

The Anatomy Of A Caribbean Earthquake

by Richard Harris, NPR

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Though we don't necessarily think of the Caribbean as earthquake country, it most definitely is.

The earthquake that devastated Port-au-Prince on Tuesday occurred along the boundary of two tectonic plates — great slabs of crust that slide past one another slowly over time.



Alyson Hurt/NPR

Haiti sits on a fault line between huge tectonic plates of the Earth's crust, the North American Plate and the Caribbean plate. The dotted orange lines indicate fault lines.

In this case, the Caribbean plate is moving east in relation to the North American plate. Large earthquakes frequently occur on these plate boundaries.

The Caribbean plate has been moving about a quarter of an inch per year, relative to the North American plate. But the two plates don't simply glide past one another. Strain builds up along faults at the plate boundaries, until it's released in a sudden burst of energy. That's an earthquake.

There are two major faults along Hispaniola, the island shared by Haiti and the Dominican Republic. This earthquake occurred on the southern fault, the Enriquillo-Plantain Garden fault system.

There hasn't been a major quake on this system for about 200 years. That means stress has been building up there for quite some time. When the strain finally grew too large, rock along the fault failed, and released a huge burst of energy in less than a minute.

Geologists are still working on the details, but it appears that 30 to 60 miles of the fault gave way. That not only triggered the original quake but has also generated more than a dozen aftershocks of magnitude 5 or higher. Those are also strong quakes, and they pose a risk to the buildings that were damaged in the original shock.

Aftershocks are common after large quakes, and they continue for days, weeks and even longer — though they become less frequent as time passes.

More Strong Quakes Possible

Earthquakes in this region often originate at a point in the Earth that's relatively shallow. In this case, preliminary estimates say the rupture started about six miles below the surface. Since Port-au-Prince was only about 10 miles away from the quake's epicenter (which is the spot on the surface directly above the origin of the earthquake), the ground motion in the city of 2 million people was especially intense.

Geologists say the fault is a "strike-slip" fault, like the San Andreas in California. That means the relative motion between the two tectonic plates is mostly a side-to-side slip, rather than up and down.

The second fault system on Hispaniola runs mainly on the eastern end of the island, in the Dominican Republic. That Septentrional fault system hasn't experienced a major quake for more than 800 years, but it holds the potential for producing another devastating quake — quite possibly larger than the one that struck Haiti on Tuesday.