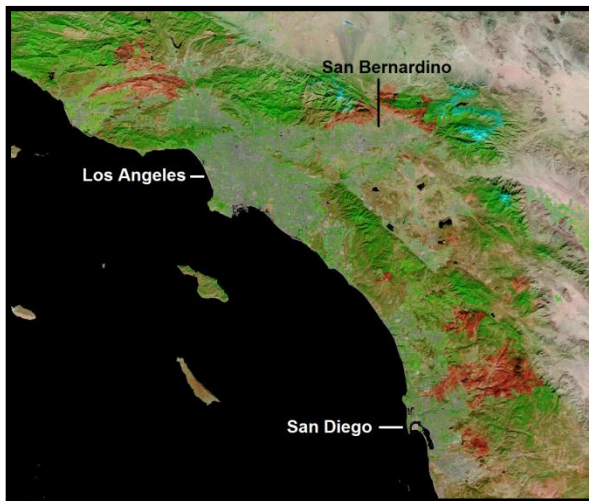


Wildfires

Location: Southern California: Los Angeles, San Bernardino, Riverside, and San Diego Counties

Date: October 23, 25, 26, 27, 28, and 29, 2003

Image Source: MODIS, Terra and Aqua satellites



Southern California Fires

The October 2003 fires in Southern California represented one of the worst disasters ever encountered in the region with at least 22 deaths, an estimated one billion dollars in property damage, and nearly 750,000 acres (303,705 ha) of burnt-over land. A set of satellite images, taken by the MODIS sensors on the Terra and Aqua satellites, show the extent and damage of the fires. These images provide both a temporal and synoptic view of the development and spread of the fires.

Southern California Climate

Coastal Southern California experiences a Mediterranean climatic realm associated with subtropical temperatures, making it a very desirable area in which to live. The most distinguishing characteristic about this climatic realm is its wet winter/dry summer precipitation pattern. The dry summers result from the presence of an ocean based subtropical high pressure cell that is not conducive for providing moisture/rainfall over the adjacent land surface. During the winter, this high pressure cell shrinks and moves away from the land allowing a subpolar low pressure cell to move in and bring with it moisture. After a long dry summer, low humidity and high fire-fuel allows the vegetation to be susceptible to heightened fire conditions. Fall wildfires are almost an annual event in Mediterranean climates followed by early winter mudslides on burnt slopes. Periodically, high pressure conditions can develop over the interior deserts producing strong, gusty winds known as Santa Ana's that flow westward from the High Desert down into coastal Southern California. Santa Ana's are dusty, hot, and dry and can create relative humidity conditions often less than 25 percent. These dry winds, often very strong, can draw out what little moisture is left in the vegetation and tend to push fires rapidly out of control toward the built-up urban areas.

October 2003 Fires

The Santa Ana winds played a major role during the October 2003 fire season as demonstrated through the six MODIS images. On October 23, prevailing westerly winds were flowing eastward, pushing the smoke from two large fires toward the interior deserts and away from the coastal urban area. By October 25, the Santa Ana winds were in effect as illustrated by the large smoke plumes flowing west and southwest. The interior deserts were clear of any clouds indicating the existence of a high-pressure condition.

The October 25 image shows huge wildfires burning east of Los Angeles near the city of San Bernardino. Thousands of acres in the San Bernardino National Forest were already burned. The fires forced the closure of two major highways and the evacuation of thousands of residents. Triple-digit temperatures and gusty winds made fighting the fires extremely difficult.

On October 26, a massive fire broke out east of San Diego and smoke overshadowed the city. The smoke became such a problem by October 27 that the Monday night football game between the San Diego Chargers and the Miami Dolphins had to be moved at the last moment to Phoenix. The relocation of this game brought attention to the severity of the California wildfires. On October 27, the wildfires began to merge, forming walls of flame stretching for miles. Firestorms developed from the near-hurricane wind gusts of up to 70 miles per hour (112 km. per hour). One fire burned 10,000 acres (4050 ha) in just 6 hours. The smoke plumes disrupted air travel over Southern California causing delays and cancelled flights. The MODIS image for October 27 shows a shifting in the smoke plumes over the open water indicating that the Subtropical High was building toward the east.

Weather conditions did not improve on October 28. Heavy smoke covered the Southern California coastal communities as multiple fires continued to burn and the Santa Ana winds continued to push the fires westward. The clear skies over the interior deserts indicated that the interior high pressure still existed, feeding the Santa Ana winds. The four largest fires persisted, burning over 480,000 acres (194,250 ha) and destroying 3521 homes. Over half of the destruction was associated with the Cedar Fire on the outskirts of San Diego—the largest single fire ever recorded in California. The October 28 image shows the smoke plumes encountering a pressure barrier over the water as the prevailing westerly winds from the Subtropical High start to dominate again.

By October 29, clouds and smoke from the fires shifted northeastward toward the Mohave Desert. These winds were calmer and forced the fires to move back over the already burnt areas. With the lack of fuel to burn, the fires could now be controlled by the nearly 12,000 firefighters who had been combating the fires for nearly a week. The burnt areas are shown in red on the location image.

Interpretive Learning...

- 1) Locate the cities of Los Angeles, San Diego, and San Bernardino on the October 23 image. An atlas might help.
- 2) After a major fire season throughout the hills of Southern California and the coming of the winter rains, what might be the next major natural disaster to occur in the region? (Heavy rains on the burnt slopes can create large mudslides. On December 25, 2003 two powerful mudslides engulfed two camp sites in the San Bernardino Mountains killing 7 adults and 9 children.)

Explore More...

Fires in Southern California.

<http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=12373&oldid=11799>

Sources:

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