

Project Abstract

Many large earthquakes are preceded by a regional increase in seismic energy release. This phenomenon, called "accelerating moment release"(AMR), is due primarily to an increase in the number of intermediate-size events in a region surrounding the mainshock. Bowman and King (GRL, 2001) and King and Bowman (JGR, 2003) have described a technique for calculating an approximate geologically-constrained loading model that can be used to define regions of AMR before a large earthquake. While this method has been used to search for AMR before large earthquakes in many locations, most of these observations are "postdictions" in the sense that the time, location, and magnitude of the main event were known and used as parameters in determining the region of precursory activity. With sufficient knowledge of the regional tectonics, it should be possible to estimate the likelihood of earthquake rupture scenarios by searching for AMR related to stress accumulation on specific faults. Here we show a preliminary attempt to use AMR to forecast strike-slip earthquakes on specific faults in southern California. We observe significant AMR associated with scenario events along the "Big Bend" section of the San Andreas fault, suggesting that this section of the fault is in the final stages of its loading cycle. Earthquake scenarios on the San Jacinto fault do not show significant AMR, with the exception of the "Anza Gap". No significant AMR is found associated with the Elsinore fault.