The Salton Seismic Imaging Project: Investigating Earthquake Hazards in the Salton Trough, Southern California.

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The Salton Seismic Imaging Project (SSIP) is a collaborative effort to provide detailed subsurface 3-D images of the Coachella, Imperial, and Mexicali Valleys (the region here called the Salton Trough) of southern California and northern Mexico. Using both active and passive-source seismic data acquired both onshore and offshore in the Salton Trough, these images will provide insights into earthquake hazards, rift processes, and rift-transform interaction at the southern end of the San Andreas Fault system. The southernmost San Andreas Fault (SAF) is considered at high-risk of producing a large damaging earthquake, yet the structure of this and other regional faults and that of adjacent sedimentary basins are not currently well understood. To improve hazard models for southern California, SSIP will evaluate the geometry of the San Andreas and Imperial Faults, structure of sedimentary basins in the Salton Trough, and three-dimensional seismic velocity structure of the crust and uppermost mantle.

Data were acquired during the period of 2 March to 18 March 2011. One-hundred and twenty-six borehole explosions (10-1400 kg yield) were detonated along seven profiles in the Salton Trough region, extending from the Palm Springs, California, area to the southwestern tip of
Arizona, and airguns (1500 and 3500 cc) were fired along two profiles in the Salton Sea and at points in a 3-D array in the southern Salton Sea. Almost 2800 seismometers were deployed at over 4200 locations throughout the Salton Trough region, and 48 OBS’s were deployed at 78 locations in the Salton Sea. Many of the onshore explosions were energetic enough to be recorded and located by the Southern California Seismograph Network (SCSN).

The focus of this abstract is geometry of the SAF and the depth and shape of the sedimentary basins in the Coachella Valley, where the only active-source data date from the early 1960’s. Prior data (potential field, seismicity, InSAR) indicate that the SAF dips moderately to the northeast from its inception at the Salton Sea to Cajon Pass in the Transverse Ranges. Much of SSIP was designed to test models derived from this prior data. The geometry of the SAF has important implications for energy radiation in the next major rupture. We will present initial data from the Coachella Valley region.