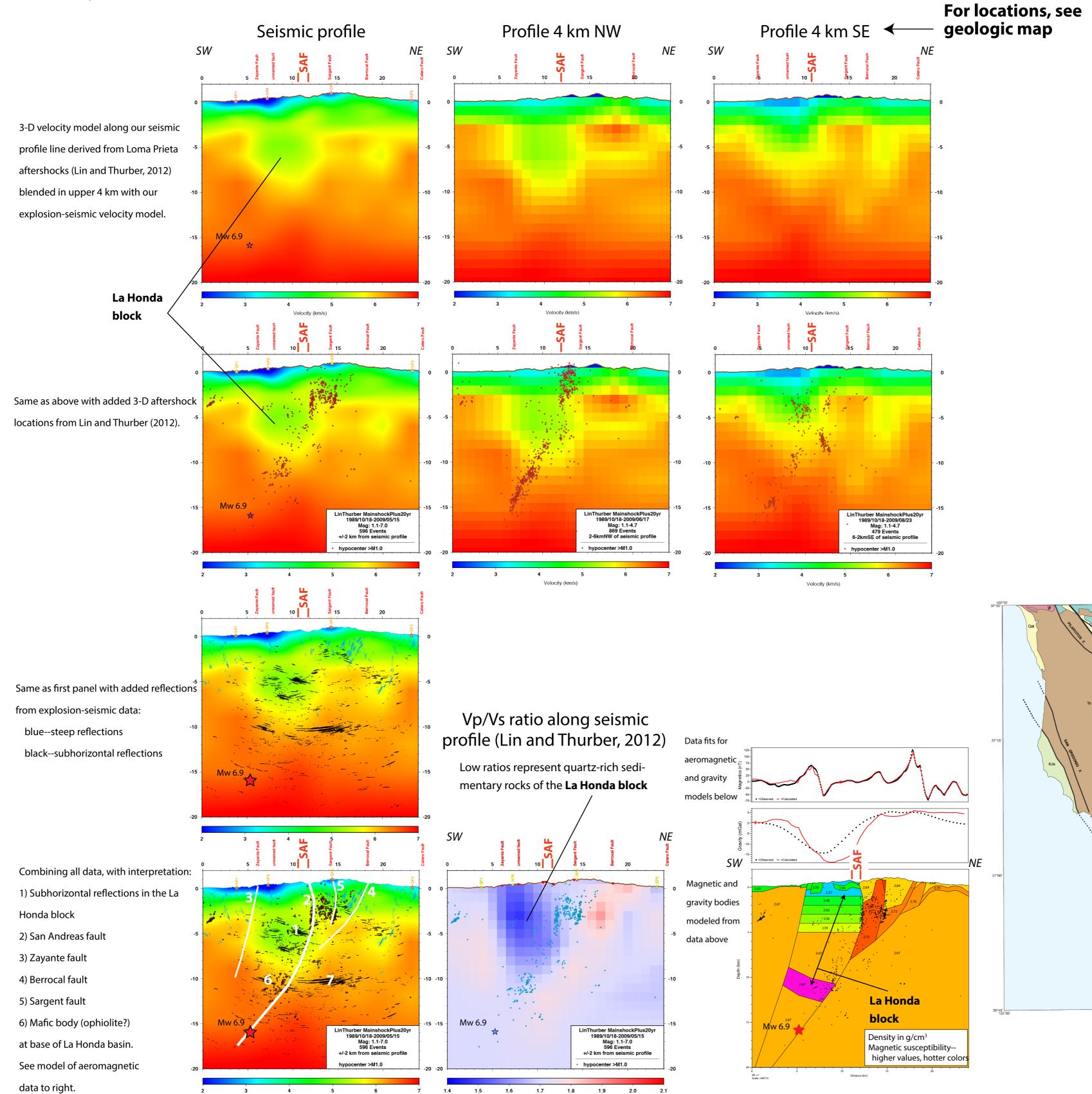
## New insights on subsurface fault and geologic structure at Loma Prieta, central California

