Drilling study finds faults after earthquakes heal faster than previously thought

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(Phys.org) —A team of Chinese researchers along with representatives from the US and Japan have found that ground fractures along fault lines due to earthquakes appear to heal faster than previously thought. In their paper published in the journal *Science*, the team reports on data found by boring holes along the fault line responsible for the 2008 Sichuan earthquake in China.

When earthquakes occur due to tectonic plates rubbing against one another, cracks open up in the ground leaving behind what look like wounds. Researchers have been studying these wounds to see if they might offer any new information that would help scientists better understand earthquakes in general. To that end, the researchers in this new effort embarked on a program called the Wenchuan earthquake Fault Scientific Drilling project. Five boreholes were drilled down into various parts of the fault and then sensors were sent down to collect heat and permeability measurements. The boreholes were drilled 178 days after the deadly earthquake in the region struck (which killed over 70,000 people.) At the time of initial drilling, the team found approximately 1 centimeter of new fault gouge, a type of rock that has been pulverized.

Subsequent measurement over a period of 18 months showed that the rock in the fault was slowly becoming less permeable—as the fault healed, water was less able to make its way through the rock. This was expected, of course. What surprised the research team, however, was how quickly the fault was being repaired by mineral deposits left behind

by water flow. They described it as "significantly faster" than lab experiments had shown.

Another surprise was a periodic tendency of the faults to lose ground in their healing process. The rock would suddenly become more permeable, the sensors showed, and then once again become less so as the healing process resumed. The team traced this to other seismic activity such as earthquakes that occurred in Sumatra in 2010 and in Japan in 2011.

The researchers acknowledge their data relates to just one fault zone in the aftermath of one earthquake, but their findings suggest that similar studies should be done following future earthquakes to help determine if what they observed is the normal case for healing fault zones.

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