

COMPARISON OF PALEOSIESMIC AND MODEL PREDICTED SLIP RATES IN SOUTHERN CALIFORNIA

THOM DEDECKO, University of Massachusetts

The area of Southern California around Los Angeles has a population of over 5.6 million with property value estimates totaling hundreds of billions of dollars. In this region there are more than 13 faults that potentially endanger the inhabitants and their property. Understanding interactions of faults is important for insurance companies. This information can be used to predict frequency of seismic events and the location of property damage.

Three-dimensional mechanical fault models for the area of Los Angeles use GPS stations to determine strains in the region. These strains characterize the slip of fault systems. The average slip rates of the model match the paleoseismic slip rates for most of the faults. Though, paleosiesmic slip rates in specific locations have not been compared to the average slip rates of the model. Analysis of this data can indicate possible inaccuracies in the model. In particular, differences in slip rates across the fault and changes in overall slip rates. Analysis can also define where future trenches should be dug to better understand the fault.

Slip rates were collected from trench locations within the Los Angeles region, studied by many researchers. These trench locations were plotted in Google Earth. The Gridlines UTM plugin was used to indicate the UTM coordinate of the plotted trenches. The paleosiesmic slip rates were compared with the model predicted slip rates in 3Dmove at the sites of the collected data. Faults analyzed in this study include: Sierra Madre, Santa Monica, Palos Verdes, Hollywood, Newport, and Los Angeles faults.

The comparison of the paleosiesmic and model predicted slip rates ranged from accurate to heavily inaccurate. The slip rate model predictions of the Newport Fault yielded a 5% error from the paleosiesmic slip rate. Whereas, the Hollywood Fault yielded a 1100% error from the paleosiesmic slip rate. The Sierra Madre Fault yielded a range of 92% error to 456% error. The Santa Monica Fault ranged from 13% error to over 1000% error. The Palos Verde fault ranged from 24% error to 79% error.

Overall, the model predicted slip rates are inaccurate when compared with paleosiesmic slip rates. This inaccuracy could be due to the high degree of error in determining the location of slip on the model and from the researchers' locations. Averaging the model predicted slip rates in a radial area of the paleosiesmic trench locations could produce more accurate results or could further prove inaccuracies in the model.