Geophysicist laments loss of fault line data

Mark Muckenfuss, Riverside Press-Enterprise, 5-19-11

PASADENA -- Before it happened, seismologists didn't believe the faults off of Sendai, Japan, were capable of generating anything much larger than a 7.5 magnitude earthquake. The March 11 quake that spawned a disastrous tsunami measured 9.0.

A Caltech scientist says that kind of miscalculation isn't a concern when it comes to faults in Southern California. But a coming lapse in satellite surveillance could be.

"This earthquake was a surprise to many of us," said Caltech geophysicist Mark Simons. "Interpretation of geodetic data on land suggested that it was unlikely that the whole plate margin (between the North American and Pacific plates) was stuck together and that only a small section was stuck. That was clearly wrong. We need to make sure that we don't make that mistake again."

Simons spoke last week at the semiannual Earthquake Research Affiliates meeting at Caltech in Pasadena. He said the Sendai earthquake ruptured a 150-mile-long section of the plate boundary, about 12 miles below the surface. It pushed the sea floor up nearly 30 feet, triggering the massive tsunami.

Closer attention to history might have alerted scientists to the temblor.

"A decade ago, some seismologists had recorded a very large event which occurred (in Sendai) in the 9th century," he said. An obscure shrine, called the Splitting of the Waves Shrine, marks the high-water mark of the tsunami generated by that quake. The shrine was built in 869.

Other seismic studies had generally looked only at the past 100 years of activity in the region, which led scientists to predict a much smaller quake than what occurred.

"In this case, clearly we didn't know the past well enough," he said.

Because the plate boundary is under the ocean, Simons said, it's more difficult to map. That's not the case with Southern California's most dangerous faults, such as the San Andreas.

Simons and his colleagues use a combination of GPS and satellite radar data to analyze the movement and stress along earthquake faults. The information only works, however, for movement on land.

"For something like the San Andreas Fault, it can give us exquisite information," Simons said.

The problem is, that information is about to disappear.

One of three satellites that provide the detailed data -- allowing scientists to see changes in the bulging of the Earth, moving magma under the surface and the motion of glaciers and ice sheets, among other dynamics -- recently reached the end of its operational life. The other two are expected to die in the coming months.

"We are now flying blind for the next couple of years," Simons said.

Neither of the two satellites expected to go dark soon belong to the United States, he said, and U.S. officials have no plans to put such a satellite into space.

"The U.S. has never seen fit to launch their own satellite with this capability," Simons said.

He said such information is critical to preparing for and responding to major earthquakes.

"Right now we're losing science," he said. "If an event were to happen on the San Andreas Fault, we wouldn't have that information to put into the mix."

In more practical terms, he said, such a satellite system could be used to quickly assess areas where the greatest damage has occurred comparing pre- and post-quake images. That data, he said, could be used to send emergency crews where they are most needed.

He said he hopes Congress will change its mind about cutting funds to such programs.