

May 19, 2008

2007 SCEC PROGRESS REPORT

Adjoint Tomography of Southern California

We are using our newly developed and implemented 3D adjoint spectral-element method to determine 3D variations in compressional- and shear-wave speeds in southern California. Our data set consists of approximately 200 $M > 3.5$ earthquakes that were well recorded by the broadband stations that comprise the SCSN. We are using an automated picking algorithm to select P, S, Love and Rayleigh wave arrivals. The differences between the data and synthetics are characterized in terms of frequency-dependent phase and amplitude anomalies, which form the dataset for adjoint tomography. We have collected more than 25,000 frequency-dependent automated phase picks. We are initially inverting the body-waves at periods of 2 s and longer, and the surface waves at periods of 6 s and longer. As the fit to the data improves, we anticipate that more-and-more phases will become suitable for measurements, and gradually we will increase the frequency content of the data and the synthetics. The final model will be made available to the SCEC community as part of the USR effort.