

Haiti quake caused by previously unknown fault

New data finds unmapped fault was responsible for magnitude-7.0 temblor

Brett Israel, MSNBC, 8-11-10

A previously unmapped fault was responsible for the magnitude-7.0 earthquake that struck Haiti on Jan. 12, not the fault originally blamed for the temblor, scientists announced Tuesday.

The massive earthquake was responsible for the death of more than 200,000 people and left more than 1.5 million homeless.

When the quake hit, scientists thought there was little doubt about the culprit, said geophysicist Eric Calais of Purdue University, at the American Geophysical Union's Meeting of the America's conference in Brazil.

The Enriquillo fault was quickly blamed, but new data, has revealed a more complicated picture.

"The fault responsible for the earthquake was not the Enriquillo fault, but it was a new fault," Calais said. "This was such a big surprise that I thought all our calculations were wrong."

Since the earthquake, several teams of geoscientists have deployed instruments in the region to provide a detailed, up-close view of how the ground moved during the quake. Researchers analyzed the instrument readings, studied satellite images, investigated offshore evidence and made field assessments of the stricken region.

Earthquakes typically occur along faults, cracks in the rocky plates of the Earth's crust. A 25-mile-long fault segment ruptured during the quake.

The plates that make up the Earth's crust move relative to one another, most of the time at an imperceptibly slow pace — on average plates move between 0.4 and 4 inches per year, which is about as fast as fingernails grow. In the case of the Haiti quake, the Caribbean and North American plates slide past one another in an east-west direction. This is known as a strike-slip boundary, or a vertical fracture where the slabs have mostly moved horizontally.

The preliminary reports suggested that the earthquake that devastated Haiti occurred at the Enriquillo fault that runs right through Haiti and is situated along the boundary between the Caribbean and North American plates. This was based on preliminary observations and previous studies suggesting this fault was primed for a rupture.

The research team found, however, that some of the faults in the area were moving in unexpected directions. The Enriquillo fault is what's known as a vertical fault, but the new data suggests that the earthquake did not happen on a vertical fault, Calais said.

"Most of the slip, if not all, was on the unmapped fault, not the Enriquillo," Calais said.

The Enriquillo-Plantain Garden fault system (EPGFZ) has not produced a major earthquake in recent decades. The EPGFZ is the likely source of historical large earthquakes in 1860, 1770 and 1751, though none of these has been confirmed in the field as associated with this fault.

Scientists aren't sure exactly how dangerous this unmapped fault is. It may be possible that the unmapped fault is part of a whole fault system that was not known before, and there is ongoing research to learn more.

"We need to know that for hazard assessment," Calais said. "It's critical."