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Lessons of 2002 Alaska Quake Ominous for L.A.

Scientist says study showing rupture of one fault can trigger earthquakes on others has "big implications for Los Angeles," where two major faults could cause a magnitude-8.

From Associated Press

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Faults that crisscross Southern California may be capable of rupturing in concert to produce larger earthquakes than previously thought, according to several studies of the magnitude-7.9 quake that rocked Alaska last year.

The Nov. 3 Denali quake was the largest to strike on land in North America in nearly 150 years, but caused few injuries and little damage because of its remoteness. It ripped across 210 miles in two minutes, split glaciers and triggered thousands of landslides.

New studies examining the earthquake reveal that it was actually a composite of three smaller quakes that began on one fault, skipped to a second and then moved on to a third. Details appear today in the journal Science.

The findings suggest a similar situation could arise in analogous Southern California, where a rupture on the Sierra Madre thrust fault could trigger an earthquake on the strike-slip San Andreas fault. In strike-slip faults, two blocks move past each other in a horizontal fashion to produce earthquakes. Thrust faults do so when one block pushes upward over another, as if moving up a ramp.

The San Andreas runs nearly the length of California but comes no closer than about 40 miles of Los Angeles. The Sierra Madre passes just miles from downtown Los Angeles.

An earthquake that struck simultaneously on both faults could be as large as magnitude-8, or larger than expected for so close to Los Angeles.

"It could increase the magnitude of earthquakes to plan for," said U.S. Geological Survey geophysicist Donna Eberhart-Phillips, a co-author of the lead study.

James Dolan, an earthquake geologist at the University of Southern California, said the new studies confirm what many had suspected about the simultaneous movement of multiple faults.

"What we have now seen in the Denali earthquake is that indeed moderate earthquakes on a thrust fault can trigger, if the geometry is correct, very large earthquakes on adjacent strike-slip faults," said Dolan, who was not connected with the studies.

The Denali quake also produced shaking of a longer duration and period, which can crack tall buildings and bridges, than do smaller earthquakes, scientists said.

Also, the energy released by the earthquake was focused in the same direction as the southeasterly progression of the rupture of the three faults. Were a similar quake to occur on some segments of the San Andreas, its energy could be focused directly at the Los Angeles region.

Together, that has "big implications for Los Angeles," said Lucy Jones, scientist in charge of the USGS office in Pasadena and another of the lead study's co-authors.

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