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7) ? Possible artifact



## Abstract

In light of recent interpretations of a two-part dip for the San Andreas fault (SAF) in the Coachella Valley, of southern California, we have compiled data sets and analyses in the vicinity of the 1989 Mw 6.9 Loma Prieta earthquake, in central California. These data sets and analyses include the 3-D seismic velocity model and aftershock relocations of Lin and Thurber (2012), seismic reflection and refraction data from a 1991 profile of Catchings et al. (2004), and potential-field data collected by the U.S. Geological Survey following the earthquake. The velocity model and aftershock relocations of Lin and Thurber (2012) clearly reveal a curving geometry for the SAF somewhat similar to that found in the Coachella Valley: the fault dips steeply near the surface and curves with depth to join the moderately SW-dipping main rupture plane below 10-km depth. The Sargent fault, 2-3 km NE of the SAF, is outlined by aftershocks as a steep fault in the upper crust, and the Zayante fault, 6-7 km SW of the SAF, is seen in the velocity model to dip moderately SW into the middle crust. The SAF is a clear velocity boundary, with higher velocities on the NE, attributable to Mesozoic accretionary and other rocks, and lower velocities on the SW, attributable to Cenozoic sedimentary and other rocks of the La Honda basin. The Zayante fault is also a velocity boundary between lower-velocity rocks of the La Honda basin on the NE and Mesozoic granitic rocks of Salinia on the SW. Cenozoic rocks between the SAF and Zayante fault constitute the "La Honda **block."** Modeling of aeromagnetic data produces a geometry for the SAF consistent with the seismic-velocity model, with some suggestion of an initial NE dip near the surface. In addition, these data indicate that the La Honda basin rocks are underlain at ~ 10-km depth by a magnetic body, interpretable as the gabbro of Logan, possibly an ophiolitic basement for these rocks. The Zayante fault, SAF, and Sargent fault are boundaries between rocks of differing reflection character as follows: Salinian rocks are poor in reflections; La Honda basin rocks are characterized by numerous subhorizontal reflections; rocks between the SAF and Sargent fault show a mix of steep and subhorizontal reflections; rocks NE of the Sargent fault are characterized by steeply SW dipping reflections as far NE as the Berrocal fault, located 4 km NE of the Sargent fault. Reflections are detected and migrated using the method of Bauer et al. (2013). In summary, the SAF is quite clearly non-vertical and nonplanar, as in the Coachella Valley.

## Reference

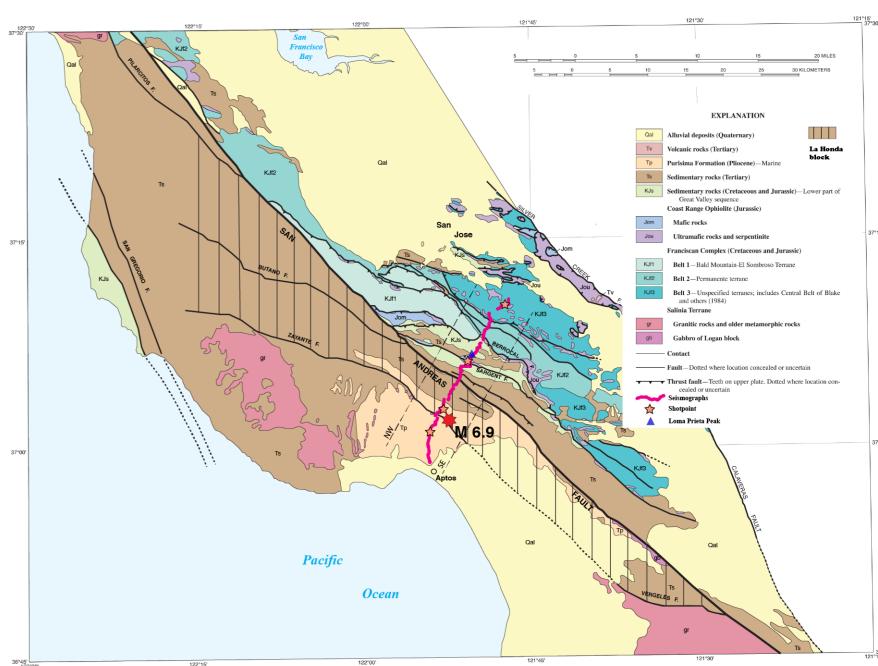
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Generalized Geologic Map of Loma Prieta Area
[after Jachens and Griscom (2004); constructed using geologic mapping by McLaughlin and Clark (2004)]

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