



Seismic imaging of the San-Andreas-Fault system at SAFOD

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We have processed active and passive seismic data sets acquired in the vicinity of the San-Andreas-Fault (SAF) system at SAFOD and derived a detailed structural image of the fault system from the surface down to 10 km depth.

On one hand we have processed an active 3-component seismic reflection data set (SAFOD2003). The imaging approach involves the separation of P- and S-waves and the subsequent application of our Fresnel-Volume-Migration technique which is particularly suited to image subvertical reflectors. The results are well resolved seismic images of the crustal structure across the SAF system and in particular in the direct vicinity of the SAFOD drill site.

On the other hand we have processed passive seismic data sets acquired by an 80-level-3C-receiver array in the SAFOD main hole. We have located several seismic events which can be directly linked to the different fault branches. Furthermore we have exploited the reflected/scattered parts within the recorded wavefield by treating the events as pseudo-active sources with the hypocenter as the source point. This allows to apply the same active seismic migration approaches to the corresponding passive seismic wavefield. Hence we have obtained high-resolution images of some faults branches in the vicinity of the borehole and the hypocenter which confirm the active surface seismic findings.

We have combined our results also with additional available information from other geophysical disciplines (borehole, MT, etc.). This yields some new interesting insights into the crustal structure and the dynamics of this mega-shear zone on different scales and in particular in the vicinity of the SAFOD borehole.