# Italy, California share earthquake risks; geology differs

**Lisa M. Krieger, Bay Area News Group, 8-24-16**

Like Italy, California is a restless landscape straddling two major tectonic plates.

But while our earthquake risks are similar, the seismic forces that underlie both regions are quite different. Our homes, churches and schools tend to differ as well.

The Italian earthquake “really comes as no surprise,” said David Schwartz, a research scientist with the U.S. Geological Survey in Menlo Park. “This is an area of active seismicity.”

Italy sits atop the slow collision of the African plate into the Eurasian plate — creating tragic earthquakes but also the beautiful Alps and Apennines Mountains, which run like a spine from the north to south of the nation.

Every year, the African plate moves northward towards the Eurasian Plate about one centimeter — and the crust of one plate is moving up in relation to the other plate.

This uplift creates dangerous stretching and extension of the Earth’s crust. The region has a long history of earthquakes; in 1169, a temblor in Sicily killed at least 15,000 people.

“The crust is being pulled apart,” Schwartz said.

California earthquakes, in contrast, are triggered by the sideways motion of the Pacific Ocean’s crustal plate moving to the northwest under North America’s continental crust.

The most famous example of our lateral “strike-slip” faults is the San Andreas Fault, a many-branched system stretching about 600 miles from Southern California to the Point Reyes Peninsula and then out to sea. The 1989 Loma Prieta earthquake and the Great Quake of 1906 struck along this fault.

Much more seismically similar to Italy is the “basin and range” area of Nevada, Idaho, Montana and Utah, which is also experiencing stretching of its crust, triggering earthquakes.

“The difference is that most of these Italian faults are close to inhabited towns, with old unreinforced structures, leading to collapse and casualties,” Schwartz said.

California is also different in another way: With a younger history than Italy, our buildings tend to be more earthquake-safe than those in Italy.

In Italy, “a lot of the older towns have buildings going back 200 to 300 years, or even older, that were never constructed with earthquakes in mind,” Schwartz said.

A 2015 study estimated that the Bay Area has a nearly three-in-four chance of experiencing a potentially deadly earthquake in the next 30 years.

Estimates show a 72 percent chance that a magnitude-6.7 or larger quake — almost the size of the Loma Prieta temblor — will strike the Bay Area before the year 2044.

The odds of a more powerful magnitude-7 quake are 50-50, according to the analysis. The likelihood that California will experience a cataclysmic magnitude-8 or larger earthquake in the next 30 years is about 7 percent.

In the Bay Area, more than $22 billion in infrastructure upgrades since Loma Prieta have built a metropolitan area that is far safer and far more resilient than before. Major water pipes are now designed to bend, not break. Bridges and overpasses can better support us.

But significant “lifelines” — BART’s tunnels under the bay and through the Berkeley hills, the Golden Gate Bridge, highways, local roads and utility distribution lines — have yet to be fully upgraded.

Italy’s tragedy is a reminder of the importance of retrofitting not only our vulnerable homes,” said Schwartz, “but the importance of retrofitting and strengthening our infrastructure to be able to respond to larger earthquakes that will happen.”