

Geologists discover local fault lines connect to San Andreas fault system

Submitted by
Franklin & Marshall College

A team of Franklin & Marshall geologists has discovered a new active fault in northern coastal California, it was announced Wednesday at the annual meeting of the Seismological Society of America in San Francisco. The meeting coincides with the 100th anniversary of the 1906 San Francisco earthquake.

The new fault is located between Fort Bragg and Westport, approximately 240 km north of San Francisco, according to Dorothy Merritts, professor of geology, and lead presenter of the research. This new fault, dubbed the Pacific Star Fault, is part of the San Andreas fault system, and has a similar sense of motion that moves crustal rocks on the western side of the fault to the north with respect to crustal rocks east of the fault.

The other researchers are Robert Walter, of Franklin & Marshall College, Caitlin Lippincott, of San Diego State University (a 2005 graduate of Franklin & Marshall), David Springer of the College of the Redwoods, and Jordan Muller (a 1996 graduate of Franklin & Marshall), NASA-Goddard.

The newly discovered fault was revealed after Merritts and her team analyzed several abandoned paleo-stream channels using GPS ground surveying of marine terraces, fieldwork, and large-scale aerial photos of the area.

"We were originally on a research expedition looking for solitary coral fossil localities in ancient beach deposits," explained Merritts. "David Springer knew of a fossil shell site near the town of Fort Bragg, and in 2003, we took some students out during one of our Keck Foundation-funded projects, and found two solitary coral samples.

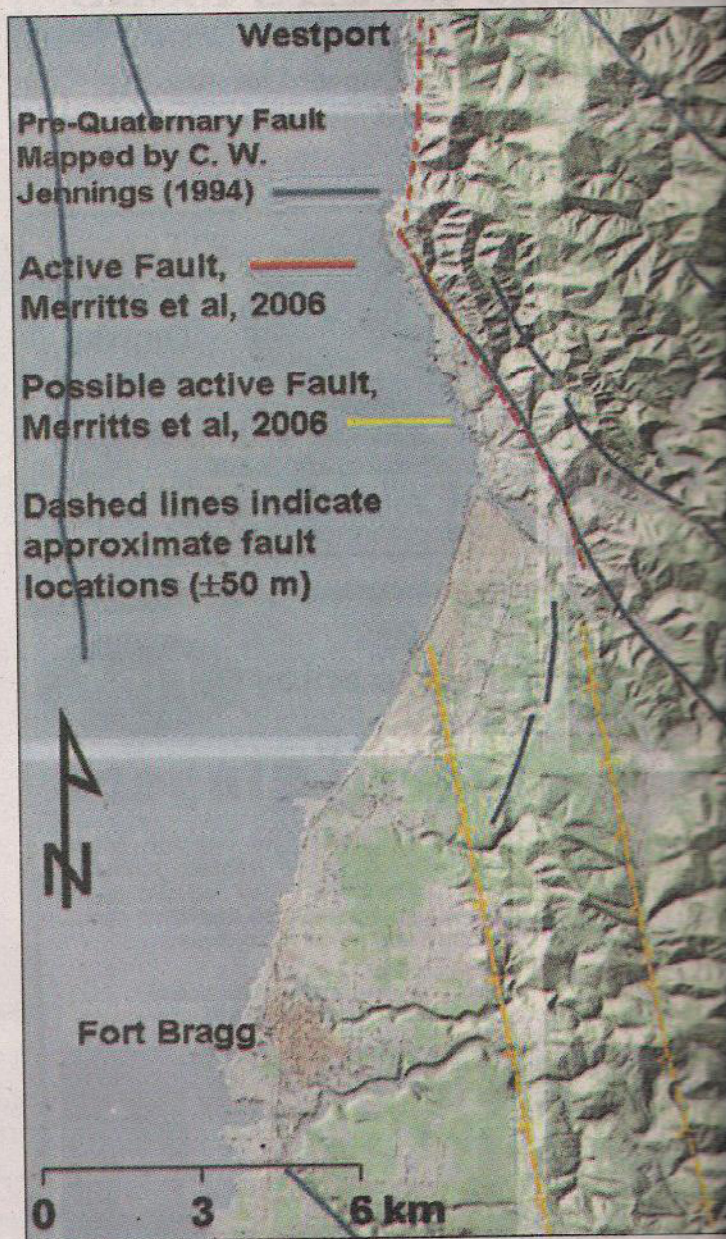
"It was during this trip that we also found evidence of ancient rivers (paleo-channels) that are now completely cut off from their sources. We wondered where these rivers came from and over the next two years did more field work to map the Pacific Star fault, which has caused the offset of the now abandoned stream channels."

After mapping and sampling the area, Merritts' analysis showed one 6-kilometer segment of a previously unmapped strike slip fault (faults along which the slip motion is parallel to the strike of the fault), and a second 8 kilometer segment that was previously mapped as an old fault, but that the work of Merritts and her colleagues now reveals is active. The slip rate on the two contiguous segments is similar.

Additionally, the team found that these faults had relatively significant slip rates (the relative speed with which the two sides of a fault move past each other) — preliminary results indicate about 4 millimeters a year; substantial amounts of cumulative right-lateral strike slip fault offset; and shear zones that range from 1 to 5 meters in width.

The main fault discovered by Merritts, Walter, et al., strikes parallel to the San Andreas Fault and runs directly beneath the Pacific Star Winery north of Fort Bragg.

Merritts and her team plan to continue their research on the Pacific Star Fault in the coming year in order to better understand the hazards associated with the fault system.



A map of the Pacific Star Fault. Part of it was mapped by Charles W. Jennings (CA Fault Map, 1994), but was shown as inactive (pre-Quaternary). New extensions to the fault to the north, and possibly to the south were also identified. The total length is at least 15 km, and perhaps as much as 30 km. Map courtesy of Franklin & Marshall College.