East Coast earthquake: How does a 5.9 temblor happen in Virginia?

Fault lines in the East are not as apparent or as active as in the West, but certain stresses can lead to a rupture. Tuesday's East Coast Earthquake was the biggest in 100 years.

By Pete Spotts, *Staff writer* / August 23, 2011

As if tracking hurricane Irene isn't enough, the eastern seaboard was rocked by a magnitude 5.8 earthquake Tuesday afternoon.

Graphic: Map of Virginia earthquake
(Rich Clabaugh/Staff)

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The quake's epicenter sat about five miles southwest of the town of Mineral, Va., in the center of the state. The rupture occurred roughly 3.7 miles under the surface.

Shaking was felt as far west and north as Ohio and Massachusetts and as far south as North Carolina, according to initial shaking reports filed with the US Geological Survey.

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According to USGS seismic hazard data, the area around epicenter of today's quake stands a 70 to 75 percent chance of experiencing a quake of at least magnitude 5 once every 1,000 years or so.

Strong quakes originating along the eastern seaboard are rare, but they happen.

In 1755, a temblor struck off of Cape Ann, north of Boston, with a magnitude now estimated at 5.9.

New York City registered a magnitude 5.5 earthquake in 1884.

Charleston, S.C., experienced a 7.3 earthquake in 1886.

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In 1925, a magnitude 7 quake struck near La Malbaie, Quebec.

The quake was moderate, notes Andre Filiatraut, who heads the Multidisciplinary Center for Earthquake engineering research at the State University of New York at Buffalo. But "it is significant because we haven't had very many earthquakes of this magnitude occurring in the eastern United States or eastern Canada."

The relatively low frequency of moderate-to-strong earthquakes in the eastern US compared with shaking and volcanism along the the West Coast is due to significant differences in the the geological activity taking place beneath their residents' feet.

In California's case, the western edge of the state straddles an active boundary between two enormous plates in Earth's crust – the North American plate and the Pacific Plate. The San Andreas fault and its tributaries mark the boundary with plenty of shaking and mountain-building as the Pacific Plate grinds against its way north against the continent.

Why quakes happen on the East Coast

The eastern seaboard, by contrast, sits in the middle of the North American Plate, but 200 million to 300 million years ago it was along an ancient plate boundary that ran through a connected Europe, Africa, and North America.

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