

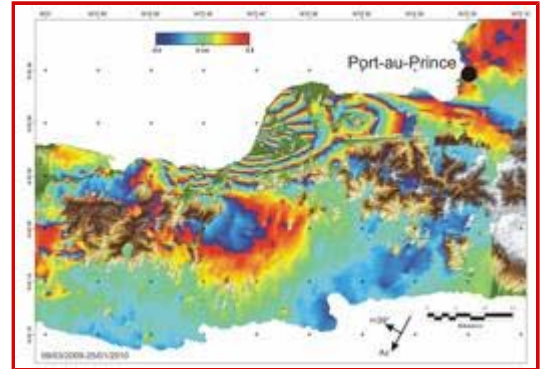
News

Haiti earthquake may have primed nearby faults for failure

Geologists say it's time to start preparing for the next big one.

Lucas Laursen

Geophysicists studying the 12 January earthquake in Haiti met yesterday with United Nations representatives and Haitian president René Garcia Préval to discuss what the latest measurements of the Earth's shape can tell policymakers about future earthquakes. Several such ongoing geodesy studies suggest that the magnitude 7.0 earthquake, which has killed over 170,000 people so far, caused a 30- to 50-kilometre stretch of the fault southwest of Port-au-Prince to slip — possibly adding tension along an unreleased stretch of the same fault that passes even closer to Haiti's capital.



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John Elliott

Eric Calais, a geophysicist at Purdue University in West Lafayette, Indiana, with a long history of carrying out research in Haiti, is coordinating three teams in field surveys and installing Global Positioning System (GPS) markers on churches and police stations — the most secure places to leave the high-tech equipment — to pinpoint movement caused by the earthquake.

"The UN is starting to put together a beginning of a plan to try to engage the Haitian government with support of non-governmental organizations and scientists to change things, to make the rebuild safer," Calais said, just before leaving his tent camp on 1 February for his meeting at Port-au-Prince airport with UN and Haitian government officials.

Other researchers are using seismometers and radar-equipped satellites to locate the earthquake's epicentre and measure surface movement since the earthquake, data that they can plug into models of how tectonic plates release their tension. French researchers are listening in by means of a seismometer in the French embassy in Port-au-Prince and preparing a ship to drop ocean-bottom seismometers near a suspected offshore branch of the fault system.

Stress relief

American and British researchers are building new radar interferometry maps every few days as satellites pass over Haiti. Knowing exactly where an earthquake occurs and the extent of the slipping

helps geophysicists calculate how much of the pent-up stress remains and where it might be concentrated.

“The main problem in Haiti is we don't know much about its history.”

*Yann Klinger
Institute of Geophysics,
Paris*

"The main problem in Haiti is we don't know much about its history," says Yann Klinger of the Institute of Physics of the Earth in Paris. "In other places like North Anatolian Fault or Dead Sea Fault, we see clusters of earthquakes" over thousands of years, giving a baseline of data for stress calculations of these regions.

Geologists have measured relative movements of about 20 millimetres per year between the North American and Caribbean tectonic plates, but that is divided among several faults at their interface, and the details of the shifts are murky.

The Septentrional and Enriquillo faults at the edges of the two plates penetrate deep into the north and south coasts of Haiti, accumulating strain as the two plates try to move past each other. During the earthquake last month, the Enriquillo fault, which passes just south of Port-au-Prince, slid about a metre, releasing some of the accumulated strain.

The last time such a large earthquake struck the region was in the eighteenth century. ADVERTISEMENT Strike-slip earthquakes elsewhere have set each other off on timescales of decades after longer periods of quiet, so geophysicists are keen to improve their model of how an earthquake on one fault segment affects the rest of that fault and its neighbours.

"There is some translational movement, going east and west, but we also detect a convergence component," says John Elliott, of the University of Oxford. "Interferometry should help pin that down," he says, in combination with the GPS and seismometers on the ground. But even a good model can only predict to within a few decades whether another earthquake might occur.

Calais says, "Regardless of what our calculations show, things have to change dramatically as far as earthquake safety." The cost of California- or Japan-style earthquake-resistant buildings might be too high for Haiti, he says. But many houses remained intact amidst collapsed neighbourhoods: "It would be interesting to know whether the cost of the house that collapsed and the house that stayed were the same."

Falk Amelung and colleagues at the University of Miami analysing satellite radar data also suggest that relocating the capital's main infrastructure to the mountains a few kilometres north might help prevent similar devastation in the future.

CORRECTED:An earlier version of the story stated incorrectly that the Enriquillo fault slipped 7 millimetres during the Haiti earthquake. This was actually the annual average strain accumulated by the fault.

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#9407

One would be reminded that frequent predictions of its imminence have been made for decades. Nonetheless, be prepared.

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