

SCEC/SURE: Are Balanced Rock Orientations Controlled by Fracture Patterns?

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Precariously and semi-precariously balanced rocks can serve as indicators of past ground motions in seismically active areas. The focus of my SCEC internship has been on a group of balanced rocks in southern California that run approximately parallel and equidistant between the Elsinore and San Jacinto faults. The majority of these rocks are oriented with their long-axes sub-parallel to the strikes of the faults, or at about 130 degrees from north. A rock oriented as previously described will topple in a fault-perpendicular direction. Current ground motion models predict the highest levels of ground shaking on strike-slip faults to be perpendicular to the faults. Taking this into consideration, it is likely that rocks which are highly sensitive to fault-perpendicular motion, which describes the majority of the rocks found between the two faults, would have already toppled. In order to better understand this peculiarity, I have studied the fractures around five different balanced rocks at three sites. If fractures are randomly orientated, atypical ground motions might be responsible for this pattern of balanced rocks. My results however, show a fault-parallel fracture pattern in the vicinity of the balanced rocks which may influence the formation and stability of balanced rocks.