

ESP FOCUS

Volcanoes



Volcanoes are a part of our environment!

Volcanic eruptions are not as common as earthquakes in California, but, like earthquakes, they have played a significant role in shaping the landscape along the eastern Sierra Nevada range.

Scientists estimate that eruptions have occurred in the area for nearly four million years and that two volcanic systems—the Long Valley Caldera and the Mono-Inyo Craters volcanic chain—are responsible for most of the activity.

Long Valley Caldera is a large depression in the earth located about 12-1/2 miles south of Mono Lake. The caldera stretches over 450 square kilometers or about 175 square miles. The caldera was formed approximately 760,000 years ago as the result of an eruption that spewed molten rock, or magma, and sent airborne ash as far away as what is now Nebraska. Scientists estimate that eruptions from the caldera have occurred approximately every 200,000 years since then. They believe that the last caldera eruption occurred about 100,000 years ago.

Mammoth Mountain, the Mono Craters and Inyo Craters also owe their existence to volcanic activity in the Mono-Inyo Volcanic Crater chain. Scientists believe volcanic activity in the chain began 60,000 to 400,000 years ago. They estimate that much smaller eruptions in the vents along the chain occur every 250 to 700 years, with the two most recent occurring about 250 and 500 years ago.

The reverse side of this *Focus Sheet* features information about the volcanic history in the area, current monitoring efforts and the meaning of threat classifications issued by the United States Geological Survey (USGS). Use this information to reduce your risk of injury wherever you live, work or play.

Each month, ESP will examine a different hazard that could affect Californians and offer suggestions on how to reduce its impacts. These hazards are not limited to the month featured in the ESP Focus Sheet and can occur at any time.



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S E P T E M B E R

Recent Events: Cause for Concern?

Seismic activity in the past two decades has centered in the area near Mammoth Lakes. A series of four temblors in the magnitude-6 range shook the area in 1980, attracting the interest of the USGS.

Since then, between 10 and 20 earthquakes with magnitudes of less than magnitude-3 have struck the area on an average day. On a few occasions swarms with an earthquake in the magnitude 4 and 5 range have occurred in the area.

In 1980, USGS scientists discovered about a one-foot rise in the dome at the center of the caldera caused by rising magma. Since then, the dome has risen about another foot over a 100-square-mile area.

Scientists also discovered high concentrations of carbon dioxide at the southwestern edge of the caldera in 1990. The gas emissions have been linked to the killing of pine, fir and other cone-bearing trees.

The USGS considers a future eruption in the Inyo-Mono volcanic chain more likely than one in the caldera. It estimates the yearly odds of such an eruption as similar to the annual probability of a magnitude-8 earthquake on the San Andreas Fault in Central California—less than one per cent. However, during periods of moderate to strong unrest such as earthquake swarms, the odds increase significantly.

What Status Designations Mean

Until recently, the USGS used a series of letters from A to E to indicate the level of potential threat. E-Status represented “weak” unrest, and A-Status represented a likely eruption.

To alleviate confusion among the media and the public, the USGS in 1997 began using color-coded designations to describe unrest in the area. Following is a summary of what each color signifies:

Condition **green** signifies “weak,” “minor” and “moderate” unrest. Events in these designations range from an increase in small earthquakes or a quake larger than magnitude-3 to a magnitude-4 event or a total of more than 300 quakes in a single day. The USGS might issue status green designations several times per year, but the occurrence of the aforementioned events poses no immediate danger to the public.

One or more magnitude-5 events or the detection of deep magma movement through ground deformation indicates “intense unrest” and triggers condition **yellow**. Under such circumstances, the USGS will increase monitoring and issue a “watch” to the Governor’s Office of Emergency Services. OES will notify local authorities. A watch is expected to occur about once every 10 years.

The detection of magma movement at shallow depths triggers condition **orange** and indicates that an eruption is likely. The USGS will issue a Geologic Hazards Warning to the governors of California and Nevada, as well as others charged with advising the public.

Condition **red** indicates an actual eruption. The USGS estimates such an alert will be issued once every few centuries.

What to Do Before, During and After

Before

- Learn the meanings of designations issued by the USGS and other agencies.
- Discuss response and evacuation plans with local officials and family members.
- Update emergency kits. Include dust masks.

During

- Listen to the radio or watch television for instructions and information.
- Cooperate fully with local officials.
- Avoid the volcano site.
- Stay upwind from the volcano.
- Watch for flying rocks and mudflows if there’s an eruption.
- Unless roof collapse is likely, stay indoors if ash is falling.

After

- Avoid driving in heavy dust.
- Eliminate heavy ash and dust from rooftops and rain gutters.

Sources included the USGS web page, the USGS fact sheet “Reducing the Risk of Volcanic Hazards” and the FEMA publication “Are You Ready? Your guide to disaster preparedness.”

GETTING IT DONE IN 2001 PREPARING FOR ALL HAZARDS



This action sheet is produced as part of the Earthquake Survival Program (ESP). ESP is an awareness campaign designed to increase individual and home earthquake preparedness. ESP was developed by the County of Los Angeles. The California Governor’s Office of Emergency Services (OES); representatives from Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura, and Yuma counties; and representatives from Southern California Edison assist in the development of campaign materials and coordination of the campaign.