

Times Standard

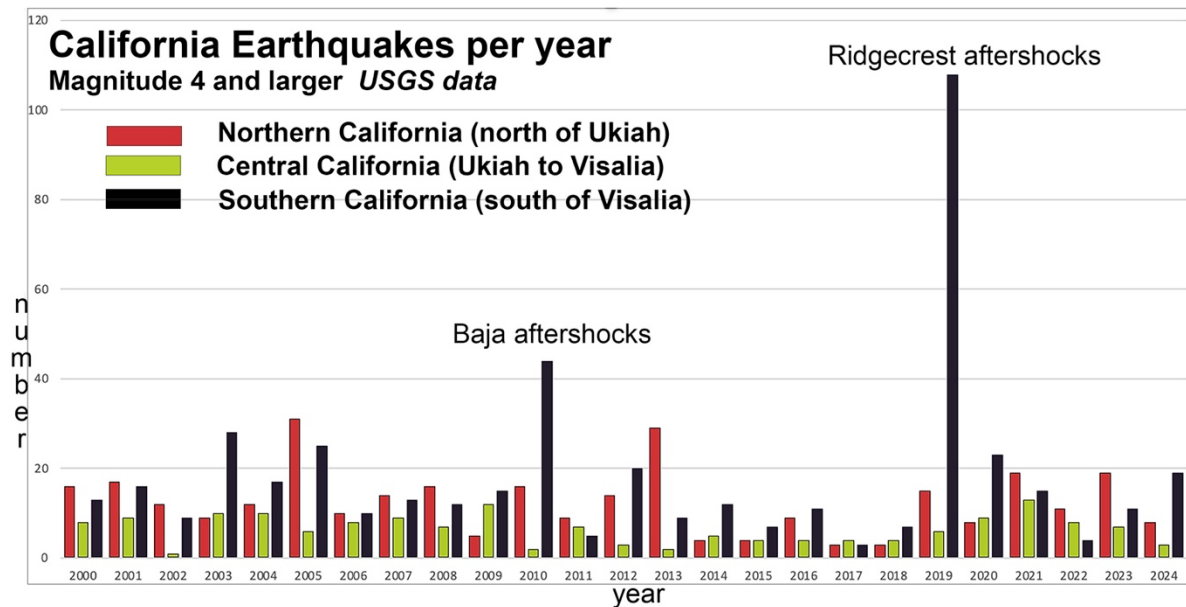
Not My Fault: What we learn from visitors to the Fair

Recent California earthquakes a reminder to ShakeOut on October 17

Lori Dengler for the Times-Standard

Posted September 21, 2024

<https://www.times-standard.com/2024/09/21/lori-dengler-recent-california-earthquakes-a-reminder-to-shakeout-on-oct-17/>



Number of magnitude 4 and larger earthquakes per year in California divided by region. The highest numbers are aftershock years following magnitude 7 earthquakes in Ridgecrest (2019) and Northern Baja (2010). Data from the USGS.

September is National Preparedness Month, October 17 is ShakeOut, and November 5th is World Tsunami Day – plenty of reminders to review your readiness state. Some recent headlines may give the impression that the next quake may come sooner than you think. “California breaks record for the most 4.0 earthquakes in a single year” shouted the Daily Mail, “Seismologist warns earthquake activity increasing in Southern California,” claimed a southern California Fox affiliate.

I’m a bit of a numbers wonk so I had to dig into the numbers and check out the validity of these claims. Looking at the past 25 years, California has experienced an average of 37 earthquakes of magnitude 4 and larger per year. The number so far in 2024 is 30, which puts us roughly on track to hit that average by the end of the year.

Numbers can be deceiving without a deeper dive. One only needs to back up to 2021 to find a total of 47 and in 2019, the golden state was rocked by 129 M4 and larger. Why so high in 2019? That was the year of the Ridgecrest earthquake sequence – a 6.4 and a 7.1 two days apart. Large earthquakes produce aftershocks and the larger the quake, the larger, longer, and

more numerous the aftershocks are. 2010 boasted the second highest M4s, boosted again by aftershocks, that time from the M7.2 Sierra El Mayor earthquake in northern Baja. Most of those aftershocks were south of the border, but nearly 40 made it into Imperial County in southern California.

Maybe those headlines were only referring to the southern part of the State. I split California into three roughly equal horizontal bands – N California north of Ukiah, C California between Ukiah and Visalia, and S California from Visalia to the Baja border. For the past 25 years, the southern segment has averaged a few more M4s a year than other parts of the State, even if I remove those big aftershock years. But SoCal numbers for 2024 still aren't on pace to be record breaking.

My third exercise was to focus only on southern California south of Santa Barbara. I looked at a longer time window, going back to 1990. Once again, the peak years could be attributed to vigorous aftershock sequences – the 1992 Landers, 1994 Northridge, 1999 Hector Mine earthquakes. Removing those resulted in a longer-term average of about 9 M4s a year. 2024 already stands at 12, a bit higher than average, but not in a league of its own.

