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Not My Fault: 2020 earthquakes at the halfway point

Lori Dengler/For the Times-Standard
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It's time for the 2020 midterm earthquake/tsunami report. The good news is that earthquakes and tsunamis did not make for much newsworthy commentary this year. The number of earthquake casualties was the third lowest in a half-year span since 2000. The not-so-good news is that US seismicity is the highest it has been since the 1990s.

In the past six months, fifty-two earthquakes equaled or exceeded magnitude 6 and five made it into the magnitude 7 range. No earthquakes hit the M8 level and only two (a 7.7 and a 7.5) made it to 7.5. The USGS long-term average rate would expect about eight earthquakes of M7 or larger and 67 M6s in a six-month period. There is variability from year to year, but 2020 from an earthquake perspective is still slightly below average.

The largest magnitude earthquake of the year was the M7.7 in the Caribbean on January 26th. This earthquake was fortuitously placed just about as far away from populated areas as is possible in the Caribbean region (see Not My Fault 2/2/20). It caused only modest damage in the Cayman Islands and no injuries. It did trigger a tsunami threat message in the Caribbean and a 4-inch tsunami was recorded at a tide gauge on Grand Cayman Island.

Just because the Caribbean quake produced almost no impact, doesn't mean it wasn't noteworthy. The Caribbean is quite capable of producing major earthquakes. Had the January quake been in a slightly different location, the story outcome could have been much different. Size and location are everything in earthquakes. A M6.4 only three weeks earlier off of Puerto Rico's SW coast killed three and caused over $3 billion in damages. The tsunami response particularly concerns me. Few people recognized the long duration of shaking as a signal to evacuate. This is particularly worrisome considering the number of tourists on or near the water who need to understand their only alert will be feeling the shaking.

The deadliest earthquake of the year to date occurred only four days before the Caribbean quake. The January 24 M6.7 Elazığ earthquake in Eastern Turkey killed 41 and injured at least 1600. The narrative was sadly similar to many other deadly earthquakes of the past few years – a mid-6 range earthquake in a densely populated area with an infrastructure not engineered to withstand strong ground motion. The earthquake impacted two cities and numerous towns and villages, triggering the collapse of over 80 multistory buildings and damaging 1200 other structures beyond repair.

The M6.5 March 31 Central Idaho and May 15th Monte Cristo in Western Nevada earthquakes tied for the largest US quakes of the year to date. The earthquakes were fortunately located in remote areas and caused no damage and no injuries. The Central Idaho earthquake was the largest in the state since the 1983 M 6.9 Borah Peak earthquake and the Monte Cristo was the largest Nevada quake since a M7.3 and 6.9 earthquakes in 1954. In addition to the two 6.5s, the Western US also experienced 5.8 near Lone Pine, a 5.7 in N. Utah, a 5.5 near Ridgecrest and a 5.2 east of Mono Lake. Four earthquakes in the M 5 range were centered off the North Coast, the largest a 5.8 on the Mendocino fault 40 miles offshore of Cape Mendocino. No surprise in the location and size. Fortunately, the larger quakes were far from populated areas and caused no impacts.

Today is the one-year marker since the M7.1 Ridgecrest earthquake centered in the Mojave Desert of South Central California. That sequence began on July 4th with a M6.4, followed 34 hours later by the 7.1. Since the 7.1 mainshock, over 1000 aftershocks of M3 and larger have been recorded, including 46 in 2020. The rate of aftershock activity has decreased but is not over. The 5.5 on June 4th was equal in size to the largest aftershocks in the entire sequence, both of which occurred in the first week after the 7.1.

The Ridgecrest sequence is arguably the best-recorded major California earthquake sequence in history, thanks to the density of modern instrumentation and new analysis techniques. It has changed the understanding of how multiple faults interact. More interesting to me, is how the Ridgecrest earthquake has affected a much larger area than just the immediate aftershock zone. It is quite likely that the more recent earthquakes to the north – near Mono Lake, in the Owens Valley and in Western Nevada are related to Northridge stress release at distances of more than 250 miles away.

What happens next? There are three options. The two most likely scenarios - the sequence is nearly done and the rate and size of earthquakes will slowly decrease over

the next six months, or the sequence will continue at more or less the present rate with an occasional 4, a few 5s and perhaps a few more regional hot spots activated. Option 3 is the one of most concern. The sequence is still evolving and one or more significant earthquakes are yet to come. There are a couple of areas that have caught my attention – there's about a 45 miles gap between the 5.2 earthquake near Mono Lake and the 6.5 W. Nevada quake. There's a similar-sized gap between the northern end of the Ridgecrest aftershock zone and the recent 5.8 near Lone Pine. And of course there is the enigmatic Garlock fault to the south, which has so far been very quiet.

Just because we are in the midst of a pandemic and other threats, don't assume this earthquakes are no longer a problem. My prediction – we will have seismic surprises and the best way to counteract any unpleasant effects is to take action to prepare now.

Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. All Not My Fault columns are archived at https://www2.humboldt.edu/kamome/resources and may be reused for educational purposes. Leave a message at (707) 826-6019 or email Kamome@humboldt.edu for questions/comments about this column, or to request a free copy of the North Coast preparedness magazine "Living on Shaky Ground."

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