Investigating Earthquake Hazards in the Northern Salton Trough, Southern California, Using Data from the Salton Seismic Imaging Project (SSIP)

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Abstract

The southernmost (San Andreas Fault (SAF) system in the northern Salton Trough (Salton Sea and Coachella Valley) is considered likely to produce a large-magnitude, damaging earthquake in the near future. The geometry of the SAF system is poorly determined, and the slip rate of specific branches of the SAF system is controversial. The Salton Seismic Imaging Project (SSIP) was undertaken, in part, to provide more accurate information on the SAF and basins in this region. We report preliminary results from modeling four seismic profiles that cross the San Andreas Fault. These profiles help to improve our understanding of the fault's earthquake potential.

NSSP Seismic Lines

- CMB: mantle
- 3-D: 3-D imaging
- Top: topography
- Land end of line (km): Land end of line (km)
- 0 - 7: 0 - 7 km
- 10 - 162: 10 - 162 km
- 220 - 272: 220 - 272 km
- 300 - 352: 300 - 352 km
- 360 - 440: 360 - 440 km

The velocity model for Line 6 shows no similar evidence for a NE dip. However, earthquakes from Yang et al. (2012) are consistent with NE dips on these two lines. The velocity model for Line 7 does not show a NE dip.

Reflection data

The velocity model for Line 7 shows no similar evidence for a NE dip. However, earthquakes from Yang et al. (2012) are consistent with NE dips on these two lines. The velocity model for Line 7 does not show a NE dip.

Models

The tomographic velocity models in this column, and also in the next column, were obtained using the inversion algorithm of Hole (1992). Models for Lines 6 and 7 have not been fully tested using alternative starting velocity models, although alternate sets of picks have been used. The model for Line 4 has been fully tested.

On Lines 4-6, we superpose earthquakes from Hausknecht et al. (2012) and focal mechanisms from Yang et al. (2012). In Line 7, earthquakes from Lin et al. (2007). For all lines, projection distances are 2 km on either side of the cross sections.

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The velocity model for Line 7 does not show a NE dip. However, earthquakes from Yang et al. (2012) are consistent with NE dips on these two lines. The velocity model for Line 7 does not show a NE dip.

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