The more important question is do increases in moderate earthquake activity point to a bigger quake coming. The USGS has been calculating aftershock probabilities for decades. Whenever a moderate to large quake occurs, visit <https://earthquake.usgs.gov/earthquakes/map/> for the latest information on location, time and size. Clicking on the earthquake of interest brings up a menu and two-thirds down on the left is a link to Aftershock Forecast. The USGS only makes aftershock forecasts for earthquakes centered beneath US soil.

Buried in the aftershock forecast is a foreshock estimate as well. Foreshocks are smaller earthquakes that are followed hours, days and sometimes weeks or longer before a larger earthquake. If you click on the forecast link, you will see a graph with the estimated odds of earthquakes in step magnitude ranges for the next week. A magnitude 5 earthquake will show a high likelihood of magnitude 3 aftershocks, and a lower number of 4s. But the graph also shows the odds of an earthquake of the same size or larger. Note that the odds are updated daily and diminish with time. For earthquakes in the magnitude 4 and 5 range, the odds that a bigger quake will soon follow are roughly in the 1% range – very small but still a slight increase over the background levels.

We have no way of telling if a particular earthquake is a foreshock or not. And there is no definitive data that points to scattered magnitude 4 or 5 earthquakes as likely to lead to a much larger earthquake. On the North Coast, we haven't had as many magnitude 4s as the southern California region. But we have had more magnitude 6s. We had a relatively quiet spell with lower-than-average earthquakes between 2012 and 2020 before activity picked up in December 2021 with a pair of 6s and the following year with a 6.4.

Bottom line - we can't predict earthquakes. We can't control earthquakes. There is only one thing we can do – prepare by making our homes, offices, and communities as resilient as possible. An easy way to start the process is to participate in next month's ShakeOut.

I've spent the better part of my career working on community disaster resilience. It's a sticky problem – we have relatively little interest in taking preparedness actions in the quiet times and

once the shaking starts, it is too late. How to get you interested beforehand? Widely felt earthquakes like the slight 2024 uptick in southern California is one way as long as it is approached in a way that encourages people to think positively about preparedness.

In recent years the combination of misinformation and media fear tactics leads to denial, avoidance, or a feeling that nothing can be done to make any difference. ShakeOut is an event to encourage everyone that you do have the power to control your personal space and what you do before and during shaking can make a difference.

ShakeOut started in 2008 with a Drop, Cover, Hold On drill in southern California. Drop, Cover, and Hold On is still the best thing to do if you are able-bodied, awake, and indoors. I prefer to frame the message a little more broadly. DON'T MOVE WHILE THE GROUND IS SHAKING. If dropping to the ground is not an option for you, stay where you are, sit down on a nearby chair and bend over, covering the back of your neck and head with your arm. If you are in bed – stay there. We have lots of tips in the New Living On Shaky Ground magazine on what to do in other places – but all involve minimizing your movement. And remember to breathe – counting during the shaking can help calm your nerves.

Other aspects to preparedness are worthy of thought. On the North Coast, our biggest earthquake hazard could be a tsunami coming soon after the shaking stops. Take a moment to know your tsunami zone (<https://rctwg.humboldt.edu/tsunami-hazard-maps>) and if you live or work in the zone, consider adding an evacuation drill into your ShakeOut plans. ShakeOut week is a good time to check if fire extinguishers are charged and you know how and when to use them. Want to dive deeper? Visit <https://www.humboldtcert.com/> and find out how you can become CERT trained.

ShakeOut 2024 is October 17 at 10:17 AM. How to know when the Drill is starting? Mother Nature is unlikely to provide real shaking but there are ways to be alerted. KMUD and some other local radio stations will be providing a ShakeOut broadcast. MyShake earthquake early warning App users will get a drill message on your phone. County emergency notification systems will also send a message ShakeOut morning. Caveat – you must be signed up in advance to receive those alerts (<https://humboldt.gov/2014/Emergency-Notifications>) or call the Office of Emergency Services.

I encourage individuals, businesses, and other groups such as churches and faith-based organizations, service clubs or other organizations to sign up as ShakeOut participants. It's easy to do at <https://www.shakeout.org/california/> . You will find many more ShakeOut resources on this page and at <https://rctwg.humboldt.edu/great-shakeout>.

Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. The opinions expressed are hers and not the Times-Standard's. All Not My Fault columns are archived online at <https://kamome.humboldt.edu/taxonomy/term/5> and may be reused for educational purposes. Leave a message at (707) 826-6019 or email Kamome@humboldt.edu for questions and comments about this column or to request copies of the preparedness magazine "Living on Shaky Ground." Digital copies are at <https://rctwg.humboldt.edu/prepare/shaky-ground>.