

Temblor could disturb faults, scientists say

Scott LaFee, San Diego Union-Tribune, 4-5-10

The 7.2-magnitude earthquake that rippled through San Diego County and Baja California yesterday was noticeably long (up to a minute) and widely felt (as far away as Las Vegas and Phoenix), but the real import may be what the shaking bodes for California.

“Any quake of this size seems to pass some kind of threshold where it’s large enough to disturb or trigger other faults,” said Pat Abbott, a professor emeritus of geology at San Diego State University. “In cases like this, that often means increasing stress on other faults, which makes them more prone to movement. The energy seems to be moving northward toward the San Andreas Fault. I don’t want to anthropomorphize, but it’s like this quake was goading the San Andreas.”

It remains to be seen how the 810-mile San Andreas Fault was affected by yesterday’s temblors. The southern section of the fault worries scientists because it has not ruptured in more than 300 years.

A 2008 study estimated the probability of a magnitude-6.7 or greater quake occurring in California within the next 30 years at 99 percent. The probability of one that is 7.5 or larger was set at 46 percent — and would most likely happen in the southern half of the state.

Easter Sunday’s 7.2 temblor was preceded by a handful of smaller quakes that began Wednesday, with the last happening just six minutes before the big jolt.

“Obviously, these now look like they were foreshocks,” said Nancy King, a geophysicist for the U.S. Geological Survey.

Not surprisingly, the 7.2-magnitude shake was followed by dozens of aftershocks and perhaps independent quakes that were triggered on other faults. Most of the subsequent shaking measured in the magnitude 3 to 4 range, though at least one temblor reached 5.4.

The fault or faults that produced the 7.2 quake, which started at 3:40 p.m. PDT, had its epicenter 108 miles east-southeast of Tijuana in Baja California. The region is riven by numerous faults.

Among them is the Imperial fault zone, which is part of a larger system of fault zones that includes the southern end of the San Andreas. The faults in this region generally are strike-slip, in which two opposing plates grind laterally against each other in opposite directions, binding up until one finally lets go and produces a quake.

Scientists believe some of those faults, such as the Cerro Prieto and Laguna Salada, could generate temblors up to 7.5 in magnitude.

King said it will take some time to pinpoint the source of yesterday’s shaking. Unlike California and other geologically active regions of the United States, Mexico lacks networks of automated seismic stations capable of charting real-time data.

“Earthquakes don’t pay attention to international borders, which complicates our work,” King said. “Most of the seismic activity appears to be originating south of the border, which means it’s harder to get good quake

locations quickly. People are going to have to study the data. There will be field trips to the area, though that will probably take a day or two to coordinate.”

When they arrive, the scientists will inspect areas for clearly disturbed ground, such as ruptures or newly shifted terrain. By measuring the amount of visible change, they can better assess the source of the quake, its scope, intensity and nature.

“This kind of field work reveals the seismic moment,” Abbott said. “It answers the question of how much energy did the quake take to do the work?”

The 7.2-magnitude quake is notable, but not unheard of, for the border region and California. Since 1769 and the first written records of earthquakes in the state, California has experienced a handful of temblors exceeding 7.0. The last was the 7.1-magnitude Hector Mine quake in 1999, which occurred 47 miles east of Barstow. Due to the remote location, there was little damage.

More catastrophic were the state’s two biggest temblors: the Fort Tejon quake in 1857 and the San Francisco quake in 1906. Both measured 8.25.

For Abbott, the most remarkable thing about yesterday may be what didn’t happen.

“The big quake was double the size of the Haiti quake, but it doesn’t seem like there was a lot of damage caused, particularly in Mexico,” he said. “That suggests that people are building better, or at least that past quakes have already knocked down the bad stuff.”