Loma Prieta fault not so weak?

December 19 2007

A new study adds to evidence that the fault responsible for the 1989 Loma Prieta earthquake is not as unusually weak as had been thought.

In general, a "weak" fault is one that ruptures relatively easily, resulting in smaller but more frequent earthquakes, while a "strong" fault can accumulate more strain before breaking in larger shocks, said Robert Twiss, professor emeritus of geology at UC Davis and co-author of the study with Jeffrey Unruh of William Lettis and Associates of Walnut Creek, Calif.

The Loma Prieta fault has been described as unusually weak based on studies of the aftershocks from the 1989 earthquake. By looking at the direction and movement of the aftershocks, researchers could calculate the strains in the fault. Previous studies looked at the aftershocks in total.

Twiss and Unruh took a new approach, breaking the aftershocks up into 17 separate clusters. They found that the fault is complex, with different kinds of deformation in different places. When they looked at the aftershocks in greater detail, they found more stresses in the structure.

"You're losing most of the essential mechanical information about the fault by piling these details together," Twiss said.

The researchers also found that the stresses and slip directions of the main earthquake were reproduced in the aftershocks, implying that the stresses continue to be present.

Twiss said that there is "no way" to predict the strength or timing of future earthquakes on the same fault using these results. But the findings would be relevant for other researchers seeking to build models of earthquake faults in the Bay Area, he said.

The paper was published in the September/October 2007 issue of the *Geological Society of America Bulletin*.

Source: University of California - Davis