DYNAMIC RUPTURE MODELS OF EARTHQUAKES ON THE BARTLETT SPRINGS FAULT, NORTHERN CALIFORNIA

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ABSTRACT

The Bartlett Springs Fault (BSF), the easternmost branch of the San Andreas fault system north of San Francisco Bay, is known to exhibit aseismic creep along much of its length. Geodetic data for the BSF are mostly sparse and surface creep rates are generally poorly constrained, but two separate geodetic inversions resolve at least one locked patch within the creeping zones. We use the 3D finite element method to construct models of dynamic rupture on both interpretations of the fault, in order to determine the ability of rupture to propagate beyond the locked patch into the creeping regions, and to assess possible magnitudes for BSF ruptures. We find that, for both parameterizations of the fault, regions of aseismic creep limit the extent of coseismic rupture, as a result of contrast in frictional properties between the locked and creeping regions.