Project Abstract

The Southern California Earthquake Center's (SCEC) Community Fault Model (CFM) has defined the three-dimensional configuration of active fault surfaces in southern California. Since this database will be used in future geological studies including earthquake predictive models, validation of the CFM geometries is needed. The CFM, when combined with numerical modeling software, can be used to determine both slip rates and recurrence rates, which can be compared to rates calculated in past studies. The focus of this particular project was to expand the existing three-dimensional boundary element method model of the Los Angeles region to include faults within Southern California's Mojave area (faults east of the San Andreas). Unlike past models, which were driven using remote strain, we drive deformation in southern California by prescribing slip onto the San Andreas and San Jacinto faults. It is believed that the San Andreas fault drives deformation and slip along surrounding faults. We tested this hypothesis by prescribing slip on the San Andreas and San Jacinto fault systems and evaluated the rate and direction in which the remaining faults were slipping. Our results indicate that unless remote strains are also applied, many faults slip in the opposite sense and are not within past slip rate ranges. For example, in our model, contrary to past geologic studies, the Garlock fault is slipping in a right-lateral sense and many other known right-lateral faults are slipping in a left-lateral sense. The zero remote strain boundary condition causes these faults to counter-act the prescribed slip along the San Andreas and San Jacinto faults. The slip sense discrepancies may be alleviated by prescribing both slip along the San Andreas and San Jacinto faults as well as remote strain corresponding to the overall plate motion displacement field.